সপ্তদশ শিক্ষক নিবন্ধন পরীক্ষা-২০২০

কলেজ পর্যায়

সিলেবাস

বেসরকারি শিক্ষক নিবন্ধন ও প্রত্যয়ন কর্তৃপক্ষ (NTRCA)

শিক্ষা মন্ত্রণালয়

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কলেজ পর্যায়

(উচ্চ মাধ্যমিক বিদ্যালয়, কলেজ, মাদরাসা, ব্যবসায় ব্যবস্থাপনা ইনস্টিটিউট ও কৃষি ডিপ্লোমা ইনস্টিটিউট প্রতিষ্ঠানের প্রভাষক / ইন্সট্রাক্টর (টেক) পদে নিবন্ধনে ইচ্ছুক সকল প্রার্থীদের জন্য)

Syllabus for Preliminary Test
বিষয় কোড: ৪০০

পূর্ণমান-১০০, সময়: ১ ঘণ্টা

ক. বাংলা (Bengali): ২৫

ভাষারীতি ও বিরাম চিহ্নের ব্যবহার, বাগধারা ও বাগবিধি, ভুল সংশোধন বা শুদ্ধকরণ, যথার্থ অনুবাদ ও শিরোনাম, সন্ধি বিচ্ছেদ, কারক বিভক্তি, সমাস, প্রত্যয় বিন্যাস, সমার্থক ও বিপরীতার্থক শব্দ, প্রায়োগিক প্রয়োজনীয়তা (বিরাম চিহ্ন, বাগধারা, সন্ধি, কারক, সমাস, কারক বিভক্তি, প্রত্যয়) প্রভৃতি।

খ. ইংরেজি (English): ২৫

Errors in composition, Fill in the blanks with appropriate preposition, Uses of article, verbs, Identify appropriate translation from Bengali to English, Identify appropriate title from story, article, Transformation of sentences, synonyms and Antonyms, completing sentences, Idioms and phrases.

গ. সাধারণ গণিত (General Mathematics): ২৫

পাটিগণিত: সূত্র ও নিয়মাবলী (পাটিগণিত সম্বন্ধীয়) গড়, ঐকিক নিয়ম, লসাগু, গসাগু, শতকরা, সুদকষা, লাভ-ক্ষতি।

বীজগণিত: উৎপাদক, বর্গ ও ঘনসম্বলিত সূত্রাবলী ও প্রয়োগ, গসাগু, বাস্তব সমস্যা সমাধানে বীজগাণিতিক সূত্র গঠন ও প্রয়োগ, সূচক ও লগারিদমের সূত্র ও প্রয়োগ, অনুপাত ও সমানুপাত।

জ্যামিতি: পরিমিতি ও ত্রিকোনমিতি সম্পর্কিত সাধারণ ধারনা, নিয়ম ও প্রয়োগ।

ঘ. সাধারণ জ্ঞান: ২৫

১. বাংলাদেশ সম্পর্কিত বিষয়
২. আন্তর্জাতিক বিষয় ও চলতি ঘটনাবলী
৩. বিজ্ঞান, প্রযুক্তি, পরিবেশ এবং রোগব্যাধি সম্পর্কিত মৌলিক জ্ঞান।

বিস্তারিত বিষয়াবলী:

বাংলাদেশের ভূপ্রকৃতি, জলবায়ু, পরিবেশ, ইতিহাস, ভাষা আন্দোলন, মুক্তিযুদ্ধ, সভ্যতা, সংস্কৃতি, বাংলাদেশের অর্থনীতি, সম্পদ (বন, কৃষি, শিল্প, পানি), যোগাযোগ ব্যবস্থা, বাংলাদেশের সমাজ জীবন, সমস্যা, জনমিতিক পরিচয়, রাষ্ট্র, নাগরিকতা, সরকার ও রাজনীতি, সরকারি ও বেসরকারি লক্ষ্য, নীতি, পরিকল্পনা (অর্থনৈতিক, সামাজিক, স্বাস্থ্য ও শিক্ষা), কর্মসূচি, আন্তর্জাতিক সম্পর্ক, মানব সম্পদ উন্নয়ন, বিশ্ব ভৌগলিক পরিচিতি, জলবায়ু পরিবর্তন ও দুর্যোগ, নবায়ন যোগ্য শক্তি, জাতিসংঘ, আঞ্চলিক ও অর্থনৈতিক সংগঠন, পুরস্কার ও সম্মাননা, আন্তর্জাতিক মুদ্রা সংক্রান্ত, আন্তর্জাতিক রাজনীতি ও আনুষঙ্গিক বিষয়াবলী, স্বাস্থ্য, চিকিৎসা, তথ্য, যোগাযোগ ও প্রযুক্তি, প্রাত্যহিক জীবনে বিজ্ঞান (পদার্থ, রসায়ন ও জীব বিজ্ঞান সংশ্লিষ্ট) সাধারণ রোগ ব্যাধি ও পরিবেশ বিজ্ঞান সংশ্লিষ্ট।

কলেজ পর্যায়

(উচ্চ মাধ্যমিক বিদ্যালয়, কলেজ, মাদরাসা, ব্যবসায় ব্যবস্থাপনা ইনস্টিটিউট ও কৃষি ডিপ্লোমা ইনস্টিটিউট প্রতিষ্ঠানের প্রভাষক / ইন্সট্রাক্টর (টেক) পদে নিবন্ধনে ইচ্ছুক সকল প্রার্থীদের জন্য)

Syllabus for Written Examination

পদের নাম: প্রভাষক

বিষয়ঃ বাংলা (Bengali)

বিষয় কোড- ৪০১

পূর্ণমান-১০০

১. নিম্নলিখিত রচয়িতাদের জীবনী ও উল্লেখযোগ্য রচনাবলিঃ চন্ডীদাস, মুকুন্দরাম, আলাওল, ভারতচন্দ্র, ঈশ্বরচন্দ্র বিদ্যাসাগর, মধুসূদন দত্ত, বঙ্কিমচন্দ্র চট্টোপাধ্যায়, মীর মোশাররফ হোসেন, কায়কোবাদ, রবীন্দ্রনাথ ঠাকুর, প্রমথ চৌধুরী, শরৎচন্দ্র চট্টোপাধ্যয়, কাজী নজরুল ইসলাম, জসীম উদ্দীন, জীবনানন্দদাশ। **২. বাংলা সাহিত্যের বিভিন্ন ধারাঃ** পদাবলি, মঙ্গল কাব্য, জীবনী কাব্য, রোমান্টিক উপাখ্যান, অনুবাদ কাব্য, দোভাষী কাব্য, মহাকাব্য, গীতি কবিতা, উপন্যাস, নাটক, ছোটগল্প। **৩. বাংলার ব্যাকরণ ও রচনাঃ** ক. বাগধারা খ. সমার্থক শব্দ গ. বিপরীতার্থক শব্দ ঘ. ছন্দ, অলংকার ঙ.ণ-ত্ব বিধান ও ষ-ত্ব বিধান, বাংলা বানানের নিয়ম ইত্যাদি। **৪. বাংলা ভাষার সাধারণ পরিচয় (ইতিহাস)। ৫. বাংলাদেশের সাহিত্য ঃ** কবিতা, উপন্যাস, নাটক, ছোটগল্প।

পদের নাম: প্রভাষক

বিষয় ঃ ইংরেজি (English)

কোড ঃ ৪০২

পূর্ণমান-১০০

1. **History of English Literature:** Candidates are required to have a general knowledge of English Literature from Elizabethan period to Modern period i.e. Christopher Marlowe to T.S. Eliot with special reference to the major movements and genres during different period.
2. **Literary terms:** Epic, drama, novel, tragedy, comedy, tragi-comedy, short story, romance, allegory, ode, ballad, lyric, pastoral poetry, dramatic monologue, elegy, sonnet, mock-epic, satire, three unities, miracle and morality plays, fable, interlude, soliloquy, poetic justice, parable.
3. **Figures of Speech:** Simile, metaphor, image, irony, analogy, symbol, conceit, wit, personification, hyperbol, paradox, epigram, climax, anti-climax.
4. **Individual Authors:** Candidates are expected to be familiar with the major works of the following authors - i. William Shakespeare, ii. John Milton, iii. Jonathan Swift, iv. Alexander Pope, v. Charles Dickens, vi. William Wordsworth, vii. S.T. Coleridge, viii. John Keats, ix. P.B. Shelley, x. Byron, xi. E.M.Forster. xii. Bernard Shaw and xiii. T.S. Eliot.
5. **Formal letter, letter to editors, complaint, request, job application**
6. **Summary writing**
7. **Grammar**

   Any two from the following terms: i. Changing words from one parts of speech to another and making sentence with them. ii. Synonyms and Antonyms and making sentences with them. iii. Completing sentences.

পদের নাম: প্রভাষক

বিষয় ঃ অর্থনীতি (Economics)

কোড ঃ ৪০৩

পূর্ণমান-১০০

Micro Economics

1. **Introduction:** Definition, nature and scope of Economics, Micro Economics and Macro Economics. Positive Vs. Normative Economics. The basic problems of Economic organization. Production and exchange. Production possibility frontier. The market mechanism.
2. **Supply and Demand:** Concept of supply and demand and their determinants. Market equilibrium and shifts of market equilibrium. Consumer's and producer's surplus. Concepts and measurements of various elasticity of demand and supply.
3. **The Theory of Consumer Behavior:** Utility-total and marginal utility, cardinal and ordinal utility. Law of diminishing marginal utility. Equimarginal principle and derivation of demand curves.
4. **Theory of production:** Production function. Fixed Vs. variable factors of production. Short run and long run, total, average and marginal product. The law of diminishing returns; Returns to scale, technological change.
5. **Theory of Cost and Revenues:** Short and long run cost functions. Implicit and opportunity cost. Fixed and variable costs. Total, average and marginal cost. Envelope curves. The link between production and economic profit. Profit maximizing conditions.
6. **Market:** Perfect competition and monopoly, short and long run equilibrium of firm and industry, Profit maximization, Shut down condition, Resource allocation and economic efficiency.

Macro Economics

1. **Macro Economics Overview:** Objective and instrument of macroeconomics. Fundamental concepts of macroeconomics. Potential GNP. GNP gap, Okun's law, natural rate of unemployment. Business cycles. Budget deficit and international deficit, aggregate demand and aggregate supply.
2. **National Income Accounting:** Circular flow of income. Injections and leakages, Different concepts of national income-GNP, GDP, NNP, NI at factor price, market price and constant price, personal income, disposable income, real and national GDP. Net Economic Welfare (NEW): The Consumer Price Index (CPI) & the GDP Deflator. The methods and problems of computing national income.
3. **Consumption and Saving Function:** Concepts of MPC, APC. MPS, APS. Short run and long run viewkuznet's Puzzle.
4. **Inflation:** Measures of inflation, causes of crutlation, source of inflationary pressure, consequences of inflation, deflation.
5. **Money and Monetary Policy:** Meaning of money, different concepts of money (M1. M2. M3), credit creation by banking system, function of money, demand and supply of money, velocity of money, long run impact of money on prices, short run impact of money on output, changes in income velocity, monetary policy.
6. **Fiscal Policy:** Theory of fiscal policy, relationship of fiscal policy to monetary policy. problems in implementing fiscal policy.

পদের নাম: প্রভাষক

বিষয় ঃ রাষ্ট্রবিজ্ঞান (Political Science)

কোড ঃ ৪০৪

পূর্ণমান-১০০

a. Political Science: Nature, Scope and Method and its relation to other Social Sciences. b. Selected Thinkers: Plato, Aristotle, Machievelli, Hobbes, Locke, Rousseau, J.S.Mill and Karl Marx. c. Comparative Political Systems: U.K, U.S.A. d. Constitution: Its meaning and significance: Methods of establishing constitution. Requisites of a good constitution. Comparative study of constitutional features of U.K., U.S.A; India and Bangladesh. e. Forms of Government: Democracy and Dictatorship; Unitary and Federal: Parliamentary and Presidential Governments. Organs of Government: Legislature: Executive and Judiciary: Separation of Powers; Electorate: Political Parties and Public Opinion. f. Emergence of Bangladesh: Language Movement of 1952: Elections of 1954; Autonomy. Movement and the 6 - Point Programme: Mass upsurge of 1969; Election of 1970; War of Liberation and birth of the new nation. Bangladesh Constitution 1972; Major features; Working and amendments. g. **Major Political Trends:** Awami League Government; Military intervention and the Zia Regime; Ershad Rule and the struggle for democracy: The role of political parties; Elections of 1991, 1996 and 2001 and the formation of Parliamentary Government.

পদের নাম: প্রভাষক

বিষয় ঃ ইতিহাস (History)

কোড ঃ ৪০৫

পূর্ণমান ঃ ১০০

Part-1: History of Bengal (Selected topics)
a. Pala rule in Bengal: Rise of the Palas; Dharmapala, Devapala and Mahipala l, b. The Mauryan Empire: Sources of Mauryan History, Chandragupta Maurya: Origin life, extent of his Empire, administrative system and achievements. c. The Gupta: Rise of the Guptas, Chandragupta-l, Samudragupta. Chandragupta - 11 (Vikramaditya of the Legend), the Account of Fa-hien, Gupta administration, Gupta Civilization. Golden Age of Ancient India, Later Gupta Kings and the Downfall of the Guptas. d. Muslim Rule in Bengal: Bakhtiyar Khalji, Iliyas Shah, Alauddin Hussain Shah; Mughal occupation of Bengal and the Bara Bhuiyas, Shayesta Khan and Murshid Quli Khan. e. British rule in Bengal: Battle of Palashi, Permanent Settlement. Reform movement in Bengal, Partition of Bengal, 1905.
Part-2: History of the Indian Sub-continent (Since 1526) (Selected topics): a. **History of civilization:** Indias valley and Vedic civilization; b. **Mughal rule:** Babur, Humayun and Sher Shah, Akbar, Jahangir, Shahjahan, Aurangzeb, fall of Mughal rule. c. **British rule:** Battle of Buxer and the grant of Diwani: Consolidation of British rule: Waren Hastings and Cornwallis, Expansion of British rule Wellesley and Dalhousi, Social and Administrative reforms: Ripon and Bentinck, War of 1857. Growth of Nationalism: Indian National Congress, the Muslim League, Swadeshi and Khilafat Movements. Acts of 1919 and 1935, Lahore Resolution and the Partition *of* 1947.
Part-3: Emergence of Bangladesh: Language Movement of 1952. Election of 1954 and the United Front Ministry. Six-point movement and the mass upsurage of 1969, in Liberation war and the Emergence of Bangladesh 1971.

পদের নাম: প্রভাষক

বিষয় ঃ ইসলামের ইতিহাস ও সংস্কৃতি (Islamic History & Culture)

কোড ঃ ৪০৬

পূর্ণমান-১০০

a. Social, political and economic conditions of Arabia at the time of the advent of Islam. b. Rise of Islam: Prophet Muhammad (Sm.), the pious Caliphate. c. The Ummayads: Muabivah, Abdut Malek, Al-Walid, Umar bin Abdul Aziz, fall of the Ummyads. d. Rise of the Abbasids: Al-Munsur, Harun-ur Rashid, Al Mamun fail of the Abbasids. e. Rise and Fall of Muslim Rule in Spain. f. Arab conquest of Sind, Mahmud Ghaznavi, foundation of Muslim rule in India: Muhammad Ghori. Qutubuddin Aibak, Iltutmish, Balban, Alauddin Khalji, Muhammad bin Tughluq, fall of the Delhi Sultanate. g. Advent of the Mughals: Babor, Humaun and Sher Shah, Akber, Jahangir. Shalijahan, Aurangeb, Advent of the Europeans: Battles of Palashi and Buzar, War of Independence, 1857. h. Religion: Five pillars of lslam The Quran, Hadith, Four Sunni Schools of law, Shifilcs, Kharijites. Mutazilites, Ashantes, Kuslim Jurisprudence. i. Muslim art: Attitude of Islam Towards Art and Painting - Early paintings in Islam: Sources & Subject-Niatter of Muslim painting, Schools of painting and their Characteristics. j. Pattern of Muslim architecture: Prophet's Mosque at Madinah. Great Mosque of Damascus- Place of Qusayr Amra. Cardova Mosque. Abbasid Mosques at Samarra, Shahi Jam E Mosjid. Delhi-Taj Mahal of Agra, 60 Dorned Mosque at Bagerhat, Panch Bibi's Tomb at Lalbagh (Dhaka).

পদের নাম: প্রভাষক

বিষয় ঃ দর্শন (Philosophy)

কোড ঃ ৪০৭

পূর্ণমান ঃ ১০০

(i) **Introduction:** The nature and scope of philosophy, its relation to science, religion and life. (ii) Epistemology Rationalism, Empiricism, Criticism (kant) and Intuitionism. Idealism Vs. Realism. (iii) Theories of Evolution: Creation and Evolution, Mechanical and Emergent Evolution. (iv) Theories of Reality: Spiritualism, Materialism and Idealism, Monism and Pluralism. Philosophy of Mind: Mind as a substance, The Idealist and the Materialist theories of the self. Theories of the mind body relation. (vi) God: Deism, Pantheism and theism, Proofs for the Existence of God. (vii) Traditional Logics: Definition; Deductive and inductive logic, sentence and proposition A.E.LO, Propositions. Different aspects of syllogism. (viii) Symbolic Logic: What is symbolic Logic, Truth and Validity, Different kinds of Arguments, Truth Table, Formal Proofs of Validity. (ix) Some Theological Trends of Muslim philosophy: The Qadarites, The Jabarites, The Mutazilas and The Asharites and their Philosophical views. (x) The Muslim Thinkers: AI-Kindi, Al-Farubi, lbn-e-Sina and Al-Ghazali. (xi) Indian Philosophy: The philosophy of Charaka, The Buddhism and the philosophy of Vedanta. (xii)Moral Theories: Moral Judgement, Motive and Intension. Theories of Moral Standard: Perfectionism, Kants theory of categorical Imperative, Hedonism and Utilitarianism. (xiii) Some Contemporary Trends: Existentialism, Analytic Philosophy and Pragmatism.

পদের নাম: প্রভাষক

বিষয় ঃ সমাজবিজ্ঞান (Sociology)

কোড ঃ ৪০৮

পূর্ণমান ঃ ১০০

(i) The Sociological Perspective: The origins and growth of sociology, nature and scope, theoretical perspectives. Sociology and other social sciences. (ii) The Process of Sociological Research: Sociology and scientific research, the research process, Sociology as science, research method and techniques. Objectives and ethics in social research. (iii) Culture: Definitions, components of culture, the diversity and unity of culture, cultural integration and cultural change. (iv) Social Institutions: Family and marriage, definitions, forms and functions of family, types of marriage, recent trends in family and marriage; Economic Institutions: Contemporary economic systems capitalism, socialism, economic system of developing countries property; Political Institutions: state, political systems, power, authority, leadership, political parties, bureaucracy, nature of civil society and democratization in developing countries; religion: definition, varieties theories, religion and social change, mass media, growth of media press radio, television, internet, impact of mass media and global culture. (v) Society and Social Structure: The Units of social structure-status role groups, institutions; types of societies: hunting and gathering societies. Horticultural societies, pastoral societies, agrarian societies, industrial societies, post industrial/post-modern societies. (vi) Social Differences and Social Inequality: Principles of stratification major forms: slavery, estate, caste, class and status group: theories of stratifications: functionalist theories, conflict theories, Lens Ki's theory. Social structure and differentiation; by age, gender, ethnicity, social class and social mobility: stratification pattern in Bangladesh. (vii) Socialization: Definitions, formation of the self-James cooley and the social self, mead and the self process, Goffman and the presentation of self; Socialization process, agents of socialization. (viii) Deviance and Social Control: Nature of deviance and crime. sociological theories of crime and deviance; Social control - agencies of social control: Religion, art, public opinion, education, mass media custom and law, state and government. Family, Agencies of social control with particular reference to Bangladesh. (ix) Population, People and Their Environment: Basic demographic concepts, the growth of populations, theories of populations, composition of the population. Population patterns in modern and developing nations; population resources and the environment; human impact on the natural world; environmental movements. (x) Urban Development and Community: Urban versus rural life- the origin and growth of the cities, urbanization after the industrial revolution, urban life and change, metropolitan problems and the urban crisis. (xi) Social change: Definitions, sources of change, social change and modernization. Types of change major theories of change: change, progress and evolution. Social History of Bangal: Impact of Muslim rule, British rule and its impact, developments of middle class, emergence of Bangladesh, tribes of Bangladesh. Racial characteristics of the population of Bangladesh, rural development in Bangladesh, role of BARD and other similar organizations in rural development including NGO's.

পদের নাম: প্রভাষক

বিষয় ঃ সমাজকল্যাণ/সমাজকর্ম (Social Welfare/Social Work)

কোড ঃ ৪০৯

পূর্ণমান-১০০

a. Definition, objectives, history and scope of modern Social Welfare and Social work. Religious teachings and Welfare-Islam, Hinduism. Buddhism- Christianity. b. Nature of social work in pre and post industrial society with special reference to lndo-Pak-Bangladesh sub-continent. c. Industrial Revolution and its impact on social life: the emergence of new social problems and social services, d. Basic human needs: Food, clothing, shelter, health, education and their bearing on human life and welfare, with special reference to Bangladesh. e. Major social evils and social problems in Bangladesh: poverty, unemployment, ill health, beggary, over-population, illiteracy, drug addiction, crime and delinquency, slum and urban problems, family violence, child labour, gender discrimination, immoral trafficking, their causes, effects and remedies. f. Constitutional guarantee of social welfare and social security in Bangladesh, Social welfare in the national five year plans of Bangladesh g. Definition, scope, principles and significance of Social Case work, Social Group Work- Community Organization and Community Development. h. Social Case work as a problem-solving process its elements, steps methods and significance of Rapport. i. Social Group Work. Community Organization and Community Development as a problem solving process: its elements, steps, methods and importance. Definition and role of Social Administration. Social Research and Social Action in promoting Social Welfare in Bangladesh. k. Significance of Social legislations to bring about Social reforms in Bangladesh. l. Some national NGO's and international agencies working in Bangladesh: Their composition, role, contribution and future prospects in national development: BRAC, Grameen Bank, Proshika, ADAB, Bangladesh Diabetic Association. Bangladesh Probin Hitoishi Shangha, CARE, World Vision, Bangladesh Red Crescent Society.

পদের নাম: প্রভাষক

বিষয় ঃ মনোবিজ্ঞান (Psychology)

কোড ঃ ৪১০

পূর্ণমান ঃ ১০০

1. **Introduction:** Definition and nature of Psychology. Psychology as a Science. Fields of Psychology: Experimental, Physiological, Clinical, Counseling, Industrial, Educational, Social and Development Psychology. Methods of Psychology: Experimental, observational, Clinical, Case histories, Survey Method.
2. **Learning:** Definition and nature of Learning. Factors of Learning. Classical Conditioning, Operant Conditioning, Cognitive Learning, Latent Learning, Insightful Learning: Memory and forgetting, Ways of measuring memory. General causes of forgetting.
3. **Perception:** The nature of Perception. Selectivity in Perception.
1. **Form Perception:** Figure and ground, contour, Perceptual organization. Depth perception: Monocular and Binocular cues to depth perception. Perception of movement, Illusion and Hallucination.
4. **Motivation and Emotion:** Defining Motivation, Motivation Cycle, and Classification of motives, Biological motives, Social motives, and Motivation theories. Nature of emotion, Theories of emotion, Physiological changes in emotion. Behavioral changes in emotion, Dealing with emotional behaviour.
5. **Personality and Intelligence:** Nature of personality. Determinants and Measuring of personality. Type of personality. Definition of Intelligence. Concept of I.Q. Measurement of Intelligence.
6. **Socialization:** Nature of Socialization. Process and agents of socialization. Effect of Socialization. Impact of Culture on Personality.
7. **Attitude and Job satisfaction:** Characteristics and components of attitude. Formation and change in attitude. Measurement of attitude and Job satisfaction.
8. **Measurement and Evaluation:** Need for measurement. Goals of the student evaluation system. Characteristics of objective and Essay type tests.
9. **Group and intergroup behaviour:** Group dynamics, crowds, Rumour. prejudices. Group cohesiveness, Sociometry inter group behaviour Conflict commitment, power and politics.
10. **Leadership:** Definition approaches to the study of leadership, functions and types of leaders; Effective leadership and its determinants. Leadership theories.
11. **Psychology of being a teacher:** Characteristics and behaviours of effective teacher. Teacher as a Learner, Teacher-Student interaction, Teacher Centered approach to learning.

পদের নাম: প্রভাষক

বিষয় ঃ সংস্কৃত (Sanskrit)

কোড ঃ ৪১১

পূর্ণমান-১০০

১. **অনুবাদ ঃ** ক. বাংলা অথবা ইংরেজি থেকে সংস্কৃত অনুবাদ। খ. সংস্কৃত থেকে বাংলা অথবা ইংরেজিতে অনুবাদ।

২. **ব্যাকরণ ঃ** সন্ধি, কারক ও বিভক্তি, সমাস, আটমানচ্পদ বিধান, স্ত্রীপ্রত্যয়, অব্যয় এবং তদ্ধিত।

৩. **ছন্দ প্রকরণ (Posody) ঃ** ইন্দ্রভজরা, উপেন্দ ভজরা বিদ্যুণমালা, শিখারানী, মালিনি, বাসন্তাতীলাকা, রাথোদ্ধাতা, হারিনাল, বামশাস্থবিলা, মন্দাক্রান্ত রুচিরা, ভুজং গোপ্রায়াতা, আর্যশালিনি, শার্দুলাবিক্রিরিতা।

৪. **সাহিত্য ঃ** স্বপ্রভাসাবাদাত্তা, অভিজ্ঞান শকুন্তলা, মেঘদূত, কিরতূর্যনিয় কান্তে -১।

৫. **সংস্কৃত সাহিত্যের ইতিহাস।**

পদের নাম: প্রভাষক (পদার্থবিদ্যা)

বিষয় ঃ পদার্থবিদ্যা (Physics)

কোড ঃ ৪১২

পূর্ণমান-১০০

Exam Duration: Three Hours

Instructions:
Candidates will have to answer 10 questions prepared from 10 units each carrying 10 Marks. Each question will have 2 to 4 sub-items (e.g. a, b, c, d). The distribution of marks for each question can be 2+3+5, 2+4+4, 2+2+6, 2+2+3+3, 1+2+3+4, 3+3+4, 4+6 or 5+5 . Questions will be prepared following Bloom's taxonomy of cognitive learning. A minimum of 20% marks should be allotted to higher order questions which require analyzing, evaluating, complex problem solving or creating/synthesizing. There will be alternatives for three (3) questions; an alternative question must be prepared from the same unit with same structure covering same sub-domain and mark distribution.

Assessment Targets The candidates will be able to …	**Contents**	**Marks**
• state and explain concept and terms regarding vector, motion, work and energy. • relate the concept with the real-life phenomenon regarding vector, motion, work and energy. • formulate mathematical expression related to the context of vector, motion, work and energy. • demonstrate the problem-solving ability in relation to vector, motion, work and energy.	**Unit: One** **Vector Analysis:** Concept and Applications of Vectors and scalars; Dot and Cross product, Vector Differentiation, Gradient, Divergence, Curl and Vector Integration. **Laws of Motion:** Projectile Motion**,** Newton's laws of motion and their application, Frictional forces, Impulse and Momentum, Conservation of liner momentum, Elastic and Inelastic collisions. **Work and Energy:** Work and Kinetic Energy, Conservative and Non conservative Forces, Work done by Gravitational force & Spring force, Work and potential energy, Gravitational potential energy, Work-energy theorem, Conservation of energy. **Rotational Motion:** Rotational Variables, Torque, Moment of inertia and its calculation, Kinetic energy of rotation, Angular Momentum and its conservation, Radius of gyration.	10
• state and explain concept and terms regarding gravitation and properties of matter.	**Unit: Two** **Gravitation:** Newton's law of Gravitation; Gravitation near earth surface; Gravitation inside earth; Effect of spherical distribution of mass, Planets and satellites: Kepler's laws, Orbits and Energy.	10

Assessment Targets The candidates will be able to …	**Contents**	**Marks**
• analyze real world phenomena with the concept of gravitation and properties of matter. • formulate mathematical expression related to context of gravitation and properties of matter. • demonstrate the problem-solving ability regarding the concept of gravitation and properties of matter.	**Elasticity:** Stress and Strain, Hook's Law, Determination of Young's and Rigidity modulus, Torsion of a cylinder, Bending moment and cantilever. **Surface Tension:** Molecular concept, surface energy and surface tension, angle of contact, Determination of surface tension by capillary method. **Viscosity:** Streamline and turbulent motion, Bernoulli's Equation, Poiseuille's equation, Determination co-efficient of viscosity using capillary flow method.	
• state and explain the concept and terms of heat and thermodynamics. • relate the concept with the real-life phenomenon in relation to heat and thermodynamics. • formulate mathematical expression in relation to heat, thermodynamics, statistical mechanics and radiation. • demonstrate the problem-solving ability in relation to heat, thermodynamics, statistical mechanics and radiation.	**Unit: Three** **Heat & Thermodynamics:** Temperature and Heat, Zeroth Law of Thermodynamics, First Law of Thermodynamics, Kinetic Theory of Gases, Mean Free Path, Van der Waals equation of State, Degrees of freedom and Molar Specific Heat, Distribution of Molecular Speed, Reversible & Irreversible Processes, Entropy, Change in Entropy, Second Law of Thermodynamics, Engine and Refrigerators. **Statistical Mechanics:** Concept of Microstates and Microstates, Statistical Ensemble, Maxwell-Boltzmann distribution, Bose-Einstein distribution, Fermi-Dirac distribution. **Radiation:** Concept of Black Body and Black Body Radiation, Stefan-Boltzmann's Law, Wien's displacement law, Rayleigh-Jean's law, Planck's law.	10
• state and explain concept and terms regarding	**Unit: Four** **Electromagnetism:** Coulomb's law & Gauss's law.	10

Assessment Targets The candidates will be able to …	**Contents**	**Marks**
electromagnetism. • analyze real world phenomena with the concept of electricity and magnetism • formulate mathematical expression in relation to electromagnetism. • demonstrate the problem-solving ability related to the concept of Electromagnetism.	Electric field and Potential due to Point charge & Dipole. Capacitors and Dielectric, Calculation of capacitance for parallel-plate capacitor, Dielectric and Gauss's law, Electrical Energy, Ohm's law and Kirchhoff's law, Whetstone bridge principle and its applications. Magnetic Force on a current, Torque on a current loop, Ampere's law & Biot-Savart law and their application, Faraday's law & Lenz's Law of Induction and their Applications, Magnetic Properties of Matter, Maxwell's Field Equations.	
• interpret concept and terms regarding waves, oscillation and optics. • relate the concept with the real-life phenomenon to the concept of waves, oscillation and optics. • formulate mathematical expression in relation to waves, oscillation and optics. • demonstrate the problem- solving ability regarding waves, oscillation and optics.	**Unit: Five** **Waves:** Transverse and Longitudinal Wave, Wave Equation, Interference of Waves, Standing Waves and Resonance, Beats, The Doppler Effect, Applications of waves in real life. **Oscillation:** Simple Harmonic Motion, Energy in SHM, Lissajous Figures, Damped SHM, Forced Oscillations and Resonance. **Optics:** Light and the electromagnetic spectrum, Young's Interference experiment, Intensity in single & double slit experiment, Fresnel and Fraunhofer class diffraction, Diffraction- Single slit, double slit, Plane and circular polarization, Optical phenomena in real life, Dispersion, Optical Fiber in Communication.	10
• explain concept and terms regarding theory of relativity, atomic physics and Laser. • analyze real world phenomena with the concept of theory of	**Unit: Six** **Theory of Relativity:** The experimental background of the Theory of Special Relativity; The Michelson–Morley experiment; The postulates of Special Theory of Relativity; Time dilation; length contraction; Relativistic Mass and Momentum; Mass and energy equivalence; the General Theory of Relativity.	10

Assessment Targets The candidates will be able to …	**Contents**	**Marks**
relativity, atomic physics and Laser. • formulate mathematical expression in relation to theory of relativity, atomic physics and Laser. • evaluate the importance of concepts and applications regarding theory of relativity, atomic physics and Laser.	**Atomic Physics:** The nuclear atom, electron orbits, atomic spectra, The Bohr Atom, Energy levels and spectra. **Laser:** Basic principles of laser; Stimulated absorption, spontaneous and stimulated emission; population inversion and optical pumping; Helium-Neon laser; Application of laser.	
• explain concept and terms regarding quantum mechanics. • relate the concept with the real-life phenomenon in relation to quantum mechanics. • formulate mathematical expression in relation to quantum mechanics. • Justify the importance of concept and applications regarding quantum mechanics.	**Unit: Seven** **Particle Properties of Waves:** Blackbody radiation; Photoelectric effect; Einstein photon theory; The Compton effect; Pair production and pair annihilation; Photon and gravity **Wave Properties of Particles:** De Broglie waves; Phase and group velocities; The uncertainty principle. **Quantum Mechanics**: Schrödinger's equation: Time dependent form and Steady-state form; Application of Schrödinger's equation: particle in a box, harmonic oscillator and hydrogen atom.	10
• explain concept and terms regarding nuclear and bio physics. • analyze real world phenomena with the concept of nuclear and bio Physics.	**Unit: Eight** **Nuclear Physics**: Nuclear composition; Binding energy and separation energy; Radioactive decay; Nuclear reaction; Nuclear fission and fusion; Nuclear Model. **Elementary Particles**: Interactions and particles: Leptons and Hadrons; Elementary particle quantum numbers; Quarks Models, Field Boson; Unification of forces; Origin of the universe and The Big Bang;	10

Assessment Targets The candidates will be able to …	**Contents**	**Marks**
• formulate mathematical expression in relation to nuclear and bio physics. • Justify the importance of concept and applications regarding nuclear and bio physics.	Ultimate fate of the universe, Dark matter. **Physics in Medical Science:** Uses physics concepts and procedures in the prevention, diagnosis, and treatment of disease: X-Rays, Ultrasonography, MRI, CT Scan, ECG, ETT, Endoscopy, Radiography, Chemotherapy, Angiography, and Laser Surgery. Precaution and care in using instruments in diagnosis.	
• explain concept and terms regarding semiconductor, superconductor, diode and transistor. • apply the concept with the real-life phenomenon with the concept of semiconductor, superconductor, diode and transistor. • design and analyze circuit with the concept of diode, transistor and integrated circuit. • demonstrate the problem-solving ability and evaluate related to the concept of semiconductor, superconductor, diode and transistor.	**Unit: Nine** **Semiconductor:** Band Theory, Types of Semiconductors, Diode and its Applications: p-n junction, biasing, Diode Characteristics, Diode rectification, Zener voltage regulator, LED, Photodiode & Solar Cell. **Transistor and its Applications:** Types of Transistors, Transistor Configurations-CB, CE and CC configuration, Input and Output characteristics, Transistor as an amplifier and a switch, Integrated Circuit. **Superconductivity**: Basic properties of superconductors, Meissner effect, BCS theory of superconductivity.	10
• explain concept and terms regarding logic gate and programming. • apply the concept with the real-life phenomenon with the concept of logic circuits and programming.	**Unit: Ten** **Digital Electronics**: Boolean Algebra; Truth Tables, Basic logic operations and gates: OR, AND, and NOT, Universal gates: NAND and NOR, Complex gates: X-OR & X-NOR, De Morgan's theorem. Universality of NAND and NOR Gates. Design of a Half and Full Adder. **Basic Programming in Physics**: Overview of	10

Assessment Targets The candidates will be able to …	**Contents**	**Marks**
• draw and design diagram of logic circuit with the concept of logic gate. • justify the use and problem-solving ability with the concept of logic circuits and programming.	"C/C++" Programming: Data Types, Constants, Variable and arrays, Declarations, Expressions, Statements, Relation and logical operators, Assignment operators, if statement, if-else statements, Nested if statements, for loop, while loop, do-while loop, Nested loops, switch statement, continue statement, break statement, goto statement.	

পদের নাম: প্রভাষক

বিষয় ঃ রসায়ন (Chemistry)

কোড ঃ ৪১৩

পূর্ণমান-১০০

Exam duration: 3 hours

Instructions: There will be seven sections (A, B, C, D, E, F, and G) and ten (10) questions in Chemistry. Every question contains 10 marks and may have more than one part like a, b, c. The marks distribution of a question may be 2+3+5 or 2+2+6 or 3+3+4 or 2+4+4 or 1+4+5 or 4+6 etc. Candidates have to answer two (2) questions from each section of A, B, C, and one(1) question from each section of D, E, F, G. Question setter may consider the distribution of lower marks (1 or 2) for the basic level of questioning (such as to define, classify, explanation) and higher marks (3 or 4 or 5) for advanced level of questioning (such as apply, calculate, analyze, evaluate, etc.).

Marks distribution

Sections	**No. of question × Marks = Total Marks**	**Comments**
A. Physical Chemistry	2 × 10 = 20	Out of 2, there will be 1 alternative question
B. Inorganic Chemistry	2 × 10 = 20	Out of 2, there will be 1 alternative question
C. Organic Chemistry	2 × 10 = 20	Out of 2, there will be 1 alternative question
D. Environmental Chemistry	1 × 10 = 10	No alternative question
E. Industrial Chemistry	1 × 10 = 10	No alternative question
F. Analytical Chemistry	1 × 10 = 10	No alternative question
G. Polymer Chemistry	1 × 10 = 10	No alternative question
	Full marks = 100	

Section A: Physical Chemistry

Assessment Targets: The candidate will be able to.....	**Contents**	**Marks**
• **Explain** the gas laws. • **Derive** different equations using gas laws. • **Explain** gas behavior using postulates of kinetic theory. • **Derive** gas laws from kinetic theory. • **Solve** mathematical problems using gas laws.	**1. Gaseous state** The gas laws, Ideal gas equation, Kinetic theory and its application to ideal gases, Deviation from ideal behavior, van der Waals equation, Dalton's law of partial pressure; The critical state and critical constants, liquefaction of gases.	20
• **Define** different terms related to the solution. • **Explain** different laws of solution. • **Analyze** colligative properties of solutions. • **Solve** mathematical problems using different laws of solution and solubility concepts. • **Explain** different colloids and their uses.	**2. Solutions and colloids** Solubility, Henry's law, Raoult's law, Ideal and non-ideal solutions, Colligative properties of solutions, Effect of electrolytes on colligative properties, Buffer solutions, and Colloids.	

Assessment Targets: The candidate will be able to.....	Contents	Marks
• **Compare** between solution and colloid system.		
• **Define** different terms of thermochemistry and thermodynamics. • **Explain** different laws of thermochemistry. • **Explain** the relation between **the** spontaneity of process and enthalpy/entropy/free energy. • **Solve** mathematical problems using different laws of thermochemistry.	**3. Thermochemistry and thermodynamics /Energetics in chemistry** Work and heat, Internal energy, Three laws of thermodynamics and their application, Enthalpy, Enthalpy changes in various chemical and physical processes, Joule-Thomson effect, Entropy, Spontaneity, and reversibility of chemical reaction, Lavoisier and Hess's law and its application, Bond enthalpy, Free energy.	
• **Define** different terms of phase systems. • **Explain** the phase rule. • **Apply** the phase rule in a one-component system. • **Apply** the phase rule in two components system.	**4. Phase equilibrium** Phase, Components, and degrees of freedom. Phase rule, Application in one component system like water and sulfur, Completely and partially miscible liquid pairs.	
• **Define** different terms related to chemical equilibrium and chemical kinetics. • **Explain** laws of chemical equilibrium and dilute solution. • **Analyze** the degree of dissociation and equilibrium constant. • **Analyze** the change of equilibrium with changing reaction conditions. • **Explain** the pH of different solutions. • **Derive** the mathematical equation of zero, first, second-order reaction, and effect of temperature on the reaction rate. • **Solve** mathematical problems of the equilibrium constant, chemical kinetics, and pH.	**5. Chemical equilibrium and chemical kinetics** Equilibrium in chemical reactions and the equilibrium law (law of mass - action), Kp, Kc and Kx measurements and effect of temperature; Pressure of Kx measurement, Degree of dissociation, Equilibrium constant. Ostwald dilution law, Concentration change on the dissociation of solids, Le- chatelier principle, Solubility product, common ion effect, pH and buffer solution, buffer action, Henderson equation. Rate equation, Order of reaction, Molecularity of reaction, Rate constant, Zero, first and second-order reaction, Effect of temperature on the rate of reaction.	
• **Define** different terms related to electrochemistry. • **Explain** the terms related to conductance. • **Explain** the construction of different electrodes and cells. • **Explain** transport number of conductance. • **Derive** the mathematical equation of emf of different electrodes and cells. • **Solve** mathematical problems of emf of different electrodes and cells.	**6. Electrochemistry and conductance** Electrolytes and non-electrolytes, Ionic mobility and conductance, Electrochemical cells, pH and Electrode potentials- emf of cells, Transport number and their determination, Electrolytic and galvanic cells, Half cells, Different types of electrodes, Standard Hydrogen electrode, Measurements of electrolytic conductance. Rechargeable Battery, Fuel cells.	

Assessment Targets: The candidate will be able to.....	Contents	Marks
• **Explain** charging, discharging, and uses of rechargeable batteries.		
• **Define** different terms related to surface chemistry. • **Explain** the technique for the measurement of adsorption from the different phases. • **Derive the** different adsorption isotherms (Langmuir, Freundlich, and BET).	**7. Surface chemistry** Solid surfaces and their characterization; Adsorption on solid surfaces: a technique for measurement of adsorption from the gas phase and solution; Langmuir, Freundlich and BET adsorption isotherm: Enthalpy of adsorption; Adsorption on the liquid surface.	
• **Define** different terms related to quantum chemistry. • **Explain** different phenomena of basic quantum theory. • **Derive the** different equations related to quantum phenomena.	**8. Quantum chemistry** Failure of classical mechanics, black body radiation, Planck's quantum theory, photoelectric effect, Einstein's explanation of the photoelectric effect, Compton effect, heat capacities of solids, atomic spectra, de-Broglie's hypothesis, diffraction of electrons, consequences of de Broglie's concepts, Heisenberg's uncertainty principle, consequences of the uncertainty relation. Schrodinger wave equation.	

Section B: Inorganic Chemistry

Assessment Targets The candidate will be able to...	Contents	Marks
• **Explain** an atom and its orbit and orbital. • **Differentiate** between isotope, isobar, and isotone. • **Distribute** electrons in different shells following some rules. • **Explain** the order of energy of orbitals. • **Explain** the reason for the exceptional electron distribution of some elements.	**1. Atomic structure** Nuclear model of the atom, Nuclear structure, Isotopes, Isobars, Isotones, Quantum number and atomic orbital, Electronic structure of atoms, electron spin and the Pauli exclusion principle, Hund's rule; Aufbau principle, electronic configuration, some exceptional electron distributions.	20
• **Make** various charts/tables for elements. • **Categorize** elements into different groups and assign them to the periodic table. • **Link up** the physical and chemical properties of elements with periodicity.	**2. Periodic table and classification of elements** The modern periodic tables, Usefulness and, limitations of the periodic tables, Periodic properties, Atomic radius, Ionization energy, Electron affinity, and electronegativity.	
• **Explain** the concept of various chemical bonding. • **Relate** the function of the electron with bonding types. • **Interpret** the relationship between	**3. Modern concepts of chemical bonds and Bonds type** Ionic bonds-energy involved in ionic bonding, ionic radii, Covalent bonds, Lewis formulas, Co-ordinate covalent	

Assessment Targets The candidate will be able to...	Contents	Marks
bond length and bond order. • **Illustrate** molecular structure using various theories.	bonds, Octet rule, Duet rule, Multiple bonds, Polar covalent bonds-electronegativity, Delocalized bonding resonance, Bond length, Bond order, Bond energy, Valance bond theory, Molecular orbital theory, Metallic bond, Hydrogen bond, Vander Waals forces.	
• **Explain** the repulsion effect of lone pair electrons on chemical structure. • **Interpret** bonding in a molecule using VBT and MOT. • **Sketch** the MO diagram of diatomic molecules.	**4. Structure of molecules** Valence-shell electron-pair repulsion (VSEPR) theory; dipole moment and molecular geometry; Theories of bonding: Valence bond theory (VBT), hybridization of bond orbitals, molecular orbital theory (MOT), bonding and anti-bonding orbitals, MO diagram of the simple homogeneous diatomic molecule.	
• **Explain** the reason for being an element radioactive. • **Differentiate** between a chemical reaction and a nuclear reaction. • **Evaluate** the difference between nuclear fission and fusion. • **Calculate** the half-life of fossils. • **Apply** the concept to nuclear reactions to produce electricity**.**	**5. Radioactivity, nuclear reactions, and atomic energy** Natural and artificial radioactivity, radioactive elements, radioactivity types, radioactive equilibria, nucleus, nuclides, permanent and temporary particles in the nucleus, nuclear binding energy, half-life, average life, relation, between half-life and average life, carbon dating, chemical reaction, and nuclear reaction, nuclear fission and fusion, H-bomb, Nuclear reactor, Principle, parts of a nuclear reactor, research reactor: water reactor, power reactor, application of nuclear reactor for electricity generation.	
• **Define** acids and bases from different viewpoints. • **Detect** the strength of acids and bases. • **Determine** the pH of a solution.	**6. Acids and Bases** Arrhenius concept, Boronsted-Lowry concept, Lewis concept, Acid-base strength, Molecular structure, and acid strength, Self ionization of water, and pH.	
• **Differentiate** clearly between oxidation and reduction reactions. • **Assign** the role of oxidant/reducing agents in the redox reaction. • **Complete and balance** redox reaction.	**7. Oxidation and Reduction** oxidation, reduction, oxidation half-reaction, reduction half-reaction, redox reaction, oxidant, deducing agent, oxidation number, Redox reaction completion	
• **Classify** the elements into different groups. • **Explain** the properties of elements of different groups. • **Predict** the property of an element in a group.	**8. Common elements and their important compounds with applications** Hydrogen, Group 1 or IA (The alkali metals). Group 2 or IIA (The alkaline earth metals), Group IIA, Group IVA, Group VA, Group VIA. Group VIIA (Halogens), The noble Gases, Transition Metals.	

Assessment Targets The candidate will be able to...	Contents	Marks
• **Define** the terms of complex compounds. • **Explain** the properties of complex compounds. • **Explain the split of** the d-orbital. • **Justify** the stability of 6-coordination numbered complexes. • **Illustrate** the bonding structure in complex compounds.	**9. Coordination compounds; structures and Isomers in coordination** Coordination compounds, ligands, types of ligands, the nomenclature of coordination compounds, 18-electron rule, isomerism in coordination compounds, types of isomerism, the stereochemistry of 4 and 6- coordination complexes, chelate complexes, inner complexes, application of coordination complexes. **Bonding in coordination compounds** Coordination bond, Werner postulates and its limitation, Sidwick's electronic concept and its limitation, crystal field theory, orbital splitting in octahedral, tetrahedral and square planner complexes, magnitudes of 10Dq, factors affecting the magnitude of 10Dq, application of crystal field theory, failure of CFT, ligand field theory, spectrochemical series, high spin, and low spin complexes, Jahn-Taller effect, magnetic moments, the origin of color, comparison between VBT and CFT, molecular orbital theory for octahedral complexes.	
• **Explain** nanoscale. • **Define** nanoparticles. • **Classify** nanoparticles. • **Explain** the property of nanomaterials based on catalysis.	**10. Nanochemistry** Nanoscale, nanotechnology, nanoparticles, size-dependent properties of materials, classification of nanomaterials, chemical and catalytic aspect of nanomaterials	

Section C: Organic Chemistry

Assessment Targets: The candidate will be able to.....	Contents	Marks
• **Define** different terms related to basic organic chemistry. • **Explain** different phenomena in organic compounds. • **Analyze** the stabilities of carbocation's, carbanions, free radicals. • **Describe** the nomenclature of organic compounds. • **Analyze** the isomerization (structural, geometrical, and conformational) in organic compounds.	**1. Bonding of organic compounds** Atomic orbitals, covalent bonds, hybridization of orbitals and shapes of molecules, functional groups, homologous series, the nomenclature of organic compounds, the polarity of molecules, carbocation's, carbanions- free radicals and their stabilities, fission of covalent bond, change of electron density and different effects (Inductive, Mesomeric, Electromeric, and Hyperconjugation). Resonance, Isomerization	20
• **Describe** the structure, source, preparation, physical and chemical	**2. Aliphatic and aromatic hydrocarbons**	

Assessment Targets: The candidate will be able to.....	Contents	Marks
properties of aliphatic and aromatic hydrocarbons. • **Explain** the characteristic reactions in aliphatic and aromatic hydrocarbons. • **Identify** the saturated and unsaturated hydrocarbon through chemical reactions. • **Explain** the mechanism of reactions in aliphatic and aromatic hydrocarbons. • **Analyze** the markowikov's and anti-markowikov's rule & application. • **Narrate** the Concept of aromaticity and Huckel's rule.	Alkanes, cycloalkanes, alkenes, dienes, alkynes, classification of hydrocarbons, (structure, source, preparation, physical and chemical properties) of aliphatic and aromatic hydrocarbons, mechanism of reactions, CFC, cis-trans & E-Z systems, markowikov's and anti-markowikov's rule & application, conjugated dienes, the acidity of alkynes, etc. Addition reaction in unsaturated hydrocarbons. Concept of aromaticity, Huckel's rule, substitution and orientation, activation and deactivation in aromatic substitutions, electrophilic substitutions in the aromatic system: (halogenations, nitration. sulphonation, alkylation, and acylation).	
• **Describe** the nomenclature of heterocyclic compounds. • **Explain** the structure, source, preparation, physical and chemical properties of heterocyclic compounds. • **Narrate** the concept of aromaticity and Huckel's rule of heterocyclic compounds.	**3. Heterocyclic compounds** aromaticity of heterocyclic compounds, some preparation, and reactions of heteroaromatic compounds.	
• **Explain** the structure, source, preparation, physical and chemical properties of alkyl halides. • **Explain** the named reactions.	**4. Alkyl halides** Structure, nomenclature, classification, preparations, and properties of alkyl halides; mechanism of nucleophilic substitution reaction and elimination reactions, Grignard reagent, synthesis and application-reaction of Grignard reagent, Wurtz reaction.	
• **Describe** the structure, source, preparation, physical and chemical properties of hydroxy compounds and ether. • **Explain** the classification of alcohol and monohydric alcohol. • **Identify** the 1^{o}, 2^{o}, and 3^{o} alcohol through chemical reactions. • **Analyze** comparative reactivity of –OH group substitution from aliphatic and aromatic compounds.	5. **Hydroxy compounds & Ethers** Alcohol, phenols and ethers, structure, nomenclature, their physical properties, synthesis, and reactions including classification of alcohols, the distinction between different types of alcohols, crown ethers, the acidity of phenol.	
• **Describe the** structure, source, preparation, physical and chemical properties of carbonyl compounds and carboxylic acid. • **Identify** the carbonyl compound through chemical reactions. • **Differentiate** between aldehyde and ketone through chemical reactions.	**6. Carbonyl compounds & Carboxylic acids** Structure, nomenclature, orbital picture, preparations, and reactions of aldehydes, ketones, and acids including nucleophilic addition to carbonyl compounds, resonance and inductive effects on acidity, Aldol condensation reaction, Canizaro reaction.	

Assessment Targets: The candidate will be able to.....	Contents	Marks
• **Compare** the acidity among different no. of halogen substituted carboxylic acids. • **Explain** comparative reactivity of carbonyl group of aldehyde, ketone, and carboxylic acid.		
• **Describe** the structure, source, preparation, physical and chemical properties of Aliphatic, aromatic amines, and amino acids. • **Identify** the nitrogen in organic compounds through chemical reactions. • **Differentiate** between Aliphatic and aromatic amines through chemical reactions. • **Compare** the basicity among ammonia, 1^{o}, 2^{o}, and 3^{o} aliphatic, aromatic amines.	7. **Amines, amino acids, proteins, and nucleic acids** Aliphatic and aromatic amines, nomenclature, preparation, and reactions including Hofmann degradation, separation of amines, reactions of diazonium salt, coupling reaction. Structure, classification, synthesis, physical and chemical properties of amino acids, isoelectric points of peptides, general nature and assay of polypeptides and proteins, nucleic acid, DNA and RNA structure, peptide bond, nitrogen test.	
• **Describe** the structure, source, preparation, physical and chemical properties of carbohydrates. • **Explain** the classification of carbohydrates. • **Analyze** the structure and conformation of aldohexose, sucrose, maltose & lactose.	8. **Carbohydrates** Sources, importance, classification, the configuration of aldoses & ketoses, projection formula, reactions of mono-saccharides, structure and conformation of aldohexose, the structure of sucrose, maltose & lactose; mutarotation, anomerization, epimerization, glycoside bonds.	

Section D: Environmental Chemistry

Assessment Targets: The candidate will be able to.....	Contents	Marks
• **Explain** the source, causes of pollutants of water pollution. • **Describe** the different types of water pollutants. • **Explain** the different parameters of water. • **Analyze** the impact of water pollution on the human body and other natural bodies	**1. Water pollution** Causes of water pollution, different types of water pollutants (inorganic, organic, nutrients. pesticides, Polychlorinated biphenyls (PCBs), Polynuclear Aromatic Hydrocarbons (PAHC), Benzene hexachloride (BHC), toxic heavy metal) industrial wastewater and municipal water treatment, control, and treatment of water pollution, measurement parameter pH, DO, BOD, COD.	10
• **Describe** the composition of the atmosphere. • **Explain** the components of different levels of the atmosphere. • **Narrate** the source, causes of pollutants of air pollution. • **Explain** the different parameters of water.	**2. Air pollution** Composition of the atmosphere; nitrogen, oxygen, carbon dioxide, cycles; structure of troposphere, mesosphere, stratosphere & ionosphere; criteria and non-criteria pollutants; Causes of air pollution, primary and secondary pollutants; toxic effects of various pollutants; acid rain ; photochemical smog; greenhouse gases & greenhouse	

Assessment Targets: The candidate will be able to.....	Contents	Marks
• **Analyze** the impact of air pollution on the human body.	effects; ozone layer depletion. Control and treatment of air pollution.	
• **Describe** the source, causes of pollutants of soil pollution. • **Explain** the different parameters of soil. • **Analyze** the impact of soil pollution on the human body.	**3. Soil pollution** Composition of soil, different types of soil pollutants and their effects, Causes of soil pollution, sustainable practices, and techniques for control of soil pollution.	
• **Explain** the source, causes of pollutants of heavy metal pollution. • **Analyze** the impact of heavy metal pollution on the human body.	**4. Heavy metal pollution** Mercury, chromium, arsenic lead pollution, source, biochemical effects, toxicity, control and treatment, Industrial waste and ETP	

Section E: Industrial Chemistry

Assessment Targets: The candidate will be able to.....	Contents	Marks
• **Explain** the raw materials, manufacturing process, chemical changes in process, and environmental hazards in inorganic Industries. • **Explain** the general steps of metal extraction. • **Describe** the chemical reactions of the metal extraction process.	**1. Inorganic industries** Raw materials and manufacture of caustic soda, soda ash, sodium bicarbonate, environmental hazards of these chemicals; Portland cement, classification of cement, manufacture of Portland cement; raw materials of glass, method of manufacture & chemical reactions of the glass furnace, annealing, special glasses; basic raw materials and manufacture of ceramics & refractories raw material and manufacture of hydrochloric, sulfuric acids, concentration and purification of acids safety and hazards; fundamentals of metallurgy, ores of iron, three commercial forms of iron, blast furnace operation and reactions, classification of steels. Preparation of toilet cleaner and glass cleaner. Phosphate fertilizer, NPK fertilizer.	10
• **Describe** the raw materials, manufacturing process, chemical changes in process, and environmental hazards in organic Industries. • **Explain** the different steps of distillation of crude oil. • **Explain** the chemical reactions of petrochemicals industries.	**2. Organic industries** The industrial extraction process of sugar, management of industrial waste of sugar industry; sources of cellulose, manufacture of paper& paper board; solid, liquid and gaseous fuels, analysis & calorific value of coal, refining and distillation of crude oil, hydrocarbon & petroleum, petroleum refining, petrochemicals from liquid and gaseous hydrocarbons, natural gas and its utilization; natural oil, fat &waxes, hydrogenation of oils-soybean &	

Assessment Targets: The candidate will be able to.....	Contents	Marks
	sunflower and their uses; constituents of paints, varnishes, and their manufacture; raw materials and manufacture of laundry soap, toilet soaps & detergents; some manufacturing steps of leather & its wastewater treatment. Preparation of Vinegar from acetic acid, Extraction of Ghee from milk. Urea fertilizer.	

Section F: Analytical Chemistry

Assessment Targets: The candidate will be able to	Contents	Marks
• **Explain** the basic concept of analytical terms. • **Categorize** the cations and anions and separate them. • **Consider** the necessary parameters for correct analytical calculations.	**1. Basic concepts in analytical chemistry** Classical and modern concepts of analytical detection and quantification, sensitivity, selectivity, specificity, concentration limit, dilution limit, etc. of chemical reactions, sample containers, sample preservation, sampling, sample dissolution, wet ashing and dry ashing, reagents and reactions, group separation, elemental analysis, and analysis of insoluble materials, precision and accuracy, mean and median, types of errors, significant figure convention.	10
• **Evaluate** the role of buffer in analytical chemistry. • **Select** suitable indicators for acid-base titrations. • **Explain** the role of solvent choice in titration. • **Use** redox technique in analysis. • **Choose** indicator for redox titration. • **Utilize** some oxidants for standard titration methods.	**2. Volumetric methods of analysis** **Acid-base reactions:** Acid-base equilibria and buffers in analytical chemistry, indicators, titrations of acid-base, titration in non-aqueous solvents - solvent choice and advantages. **Redox reactions:** Oxidation-reduction equilibria in chemical analysis, redox titration curve, indicators for oxidation-reduction titrations, KMnO4 as a standard oxidant, titrations with $K_2Cr_2O_7$, and cerium (IV), redox titrations involving iodine, iodometric and iodometric methods.	
• **Define** the complex metric methods of analysis. • **Calculate** the step-wise formation constant. • **Apply** masking and demasking technics for selective complex formation.	**3. Complex metric methods of analysis** Complexes, formation constants, chelates, EDTA equilibria, the effect of pH on EDTA equilibria, EDTA titration curves, types of EDTA titrations, selectivity, masking, and demasking agents, metal ion indicators, applications.	
• **Describe** the principle of the gravimetric method. • **Explain** Properties of precipitates. • **Evaluate** the effect of precipitate-	**4. Gravimetric methods of analysis** Principle of the gravimetric method, properties of precipitates and precipitating agents, coagulation and	

Assessment Targets: The candidate will be able to	Contents	Marks
related conditions on results.	peptization of precipitates, treatment of colloidal precipitates, co-precipitation and post precipitation, drying and ignition of precipitates, results, and calculation.	
• **Describe** the limitations of the wavelength range of ultraviolet and visible radiation. • **Describe** the advantage and limitations of Beer-Lambert's law. • **Apply** Beer-Lambert's law for the determination of metal-ligand complexes.	**5. Spectrophotometric analysis** Ultraviolet and visible radiation, absorbance, transmittance, absorptivity, Beer-Lambert's law, limitations of Beer-Lambert's law, wavelength selection, basic components of a spectrophotometer, qualitative and quantitative analysis, stoichiometric determination of metal-ligand complexes, derivative spectrophotometry.	
• **Define** chromatographic terms. • **Know** various chromatographic techniques. • **Separate** solvents/compounds using chromatographic techniques. • **Explain** the basic principle of HPLC and GC.	**6. Chromatography** Chromatographic behavior of solute, retention behavior, partition coefficient, column efficiency, resolution, quantitative analysis, evaluation method, classification of chromatographic methods. (i) **Plane chromatography** Principle of paper chromatography (PC) and thin-layer chromatography (TLC), nature of mobile phase, stationary phases, development, location of spot, quantitative methods, applications. (ii) **Liquid column chromatography** Principles, stationary phases, mobile phases, and applications. (iii) **Ion-exchange method** Principles, types of resin, structure, swelling, the effect of pH, separation of metal ions, action of ion exchange resins, applications. (iv) **High-performance liquid chromatography (HPLC)** Principles, the stationary phase, the stationary (liquid) phase, carrier gas (v) **Gas chromatography** Principles, the stationary phase, carrier gas	

Section G: Polymer Chemistry

Assessment Targets: The candidate will be able to.....	Contents	Marks
• **Define** the polymers and classify the polymers. • **Differentiate** between inorganic polymers and organic polymers. • **Classify** the inorganic polymers. • **Explain** the chemical properties and uses	**1. Inorganic polymers** A general survey of Inorganic Polymers, the concept of inorganic polymers as distinct to organic polymers, classification of inorganic Polymers, the study of some typical	10

Assessment Targets: The candidate will be able to.....	Contents	Marks
of inorganic polymers. • **Analyze** the bonding and structure of inorganic polymers. • **Explain** the environmental hazards of inorganic polymers.	inorganic Polymeric Systems. (i) Silicone Polymers (ii) Silicates (iii) Phosphonitrilic Polymer (Phosphazenes) (iv) Boranes (v) Borazines (vi) Shlphur-Nitrogen Polymers (vii) Sulphanes (viii) Fluorocarbons (ix) Metal cluster systems.	
• **Define** the organic polymers and classify them as organic polymers. • **Differentiate** among organic polymers. • **Explain** the preparation, chemical properties, and uses of organic polymers. • **Analyze** the bonding and structure of organic polymers. • **Explain** the environmental hazards of organic polymers.	**2. Organic polymers** Addition (Chain reaction) and Condensation (Step reaction) Polymerizations, homopolymers, and heteropolymers. Low density and high-density polymers and their properties. thermoplastic and thermosetting polymers and their properties. Fiber and elastomer. Production of monomer unit, physical properties, and important uses of polythene, polyvinylchloride (PVC), polystyrene, polybutylene, neoprene, polyvinyl acetate, polyamides: Nylon 6, nylon 66, nylon 11 and nylon 12, silk and wool Phenol-formaldehyde, phenol-urea, melamine-formaldehyde polymers, their preparation, and uses.	

পদের নাম: প্রভাষক (গণিত)

বিষয় ঃ গণিত (Mathematics)

কোড ঃ ৪১৪

পূর্ণমান-১০০

Examination Duration: Three (03) Hours

Instructions: Candidates will have to answer 10 questions prepared from 10 units each carrying 10 marks. . Each question will have 2 to 3 sub items (e.g. a, b, c). The distribution of marks for each question can be 5+5, 4+6, 3+7, 2+3+5, 2+4+4. Question will be prepared following bloom's taxonomy of cognitive learning. A minimum of 20% marks should be allotted to higher order questions which require analyzing, evaluating, complex problem solving or creating/synthesizing. There will be alternatives for any three questions. An alternative question must be prepared from the same unit with same structure covering same sub-domain and marks distribution.

Assessment Targets *Candidates will be able to-*	**Contents**	**Marks**
1a • explain order properties of real numbers **1b** •solve inequality related problems using order properties and theorems **1c** •carry out the operations of complex numbers • solve equations of complex numbers • sum up algebraic and trigonometric series	**Unit 1** ➢ **Real Number System:** Field and order properties, Natural numbers, Integers and rational numbers, Absolute value and their properties, Basic inequalities. (Including inequalities of means, powers; inequalities of Cauchy, Chebyshev, Weierstrass) ➢ **Complex number system:** Complex numbers and De Moiver's theorem with applications. ➢ **Summation of series:** Summation of algebraic and trigonometric series.	**10**
2a • define different types of sets and functions. **2b** •solve real life problems using functions and sets **2c** •make a relationship between roots and co-efficients of an equation. • construct equation with given roots • find nature of the roots of an equation	**Unit 2** ➢ **Set theory:** Set and subsets, Set operations, Cartesian product of two sets, Operations on family of sets. ➢ **Function:** One-one function, Onto function, Inverse function, Domain and Range. ➢ **Theory of Equations:** Relations between roots and coefficients, Symmetric functions of roots, Sum of the powers of roots, Synthetic division, Des Cartes rule of signs, multiplicity of roots,	**10**
3a convert a matrix representation of a system of linear equation **3b** Solve system of linear equation **3c** •find the eigenvalues and eigenvectors of 2x2 and 3x3 matrices algebraically. **3d**	**Unit 3** ➢ **System of Linear Equations:** System of linear equations (homogeneous and non-homogeneous) and their solutions, application of matrices and determinants for solving system of linear equations, applications of system of equations in real life problems.	**10**

•convert a transformation into a matrix eigenvalue problem	➢ **Linear Transformation:** Linear transformations, Kernel and image of a linear transformation and their properties, matrix representation of linear transformations, change of bases. ➢ **Eigenvalues and Eigenvectors:** Eigenvalues and Eigenvectors.	
4a •identify the condition of general form of a pair of straight lines •measure angle between pair of straight lines • construct equations of bisectors of angles between the lines **4b** • find out the conditions in which general equation of second degree represents various types of conics **4c** •solve problems using properties of Parabola, Ellipse and Hyperbola	**Unit 4** ➢ **Two-dimensional Geometry:** Pair of straight lines (homogeneous second degree equations, general second degree equations representing pair of straight lines, angle between pair of straight lines, bisectors of angle between pair of straight lines), General equations of second degree (reduction to standard forms). ➢ **Conics:** Properties of Parabola, Ellipse and Hyperbola.	**10**
5a •recognize plane and straight line by their equation **5b** •solve problems related to planes and straight lines in three dimensions **5c** •solve geometric problems using vectors	**Unit 5** ➢ **Three-dimensional Geometry:** Coordinates, Distance, Direction cosines and direction ratios, Planes (equation of plane, angle between two planes, distance of a point from a plane), Straight lines (equations of lines, relationship between planes and lines, shortest distance). ➢ **Vector Geometry:** Vectors in three dimensional space with applications to geometry.	**10**
6a • Define limit continuity and differentiability **6b** •analyze a function about its limit, continuity or differentiability at a certain point or interval **6c** •solve real life problems	**Unit 6** ➢ **Limit and continuity:** Definitions and basic theorems on limit and continuity, Limit at infinity & infinite limits, Computation of limits, Indeterminate form (L'Hospital's rule). ➢ **Differentiation:** Tangent lines and rates of change, Definition of derivative, One-sided derivatives, Rules of differentiation (proofs and applications), Successive differentiation, Leibnitz's theorem (proof and application). ➢ **Applications of Differentiation:** Mean value theorem, Maximum and minimum values of functions, Concavity and points of inflection, Optimization problems.	**10**
7a •formulate using integral calculus to determine the area, volume and surface **7b**	**Unit 7** ➢ **Integral calculus:** Indefinite integrals, Definite integrals, Determination of area,	**10**

• determine the area, volume and surface using integral calculus **7c** • determine Complementary Function/Particular Integral/ General Solution of a differential equation	volume and surface. ➢ **Differential Equation:** Differential equations of first order and first degree, linear differential equations with constant co-efficients.	
8a •design algorithm to solve a problem **8b** • code and refine program	**Unit 8** ➢ **Programming in Fortran:** Problem analysis and development of algorithms , Program coding, execution, design, validation and refinement	**10**
9a •Identify advantage, disadvantage and limitations of different method to solve equation of one variable **9b** • Solve equation of one variable using different method. **9c** •Use appropriate formula estimating inner unknown value with the help of given set of observation. **9d** •Construct a polynomial function using given set of observation.	**Unit 9** Numerical Analysis: ➢ **Solution of equation in one variable:** Bisection algorithm. Method of false position. Fixed point iteration. Newton-Raphson method. Convergence analysis. ➢ **Interpolation and polynomial approximation:** Newton's forward and backward, Newton's general formula. Taylor polynomial, Lagrange polynomial, Iterated interpolation, Extrapolation.	**10**
10a • understand the characteristics of convex set. **10b** • find out the feasibility and optimality of a linear programming problem **10c** • formulate a linear programming problem **10d** • solve a linear programming problem graphically.	**Unit 10** ➢ **Linear Programming:** Convex sets and related theorems, Introduction to linear programming, feasibility and optimality, formulation of linear programming problems, Graphical solutions.	**10**

পদের নাম: প্রভাষক

বিষয় ঃ প্রাণিবিদ্যা (Zoology)

কোড ঃ ৪১৫

পূর্ণমান-১০০

Examination Duration: Three Hours

Instruction: Candidates will have to answer 10 questions from 10 units each carrying 10 marks. Each question will have 2 or 3 sub items like a, b, c etc. The distribution of marks for each question can be 2+3+5 or 3+3+4 or 2+2+6 or 4+6. Questions will be prepared following Bloom's taxonomy of cognitive learning. A minimum of 20% marks should be allotted to higher order questions which require analyzing, evaluating, complex problem solving or creating/synthesizing. There will be alternative for three questions; alternative questions must be prepared from the same unit with same structure covering same sub-domain and mark distribution.

Assessment Targets **The candidates will be able to**	**Contents**	**Marks**
- explain basic concept of animal diversity, classification and systematics - classify non-chordates and chordates up to classes - analyze the role of mosquitoes in disease transmission and economic importance of *Tenualosa ilisha* - relate animal adaptation with their habit and habitat.	**Unit 1. Animal diversity, classification and systematics** • Basis of animal diversity • Concept of taxonomy, systematics, classification and nomenclature • Basis of animal classification • International Code for Zoological Nomenclature (ICZN), rules of nomenclature • Non-chordates and chordates classification up to classes • Life history of a mosquito and the role of mosquitoes in disease transmission • Economic importance of *Tenualosa ilisha* • Migration and flight adaptation in birds • Flying mammals and marsupials • Aquatic adaptations of mammals	10
-explain animal cell, cell organelles, Mitosis and Meiosis division of animal cell and structure of DNA and RNA -illustrate replication of DNA, transcription and translation, gene and genetic code - analyze protein synthesis in animal cell - relate animal tissues with their functions.	**Unit 2. Cell Biology & Histology** • Structure of animal cell and cell organelles • Mitosis and Meiosis division of animal cell • Structure of DNA and RNA • Replication of DNA • Transcription and translation • Protein synthesis • Gene and genetic code • Animal tissues, types and functions	10

-explain basic terms of human physiology - relate digestive system for digestion and absorption of food -describe blood circulatory system, circulation and symptoms and treatment of heart diseases -explain respiration, respiratory system, and transportation of oxygen and carbon dioxide through blood - analyze nervous & hormonal coordination, homeostasis and feedback mechanism and evaluate impact of hormones in human body.	**Unit 3. Human Physiology** • Digestion and absorption of food in digestive system, role of enzyme in digestion • Blood circulatory system and circulation • Respiratory system and respiration transportation of oxygen and carbon dioxide through blood • Brain and Nervous system, Nervous and hormonal coordination • Heart diseases, symptoms and treatment • ECG,EEG, Angioplasty, Pace maker • Effect of hormones in human body • Homeostasis and feedback mechanism • Maintaining healthy food habit and life style.	10
- explain basic concept related to reproduction, reproductive health care and embryology - analyze the role of kidney in osmoregulation, phenomena of kidney failure and maintain healthy lifestyle - illustrate gametogenesis, fertilization, embryo formation and family planning - describe formation of human embryo and fate of germ layers - Identify sexually transmitted diseases, symptoms and preventive measures.	**Unit 4. Reproduction, excretion and Embryology** • Male and female human reproductive system • Menstruation cycle • Gametogenesis, fertilization and implantation • Embryonic circulation and nutrition • Infertility of man and woman • Birth control methods and family planning • Formation human embryo and fate of germ layers • Excretion, excretory system and osmoregulation • Failure of kidney, symptoms and treatment • Sexually transmitted diseases (syphilis, gonorrhea and AIDS), symptoms and remedy.	10
- explain terms and basic concept of genetics, evaluation - explain the theory of evolution and evidences of organic	**Unit 5. Genetics and evolution** • Terminology of genetics • Mendel's first and second law • Deviations from Mendel's law	10

evolution - solve the problems related to Mendel's ratios and deviations, polygenic inheritance - organize paleontological history of horse and major events in different stages of geological time scale.	• Polygenic inheritance • Linkage and crossing over • Sex linked, sex limited sex influenced traits • ABO blood groups and inheritance of blood groups • Theory of evolution (Lamarck & Darwin) • Evidences of organic evolution (Biogeography, comparative anatomy, physiology, embryology, palaeontology and genetics) • Geological Time Scale: Major events in different stages • Paleontological history of horse.	
- explain tissue culture process and uses, fermentation technology, concepts and scopes of genetic engineering - illustrate steps of recombinant DNA technology and the application of genetic engineering in insulin production - show the use of genetic engineering technologies in industries and the application of technology in creation of transgenic animal - evaluate the prospect of cloning, impact of bio technology, bio safety and its risk.	**Unit 6. Biotechnology and genetic engineering** • Tissue culture process and uses • Fermentation technology in food production and brewing, lactic acid fermentation, alcoholic fermentation • Concepts and scopes of genetic engineering • Recombinant DNA technology • Genetically modified organisms, their possibilities and safe uses • Production of insulin by genetically engineered *Escherichia coli* • Use of genetic engineering technologies in industries • Microinjection technology and creation of transgenic animal • Principles, techniques and applications of gene cloning • Cloning • Impact of bio technology on human being and their environment • Bio safety and its risk.	10
-describe basic concepts of parasitology and applied Zoology -explain the mechanism and importance of induced breeding of carps and management of prawn and shrimp culture -design control measures for disease control using basic concepts of epidemiology - evaluate economic importance	**Unit 7. Applied Zoology and parasitology** • Carp culture including induced breeding of carps in ponds • Prawn and shrimp culture: types, techniques and management • Life cycle of a honey producing bee species, bee-keeping and honey processing • Parasites and Parasitism, parasitic adaptation, host parasitic relationship • Epidemiology: Basic concepts, control measures and designs of control measures • Varieties of silkworm and their host plants;	10

of farming of domestic animals in our country.	techniques of silkworm rearing; silkworm diseases and pests, and their control • Farming of domestic animals- cattle and goats, economic importance of farm animals.	
- explain the basic concepts and terminology of Microbiology, structure and types of virus and bacteria -explain multiplication process of virus and bacteria and their pathological importance - Analyze viral and bacterial disease and their mode of transmission and importance of immune system in disease prevention - explain the antigen and antibody relationship and evaluate role of vaccines in disease prevention	**Unit 8. Microbiology and immunity** • Definition and scope of microbiology • Types of microorganisms in the living world • Virus: structure and types, multiplication (replication), viral diseases and their mode of transmission • Bacteria: Structure and types, gram positive and gram negative bacteria, nutrition of bacteria, bacterial multiplication, bacterial disease and their mode of transmission • First, second and third level of immunity of human body • Antigen and antibody relation in human body • Mechanism of vaccine preparation • Role of vaccines in immune system.	10
- explain the basic concept and terminology of biodiversity, ecosystem, habitats, resource managements and biogeochemical cycles - analyze the importance of components of biodiversity in maintaining the ecological balance and sustainable environment. - evaluate the causes and consequences of greenhouse effects on with possible preventive measures - evaluate conservation and management strategies to maintain environmental balance.	**Unit 9. Ecology, biodiversity and Conservation** • Ecological niche and habitats, carrying capacity and ecotone • Ecosystem: definition, food chain, food web, pond ecosystem, forest ecosystem and ecological pyramids • Concept of biodiversity and its components • Positive and negative interrelation (protocooperation, commensalisms, mutualism, competition, predation, parasitism) • Nitrogen and carbon cycle • Development activities and their impacts on environment • Global warming • Green house effects: Definition, sources of green house gases; causes and effects of green house gases; CO_2, CFC, CH_4 and N_2O, carbon dioxide and the world climate, control of greenhouse effects • Conservation and management strategies including ex-situ and in-situ • Biodiversity and resource management, coral reefs, tropical rain forest, mangrove forest	10

	• Role of legal/regulatory provisions in wildlife conservations.	
- explain basic components and terminology of Ethology, Zoogeography and Biostatistics - explain history of the distribution of the land and water bodies of the world - relate adaptive features of animal with zoogeographical regions of the world - calculate mean, median and mode, range, variance, standard deviation and standard error in study of animal population.	**Unit 10. Ethology, Zoogeography and Biostatistics** • Concepts of behaviour • Environmental influence upon behaviour • Innate behaviour of Animals • Concept of instinct and learning behaviour • Social behavior • Glaciation and its influence on animal distribution • Introduction to Zoogeography • History of the distribution of the land and water bodies of the world, Laurasia and Gondwana lard, continental drift theory • Zoogeographical regions of the world, their boundaries, physical characteristics, climatic conditions, vegetation and fauna • Introduction, definition and scope of biostatistics • Measurements of central tendency: Mean, median and mode • Regression and Correlation • Measures of dispersion: Range, variance, standard deviation and standard error • Chi square test of goodness of fit and contingency table.	10

পদের নাম: প্রভাষক

বিষয় ঃ উদ্ভিদবিদ্যা (Botany)

কোড ঃ ৪১৬

পূর্ণমান-১০০

Exam Duration: 3 hours

Instruction: The syllabus for the post of lecturer, Botany is divided into 10 units of equal importance. One question will be set from each unit of the syllabus (total 10 questions from 10 units). There will be alternatives for three questions; an alternative question must be prepared from the same unit with same structure covering same mark distribution pattern. Candidates will be evaluated on lower and higher level competency of the subject. At least 20% marks should be allotted to higher order questions which require analyzing, evaluating, complex problem solving or creating/synthesizing. Marks of a question will be 10. Mark distribution of a question may be 1+2+3+4, 2+3+5, 3+3+4, 4+6, and so on.

Syllabus Matrix

Objectives/Assessment Target: **The candidates will be able to -**	Subject Content	Mark
Unit 1 (Question 1)		**10**
	Microbiology	
- define general terms of Microbiology - describe major microbe groups - classify microbes into different groups - compare related microbial organisms and phenomena - illustrate multiplication processes of microbes - evaluate importance of microbial study.	Characteristics, illustration and importance of virus, bacteria, prions, viroid, rickettsia, mycoplasma and actinomycetes. Position of microorganisms in living world: Five Kingdom system of classification. Virus: discovery, general characteristics; structure of RNA virus and DNA virus; multiplication transmission of viruses and importance. Important plant and human viral diseases. Bacteria: structure, chemical composition, growth and multiplication, growth curve, genetic recombination in bacteria, transformation, transduction and conjugation; important bacterial plant and human diseases.	
	Mycology	
- define and characterize, the important terms of Mycology - classify Fungi into recognized taxa - explain fungi in different categories viz. nutrition, reproduction etc.	Characteristics and importance of fungi, vegetative structure, growth and development of fungi, mode of nutrition, absorptive organs, reproduction of fungi. Classification of fungi up to class (Alexopoulos and Mims 1979). Myxomycetes: general characteristics, structure, reproduction and importance of slime molds.	

To illustrate the life cycle of important fungal genera. To compare among the major fungal groups.	Chytridiomycetes: general characteristics, importance ; life cycle: *Synchytrium*. Oomycetes: general characteristics, importance; life cycle: *Saprolegnia*, and *phytophthora*. Zygomycetes: general characteristics, importance; life cycle: *Rhizopus*.	
	Ascomycetes: general characteristics, importance; life cycle: *Saccharomyces*, *Penicillium*. Basidiomycetes: general characteristics, importance; life cycle: *Puccinia* and *Agaricus*. Deuteromycetes: general characteristics, importance; life cycle: *Alternaria*, *Fusarium*, *Colletotrichum* and *Sclerotium*.	
	General characteristics and importance of mushroom. edible and poisonous mushroom, cultivation.	
	Plant Pathology	
- describe and characterize plant diseases and their causes - explain different symptoms of plant diseases - explain major stages of plant disease development - study important plant diseases and their causes - select appropriate control strategy.	Plant disease: concept, causes; diseases triangle. symptoms: hypertrophy and hyperplasia, hypotrophy; necrotic symptoms: wilt; mildew; rusts; smuts and exudation.	
	Methods of studying unknown plant disease: Koch's postulates.	
	Parasitism and disease development; pathogenicity, stages in the development of plant disease. pathogen inoculation, penetration, growth and reproduction, and dissemination. Over-wintering and over-summering of pathogen.	
	Control of plant disease: physical, cultural, chemical and biological methods.	
	Selected crop diseases: symptoms, causal agent, disease cycle and control measures of the following diseases: Rice: blast and brown spot of rice. Sugarcane: red rot of sugarcane. Ground nut: leaf spot disease of ground nut. Cucurbit: powdery mildew of cucurbits.	
	Plant disease epidemiology: role of host, pathogen, environmental factors	
	Cell wall degrading enzymes in plant disease development.	
Unit 2 (Question 2)		**10**
	Phycology	
- describe the important terms of Phycology - classify Algae into different taxa - explain habitat diversity of Algae	Definition, origin, comparison with Bryophytes. classification based on pigment, storage product, chloroplast and flagella. Classification of algae up to class according to F.E. Fritsch (1946) and R.R. Lee (1989). Economic and biological importance.	
	Algal Habitat**:** Aquatic (fresh, brackish and Marine water) terrestrial and sub-aerial.	

- explain characteristic features of different groups of Algae - compare life history of different species in Algae - evaluate the importance of algal species.	Characteristic features of the algal classes with examples in each: Cyanophyceae, Rhodophyceae, Chlorophyceae, Euglenophyceae, Bacillariophyceae and Phaeophyceae.	
	Life history of *Anabaena*, *Polysiphonia*, *Chlamydomonas*, *Oedogonium*, *Chara*, *Sargassum. Navicula*, and *Vaucheria.*	
	Limnology and Hydrobiology	
- define the important terms of Limnology - describe the fresh water resources of Bangladesh - explain about lakes and their related features - classify phytoplankton - evaluate related function of plankton - define important items of aquatic macrophytes - recognize and recommend problems of pollution.	Introduction**,** definition, scope and importance of limnology. Limnology versus hydrobiology, hydrologic cycles.	
	Distribution of fresh water**:** Ponds, Lakes, River and estuaries, aquatic resources of Bangladesh.	
	Lakes: Distribution, origin of lake basins, classification based on temperature and productivity, special lake types.	
	Plankton: classification with examples, common phytoplankton in the water body of Bangladesh water bloom, primary productivity.	
	Aquatic macrophytes: definition, classification with examples, distribution and economic importance.	
	Pollution and eutrophication of aquatic habitats, their causes, consequences and remedies.	
	Plant Ecology	
- define different ecological terms - describe adaptation process of plants - illustrate ecosystem and ecological issues - compare related topics of ecology - categorize vulnerable items of soil, air, water etc. - analyze the world phytogeographical vegetation.	Introduction: definition, different fields of ecology.	
	Adaptations of plants: hydrophytes, xerophytes and halophytes, ecological and adaptive features with examples.	
	Ecosystem: structure, components of ecosystems, food chain, food web and ecological pyramid.	
	Plant succession: types, causes, hydrosere and xerosere.	
	Forest ecology: dominant plants of semi-evergreen, deciduous, mangrove forest of Bangladesh and its edaphic features.	
	Biogeochemical cycle: definition, types of biogeochemical cycle, water, nitrogen and carbon cycle.	
	Pollution: definition, air, water and noise pollution.	
	Soil environment: physical and chemical aspects of soil environment.	
	Phytogeographical regions of the world.	
Unit 3 (Question 3)		**10**
	Biodiversity and Conservation	
- define the important terms of Biodiversity and	Introduction: definition, importance, types, elements of biodiversity.	

Conservation - describe major issues of biodiversity - explain critical points of biodiversity and conservation - compare related topics of biodiversity and conservation - analyze the role of conservation organization.	Origin of earth, continental drift; biosphere, its components in general, geographical features responsible for biodiversity distribution: tropical, temperate, tundra, alpine, examples of characteristic plants and animals of the region concerned. Losses and threats to biodiversity, threatened, endangered, vulnerable, rare and extinct plants, extinctions and their causes. Conservation: definition, types, *in situ, ex situ,* merits, demerits, botanical garden, park, eco-park, sanctuaries, seed bank. Role of following international agencies for protecting biodiversity: IUCN, WWF, CMC, CITES.	
	Environmental Science	
- describe major terms of Environmental Science - evaluate the stresses of nature - compare related topics of environment. - describe different units of climate change, Ozone layer depletion etc.	Environmental science: definition, component of the environment, composition, structure and importance of atmosphere, renewable and non renewable resources, Climate change; global warming, greenhouse effects: causes, impact, prevention. Drought and desertification	
Unit 4 (Question 4)		**10**
	Bryophyta	
- describe important terms of Bryophyta - describe the habit, habitat characteristics of Bryophytes - study different groups of Bryophyta and some of the genera - illustrate and compare the different type of Bryophyta - compare gametophyte and sporophyte.	Introduction**:** characteristic features, origin and evolution, and classification of Bryophyta. Habit, habitat and distribution of Bryophyta. General characteristics and examples of the following groups**:** Hepaticopsida, Anthocerotopsida and Bryopsida. Life history and taxonomic position of the following genera: *Marchantia*, *Porella*, *Anthoceros*, *Sphagnum* and *Funaria*. Comparative account of gametophyte and sporophyte of Sphagnobrya, Andreaeobrya and Eubrya.	
	Pteridophyta	
- describe important terms of Pteridophyta - describe types stele and their evolution - compare general features, reproduction and importance of different groups of pteridophytes - study selected genera of pteridophytes.	Introduction**:** general characters, habitat and distribution, Origin and evolution, and classification of pteridophyta. Types of steles and their evolution. General characters, ecological and economic importance of the following groups**:** Psilophyta, Lycophyta, Calamophyta and Pterophyta. Life history of the following genera: *Psilotum*, *Lycopodium*, *Selaginella*, *Equisetum*, *Ophioglossum*, *pteris*,	
	Gymnosperm	

- define the important terms of Gymnosperm - compare with pteridophytes and Angiosperms - characterize of different groups of Gymnosperm - evaluate life cycle and importance of Gymnospermic genera.	Introduction**:** habit, habitat, characteristic features, Classification and economic importance of Gymnosperm.	
	Comparative account of Gymnosperm with Pteridophyte and Angiosperm.	
	Characteristics of Cycadofilicales, Bennettitales, Cycadales, Ginkgoales, Coniferales and Gnetales.	
	Life history of *Cycas, Pinus* and *Gnetum.*	
Unit 5 (Question 5)		**10**
	Palaeobotany	
- define the important items of Palaeobotany - describe geological time scale of the earth - explain fossils and fossilization process.	Introduction**:** definition and scope of palaeobotany.	
	Types of fossil and fossilization process.	
	Geological time scale of the earth. appearance and extinction of life forms in different geological periods.	
	Fossil Gymnosperms**:** *Lyginopteris, Cycadeoidea*	
	Anatomy	
- define and characterize important items of Plant Anatomy. - illustrate plant tissues and tissue systems. - compare related topics of anatomy. - describe root, stem anatomy of plant.	Meristematic tissue and permanent tissue; structure and function of parenchyma, collenchyma and sclerenchyma.	
	Tissue systems: vascular tissue system and function.	
	Normal and secondary growth in dicot and monocot stem and root.	
	Root stem transition.	
	Wood anatomy: physical and chemical nature of wood.	
	Embryology	
- define embryological terms - illustrate Microsporogenesis and Megasporogenesis - describe fertilization process - apply embryological characters in Taxonomy - identify the embryological study - analyze embryogenesis.	Microsporogenesis and male gametophytes development. Megasporogenesis and female gametophytes development.	
	Fertilization: process, double fertilization.	
	Different types of ovules.	
	Endosperm: types of endosperm formation-nuclear, cellular and helobial.	
	Embryogenesis: development of dicot embryo.	
	Polyembryony: types, causes and importance.	
	Apomixis: types, causes and significance.	
Unit 6 (Question 6)		**10**
	Taxonomy of Angiosperms	
- define basic concept, ICBN and the important components of Taxonomy - explain origin and phylogeny of Angiosperms - describe classification systems of Angiosperms	Basic concept and scope of angiosperm of taxonomy.	
	Nomenclature**:** ICBN, name of taxa, binomial nomenclature, publication, typification, principle of priority, nomina conservanda and author citation.	
	Origin and phylogeny of angiosperms,	
	System of classification: artificial: Linnaeus; natural: Benthum and Hooker; phylogenetic: Hutchinson, and Cronquist.	

- compare the characters of the selected families and their species - illustrate identifying features of families - analyze the phylogeny of families.	Identifying characters of the selected families and scientific name of important plants of each family**:** Magnoliaceae, Rubiaceae, Apocynaceae, Fabaceae, Brassicaceae, Asteraceae, Poaceae, Liliaceae, and Orchidaceae.	
	Economic Botany	
- describe the important terms of Economic botany - enlist economically important plant with local name, scientific name and part use - describe commercial processing of tea, sugar and rubber - analyze the cultivation feasibility of tea, sugarcane and rubber.	Introduction**:** definition, scope and importance of Economic Botany.	
	Local and scientific names, parts used and importance of 10 plants of each of the following groups**:** cereals, pulses, oil, fiber, timber, fruit, vegetables, spices, and medicinal plants.	
	Tea, rubber and sugarcane cultivation, processing and economic importance.	
	Ethnobotany	
- define the important items of ethnobotany - explain major indigenous plants of Bangladesh - identify beneficial and harmful effects of plants.	Introduction**:** Definition, aims and objectives of ethnobotanical studies.	
	Pharmacology and pharmacopoeia**.**	
	Hallucinogenic, allergenic, teratogenic, poisonous plants, plants with pesticide properties, sacred plants and their uses.	
	Major 10 indigenous medicinal plants of Bangladesh.	
Unit 7 (Question 7)		**10**
	Plant Physiology	
- describe the plant physico-chemical phenomena - explain the mechanism of physiological processes including transpiration, photosynthesis, respiration, photorespiration, translocation and water and ion absorption - compare related physiological processes - identify physiological effects of growth regulators - evaluate plant nutrition - describe the physiology of flowering.	Life related physico-chemical phenomena: diffusion, imbibitions, osmosis, osmotic pressure, plasmolysis, colloidal state, root pressure, protoplasm as colloidal system.	
	Essential elements: general function of micro and macro elements in plant growth and development, symptoms of mineral deficiency.	
	Water absorption; ions absorption; translocation; transpiration.	
	Photosynthesis: light reaction - cyclic and non-cyclic photophosphorylation, C_3, C_4, and CAM pathways.	
	Respiration: aerobic respiration: glycolysis, acetyl CoA formation, TCA cycle and electron transport system; anaerobic respiration.	
	Physiology of flowering: photoperiodism; vernalization.	
	Nitrogen metabolism: source of nitrogen, mechanism of physical and biological nitrogen fixation.	

	Plant growth regulators: auxins, gibberillins, cytokinins, and ethylene.	
	Plant Biochemistry	
- define and describe major components of Biochemistry - classify the biochemical compounds - explain distribution, characters, structures, functions of different types of carbohydrates, amino acids, proteins, terpenoids, lipids, enzymes. - analyze the plant biochemical compounds.	Carbohydrates: introduction, distribution, classification, biochemical importance of monosaccharide, oligosaccharides. polysaccharides.	
	Amino acids: introduction, classification, properties and biosynthesis of amino acids.	
	Proteins: introduction, classification, properties, structures, importance of proteins.	
	Lipids and fatty acids: introduction, classification, properties and importance of lipids and fatty acid	
	Enzymes, terpenoids, alkaloids, vitamins, phenolic compounds.	
Unit 8 (Question 8)		**10**
	Cytology	
- define and characterize the important items of cell and cytology - illustrate and compare cytological components, - describe major issues of cell biology - explain critical points of cell division - compare related topics of cell and cell division - evaluate or judge the valuable matters - identify problems related to cell biology.	Prokaryotic Cell: PPLO: discovery, physical and chemical structure, and importance. Eukaryotic cell: ultra structure of a generalized plant and animal cells. Differences between: (i) prokaryotic and eukaryotic cells, (ii) plant and animal cells.	
	Cell organelles: physical and chemical structures, functions. cell wall, cell membrane, mitochondria, plastids, ribosome, Golgi complex.	
	Nucleus: discovery, morphology: nuclear membrane, nuclear pore, nuclear bleb, nucleoplasm, chromatin net, chromocenters, chromosomes and nucleolus.	
	Cell division: cell- cycle, amitosis, mitosis, meiosis and their biological significance.	
	Chromosome: physical structure, chemical components and function.	
	DNA packing in a chromosome with special reference to nucleosome model, histone and non-histone proteins, euchromatin and heterochromatin.	
	Cytogenetics	
- define and characterize the important terms of cytogenetics - illustrate and compare cytogenetical components - describe major items of chromosomal behaviour - compare related topics - evaluate the valuable matters - recognize and recommend problems of human cytogenetics.	Chromosomal aberration- a general classification. deletion, duplication, inversion, translocation.	
	Numerical aberrations- a brief overview.	
	Aneuploid: hyperploid: trisomic. hypoploid: monosomics and nullisomics.	
	Euploid: haploid; and polyploid; triploid, autotetraploid, allopolyploid, autoallopolyploid and segmental allopolyploid.	
	Human cytogenetics: introduction (i) Down's syndrome, (ii) Patau's syndrome, (iii) Edward's syndrome, (iv) Kleinefelter's syndrome, and (v) Turner's syndrome.	

	Unit 9 (Question 9)	**10**
	Genetics	
- characterize the important terms of genetics and molecular genetics - illustrate genetic components - describe major issues of Mendelism, DNA, RNA, gene, genetic code, mutation - explain critical exception of Mendel's laws - establish relationship genetic phenomena - analyze scientific importance of genetics - constitute population genetics equilibrium.	Mendelism, Mendel's laws of inheritance.	
	Exceptions to Mendelism: (A) Apparent exceptions of 1st Law and 2nd Law (B) Real exceptions.	
	Multiple allele, Pseudoallele. Sex determination: sex-limited, sex-linked and sex-influenced traits.	
	Cytoplasmic inheritance, Nucleic acid as genetic material: evidences to prove the genetic nature of DNA and RNA as the genetic material in viruses; DNA: chemical composition and structure, Watson-Crick model, RNA: chemical composition, structure, types.	
	Replication of DNA: Types of replication, semiconservative methods of replication, molecular mechanism of DNA replication. DNA repair mechanisms: Photoreactivation, excision repair, post replication recombination repair, misrepair or SOS repair.	
	Mutation: defination, types of mutation, mutagenic agents, molecular basis of mutation, detection of mutation in *Drosophila* by ClB, isolation of biochemical mutants in *Neurospora*.	
	Fine structure of genes: Classical versus molecular concept of genes.	
	Genetic code: characteristics of genetic code, triplet nature of code, deciphering the code, degeneracy and wobble, universality of the code, the code dictionary.	
	Gene expression: requirements of protein synthesis-structure of ribosome, tRNA structure and their functions, factors of protein synthesis, transcription and translation.	
	Biochemical genetics: one gene-one enzyme concept, one gene one polypeptide concept.	
	Plasmid: definition, characteristics, types, replication and importance.	
	Genetic constitution of a population: gene pool and gene frequencies, Hardy-Weinberg equilibrium and its modification under mutation, migration, selection and genetic drift.	
	Biotechnology	
- describe important terms of biotechnology - apply biotechniques - evaluate biotechnological	Historical background, scope and importance of biotechnology.	
	Laboratory organization, plant tissue culture equipment, technique, importance.	

processes - identify the importance of biotechnology.	Cellular totipotency, callus culture and cell suspension culture, organogenesis and somatic embryogenesis.	
	Haploid production and significance of haploid in crop improvement.	
	Isolation, purification and culture of protoplasts, somatic hybridization and cybridization.	
	Micro-propagation and its commercial application.	
	Germplasm conservation and cryo-preservation.	
	Plant genetic engineering: concepts, tools and application.	
	Gene cloning: definition, principles, technique, importance.	
	DNA sequencing: Methods and applications of DNA sequencing.	
	Polymerase Chain Reaction (PCR): Concept, procedure, cloning of PCR products and applications.	
	Biogas: Production methods and its uses.	
	Single cell protein: definition, production methods and its importance.	
	Rules and regulations in biotechnology: biosafety guidelines and regulations, Intellectual Property Rights (IPR).	
	Evolution	
- define terms of evolution - describe issues evolutionary processes - explain origin of life - compare related topics - summarize evolutionary theories.	Introduction, concepts regarding origin of life; Pre-Darwinian concepts of evolution: Buffon, Lamarck, and Herbert Spencer.	
	Darwin-Wallace theory of evolution, Brief life sketch.	
	Evidences of evolution.	
	Synthetic theory of evolution:	
	Speciation: characteristics of species; modes of speciation:	
	Origin of life: chemical theory: experimental evidences - Oparin-Haldane hypothesis, Miller-Urey experiment; stages of chemical and organic evolution; origin of prokaryotes and eukaryotes.	
Unit 10 (Question 10)		**10**
	Biostatistics	
- define important items of biostatistics - describe major issues of biostatistics - create statistical figures	Definition and scope of biostatistics, random variable, discrete and continuous variable, population, samples, random samples and data.	
	Organization and presentation of data, frequency distribution, graphical representation: histogram, frequency polygon, bar graphs and pie chart.	

- calculate statistical data - design field experiment - analyze and conclude experimental data experimental results.	Measures of central tendency: mean, mode and median, and measures of dispersion: range, variance, standard deviation, standard error of mean and coefficient of variation.	
	Normal, and binomial distribution. Chi-square test, goodness of fit test.	
	Comparison of means, t-test. Correlation. Regression.	
	Experimental design: concept, principles, and terminology related to experiment and experimental design.	
	Completely Randomized Design (CRD); Randomized Complete Block Design (RCBD; Latin Square Design (LSD).	
	Horticulture	
- characterize the important items of horticulture - describe major horticultural methods - apply horticultural tools - compare related topics - identify horticultural problems and recommend scientifically.	Horticultural aspects, cultivation and crop husbandry of vegetables in Bangladesh. e.g. potato, brinjal, tomato and Lady's finger.	
	Pomology: horticultural aspects, plantation and cultural practices of fruit yielding plants. e.g. mango, pineapple and lemon.	
	Floriculture: floricultural aspects and cultivation of the following plants: rose, tuberose and *Chrysanthemum.*	
	Propagation of horticultural plants, classification with examples. details about cutting, layering, grafting and their merits and demerits.	
	Fertilizer: classification of fertilizers, composition, dosage, application times and procedures.	
	Green house, shade house, phytotron and growth chamber, their characteristics and uses in horticulture.	
	Plant Breeding	
- characterize the important items of plant breeding - describe major breeding issues - explain critical breeding points - compare related topics of plant breeding - recommend appropriate breeding method.	Introduction: definition, history, relation with other branches of biology, objective of plant breeding.	
	Pollination and pollination control in crop plants, self incompatibitily, male sterility. hybridization	
	Breeding techniques in crops; selection method- pureline and mass selection.	
	polyploid breeding.	
	Plant genetic resources: collection, evaluation and conservation of germplasm, use of germplasm in plant breeding program.	
	Concept of research institutes in home (BARI, BRRI, BSRI, BINA, RTRI) and abroad (IRRI, SYMMIT, ICRISAT).	

পদের নাম: প্রভাষক

বিষয় ঃ ভূগোল ও পরিবেশ বিজ্ঞান (Geography & Environmental Science)

কোড ঃ ৪১৭

পূর্ণমান ঃ ১০০

Part 1: Physical Geography

(a) Geography as a discipline: Definition, concept, sub fields, scope and methodology. (b) The earth as a globe: form of the earth-oblate ellipsoid. Geoid, great and small circle; Meridians and parallel-longitude, latitude; Location and direction on the map and the globe, Longitude and time: local time, standard time, world time zones and International Date Line. (c) Theories on the various tectonic aspects of earth's surface process - i) Plate tectonic process ii) Wegner's Continental Drift Theory iii) Theories on Isostasy. (d) Materials of the earth crust, rocks and minerals. Types of rocks and their characteristics. Weathering and denudation. Types of major Landforms. Landforms produced by the works of river, wind glacier, sea waves etc. Volcanism and Earthquakes. Ocean currents. World soil and vegetation types. (e) Composition of atmosphere- Factors and elements of weather and climate. Atmospheric pressure and wind system. Airmass and fronto genesis, major world climates.

Part 11: Human Geography

a. Economic activities: primary, secondary, tertiary and quaternary characteristics, world pattern.
b. Agriculture: types and major food and industrial crops; livestock and livestock products. Forestry: major products and distribution, Fishing: Fishing industries and fisheries.
c. Mining and manufacturing industries: petroleum and coal industries; other energy sources. Iron and steel industry and Textile industry characteristics and global distribution.
d. Service Industries: commerce and finance, trade and transportation - regional and international context.
e. Population and human settlement. Global distribution and density of population; population and food supply: problems of over and under population and resources constraints. Rural and urban settlements: forms and function.

Part III: Geography of Bangladesh

Physiography and climate: production and distribution of major agriculture, mining and industrial products, population and settlements.

পদের নাম: প্রভাষক

বিষয় ঃ পরিসংখ্যান (Statistics)

কোড ঃ ৪১৮

পূর্ণমান ঃ ১০০

Statistics: Definition of statistics. Scope, Nature of statistical data. Attributes and Variables, Primary data and Secondary data, Construction of frequency distribution with its use, Classification and Tabulation, Graphical representation of data.

Measures of central tendency: Various measures of central tendency with their advantage and disadvantage, Criteria of a good measure, Properties of mean with proof, related theorem on measures of central tendency, Various problems, Location of mode and median graphically.

Measures of dispersion: Various measures of dispersion, Compression among the various measures of dispersion, Important theorems and related problems on dispersion, Advantage and disadvantage of various measures.**Moments:** Moments of a distribution, Properties of moments, Use of moments, Relation between row moments and central moments, Related problems on moments, Skewness and kurtosis with their types, Various measures of skewness and kurtosis, Related theorem. **Regression and correlation:** Simple correlation and simple regression, Use of correlation and, regression, Difference between correlation and regression, Properties of correlation co-efficient, Properties of regression co-efficient, Rank correlation, Partial correlation co-efficient and Multiple correlation co-efficient. **Probability and random variable:** Meaning of probability, Definition of various terms, Laws of probability, Bayes theorem, Random variable, Probability distribution, Distribution function, Joint probability distribution, Marginal and conditinal distribution, Independence of random variable. **Mathematical expectation:** Meaning of expectation, Properties of expectation, Variance of random variable, Properties of variance, Conditional expectation, Conditional variance, Relation between moments and cumulants, Characteristic function, Related problem on expectation. **Probability distributions:** Binomial distribution. Poisson distribution, Normal distribution, Hypergeometric distribution, Negative binomial distribution Geometric distribution, Uniform distribution, Exponential distribution, Beta distribution, Properties and importance of these distributions. **Sampling Theory:** Concept of sample of population, Meaning and objective of sampling, Defination of related terms, Problems in conducting sample survey, Advantage and disadvantage of census and survey, Sampling error and non sampling error, Types of sampling. Deference between different types of sampling, Simple random sampling, stratified sampling, Systematic sampling, Cluster sampling, Method of drawing random sample, Sampling distribution derivation, Properties and use of f-distribution, t-distribution chi-square distribution, Sample variance s^2. **Design of experiments:** Definition, Important steps of design of experiment. Principles of design of experiment, Analysis of variance, Completely Randomised Design (CRD), Randomised Block Design (RBD), Latin Square Design (LSD), Factorial experiment. **Index Number:** Meaning and use of index number, Problems in construction of index numbers, Methods of constructing index numbers. Test of index numbers, Cost of living index number. **Time Series:** Meaning and use of time series analysis, Different components of I time series, Different methods of calculating trend and seasonal variation. **Interpolation:** Introduction, Derivation of different interpolation formulas, Relation between divided difference and simple difference interpolation with unequal intervals of the arguments. **Test of Significance:** Basic concepts of test of significance, Definition of the related terms, Steps in a test of significance, Confidence interval, Construction of confidence interval, The important test. Normal test, t-test, chi-square test, F-test, Test for the significance of mean, variance. Correlation co-efficient, Regression co-efficient, Propertions, Test of independence in a contingency table.

পদের নাম: প্রভাষক

বিষয় ঃ মৃত্তিকা বিজ্ঞান (Soil Science)

কোড ঃ ৪১৯

পূর্ণমান ঃ ১০০

1. **Soil & soil forming process:** (a) Soil and soil forming' factors, (b) Physical and chemical weathering, (c) Genesis of podsol, laterite, chernozem, saline and alkali soils. 2. Soil classification with special reference to soils of Bangladesh. 3. Soil erosion and conservation. 4. Soil texture, structure, soil water, soil temperature, soil organic matter, irrigation & drainage. S. (a) Iron exchange capacity of soil, (b) Causes of soil acidity and alkalinity, (c) Soil reaction affecting nutrient availability in soil.6. Liming: Liming material and effects of liming on soil properties. 7. Plant nutrition: (a) Essential plant nutrients and their availability in soil, (b) Nutrient deficiency symptoms and their functions in the plant. 8. (a) Different chemical fertilizers and organic manures, (b) Time and methods of fertilizer application. 9. Biological nitrogen fixation and soil fertility. 10. Methods of soil fertility evaluation: soil testing, critical limits and fertilizer recommendation. 11. Soil fertility problems and possible means of improvement & sustenance of soil fertility.

পদের নাম: প্রভাষক

বিষয় ঃ গার্হস্থ্য অর্থনীতি (Home Economics)

কোড ঃ ৪২০

পূর্ণমান ঃ ১০০

(a) Aims and objectives of Home Economics

(b) Home Management: (i) Definiton and scope of management
(ii) Critical analysis of values, goals and use of resources as effecting management practices in homes in Bangladesh.
(iii) Socio-Cultural and economic changes and the effect upon home management.

(c) Analysis of Housing: (i) Housing design (ii) Importance of light, colour and furnishings in a home (iii) Interior decoration.

(d) Importance of Art and its Application in Home

(e) Clothing and Textiles: (i) Textiles fibres: their classification, sources and characteristics. (ii)Simple methods of the identification of fibres. (iii) Tailoring techniques: general technique of drafting garments. (iv) Fashion and Design.

(f) Child Development and Family Relation: (i) Development by stages. (ii) Juvenile Delinquency: causes and remedies. (iii)Family disruption: Its effect on children and suggestion for family solidarity and stability. (iv) Importance of family planning, advantages of small family.

(g) Child Psychology

(h) Food and Nutrition: (i) Definition of food and nutrition (ii) Six nutries: their sources, functions in the body, requirements and deficiencies.(iii) Classification of fats, proteins and carbohydrates. (iv) Properties of vitamins; vitamins in food preparation.
(v) Energy: measuring energy, energy requirement, activity and calorie requirements, energy expenditure vs. intake, calorie content in food. (vi) Basic groups of food. (vii) Planning diets: at different ages, pregnant mother, lactating mother, diet in disease: diabetes, blood pressure, heart disease and jaundice. (viii) Applied Nutrition: Nutrition problems in Bangladesh, public health activities in nutrition.

পদের নাম: প্রভাষক

বিষয় ঃ ব্যবস্থাপনা (Management)

কোড ঃ ৪২১

পূর্ণমান-১০০

A. Organization: i. Basic Concepts: Meaning of business basic elements, features-branches and their place in economy of Bangladesh, business environment, business size-location of business efficiency of business enterprises: social responsibility of business and its implication to society, business and Government. ii. Different form of Business Organization: Formation, characteristics, merits and demerits of sole Proprietorship, Partnership, Company, Cooperative society and state enterprise. iii. Institutions for furtherance of business: Chamber of Commerce and Industries EPZ-EPB-PORT Authority: BGMEA. iv. Globalization: Argument in favour and against globalization: related agency WHO, IMF, SAPTA-NAPTA-ASEAN.

B. Management: i. Introduction: Meaning-scope- Importance-Principles-Functions, Management a science or art Management as a Profession, Basic Managerial Roles and skills managers at different levels of the - organization. Management as a career. ii. Planning: Meaning. Importance. types-steps-Factors affecting Planning. Planning techniques. Limits to Planning. Making, Planning effective. Decision making Process-Nature of Managerial decision making, factors in decision making, steps in decision making. iii. Organizing: Meaning, Importance, types of organization structure, Line Organization, Committee-span of management. Authority. Delegation of authority, Centralization and decentralization of authority. Co-ordination: meaning, importance, Principles and Procedure of Co-ordination. iv. Leading: Direction: Importance and Principles of direction, advantages and disadvantages. Consultive direction: Communication and its importance; main elements and process of communication, Motivation: meaning, importance, theories of motiivation-financial and non-financial incentives-Leadership and its importance-Leadership types. Qualities of a good leader. v. Controlling: Meaning, nature, importance, control process, requirements of an effective Control system. Control techniques, budgetary control: Meaning and process of budgetary control. vi. Technology in Modern Communication: Electronic Media in oral and written Communication, (Telephone - fax-ISD-Computer-Internet-Email-Multimedia and business related software).

c. **Legal Environment of Business:** Law of Contract-The contract act of 1872: Definition of a Contract, essential elements, offer and acceptance, Consideration, void and voidable contract, performance of Contract, breach of Contract and remedy for breach, discharge of a Contract, quasi contract, indemnity and guarantee, bailment and pledge.

পদের নাম: প্রভাষক

বিষয় ঃ হিসাববিজ্ঞান (Accounting)

কোড ঃ ৪২২

পূর্ণমান-১০০

A. Financial Accounting: i. Introduction: Need and importance of Accounting, Accounting concepts and Conventions, Double entry system of Accounting, Accounting cycle up to Preparation of work sheet, Recent trends in Accounting. ii.Preparation of Trading. Profit and Loss Account and Balance Sheet of sole Proprietorship. Partnership and Companies. iii. Depreciation: Methods of depreciation: Provisions and Reserves and their treatment in Accounting. iv. Valuation Concept: Valuation of goodwill and shares. v. Accounting Information system: Basic concepts. Principles of Accounting information systems, developing an Accounting system Mcchairized Accounting system.

B. Auditing: Introduction: Objectives, advantages and techniques of Auditing-system of Internal check. Internal Control and Internal Audit. Vouching Verification and valuation of Assets and Liabilities, Auditor Duties and Liabilities-

C. Income Tax: Income-Classes of Income- Heads of Income, General Rules underlying Assessment of Income Tax for Individual.

D. Cost and Management Accounting: i. Introduction: Meaning, Objectives and Advantages of Cost and Management Accounting, Cost classification. ii. Methods of Costing. iii. Accounting for Materials, Labour and Overheads. iv. Cost-volume-Profit Analysis: Computation of break-even point, construction of break-even chart, break-even analysis for decision making, Changes in fixed cost, Volume. Price, Sales Mix and Margin of Safety. v. Budgetary Control and Elementary idea of standard costing.

পদের নাম: প্রভাষক

বিষয় ঃ বিপণন (Marketing)

কোড ঃ ৪২৩

পূর্ণমান ঃ ১০০

1. **Understanding Marketing and the Marketing Process:** Marketing in a changing world, Creating Customer value and satisfaction, Strategic Planning and the Marketing Process, the Marketing environment.
2. **Developing Marketing opportunities and strategies:** Marketing research and information systems, consumer markets and consumer buyer behaviour, Market segmentation, targeting and positioning for competitive advantage.
3. **Developing the Marketing Mix:** Product and services strategy, new product development and product life cycle strategies - pricing products, Pricing considerations and approaches, pricing strategies, distribution channels and logistics management, retailing and wholesaling, integrated marketing, communications strategy. Advertising, sales Promotion and public relations, personal selling and sales management, Direct and online marketing, the new marketing model:
4. **Managing Marketing:** Competitive strategies - attracting, retaining and growing customers, the global market place, Marketing and society.
5. **Measuring and Forecasting Demand:** Measuring current Market Demand, Forecasting Future Demand.
6. **Marketing and society:** Social Responsibility and Marketing. Ethics. Social criticisms of marketing, Citizen and Public Action to Regulate Marketing, Business Actions Towards socially Responsible Marketing.
7. **The Global Marketplace:** Looking at the Global Marketing Environment, Deciding whether to go International marketing, Deciding which Markets to Enter, Deciding How to enter the market, Deciding on the Global Marketing program, Deciding on the Global Marketing organization.
8. **Designing and Managing value, Networks and Marketing Channels:** The Marketing channels, Network-What work is performed by marketing channels, Channels design decisions-Channel dynamics, Channel management decisions, Channel conflict, Cooperation and competition.
9. **Dealing with Competition:** The Process of analyzing Competitors Market leaders strategies-Market nicher strategies.

পদের নাম: প্রভাষক

বিষয় ঃ ফিন্যান্স (Finance)

কোড ঃ ৪২৪

পূর্ণমান ঃ ১০০

Finance:

1. **Introduction:** Definition; Functions and Classifications of Finance, Scope and Functions of business finance, Principles of Finance, Goal of a firm, Profit maximization versus wealth maximization.
2. **Source of Finance:** Internal and external finance, Short term financing characteristics and types, Calculation of effective interest rate of different sources of short-term capital.
3. **Intermediate term financing:** Defirition, Characteristics, Types and sources, Advantages and disadvantages; Cost of intermediate term financing, Methods of repayment schedule.
4. **Long term Financing:** Definition, Characteristics, Importance. Sources of long term finance and methods of raising long term fund, Instruments of long-term financing-Common stock, Preferred stock capital, Debt capital, Advantages and disadvantages of long term financing.
5. **Time value of money:** Concept and importance, Time value of money. Compounding, Discounting present value and terminal value, Use of present value table, Value of an annuity, loan amortization schedule.
6. **Capital Budgeting:** Importance and application of the concept of capital budgeting, Types of investment decisions, Steps in Capital Budgeting, Techniques of Capital budgeting, Pay back period method. Average rate of return, NPV, IRR, Profitability index method and capital rationing.
7. **Cost of Capital:** Significance of cost of capital, Meaning of opportunity cost, Different sources of capital and its cost, Weighted average cost of capital and Marginal cost of capital.
8. **Risk Return Analysis:** Capital budgeting under uncertainity, Portfolio management.
9. **Financial statement analysis:** Definition, Nature, uses and importance of ratio analysis, Types of ratio analysis: liquidity ratio, leverage ratio, activity & Profitability ratio.
10. **Lease financing:** Definition, Contents, features, types, advantages and disadvantages, leasing versus borrowing decision.
11. **Capital Market:** Definition, Constitutions - their role functions of stock exchange, Procedures of trading in securities in stock exchange of Bangladesh, Security and Exchange Commission (SEC).
12. **Working Capital Management:** The concept of working Capital, Relationship between current assets and current liabilities, Components of working Capital, determinants of working capital, Working capital cycles, Estimating working capital requirements.
13. **Dividend Theories:** Divident Payments Factors influencing dividend Policy, Theories of dividend Policy, Types of dividend policy, cash dividend versus stock dividend, stock split, relationship between dividend policy and method of financing, relationship between dividend policy & value of a Campany, Walter Model, Gordon model. MM Hypothesis, Relevance of dividend policy-market imperfections.

পদের নাম: প্রভাষক (গ্রন্থাগার ও তথ্য বিজ্ঞান)

বিষয় ঃ গ্রন্থাগার ও তথ্য বিজ্ঞান (Library and Information Science)

কোড ঃ ৪২৫

পূর্ণমান ঃ ১০০

1. **Introduction**

Definition, Nature and scope of library and information science. Development of library and its rule in the society with a special reference to Bangladesh.

2. **History of Books and Libraries**

Story of books and writing materials from earliest time to modern time.

3. **Collection Development**

Principles and policies of collection development, Evaluation & selection of library materials in different types of libraries, National book policy of Bangladesh.

4. **Library Management**

Principles of library management, Elements of library management, Library cooperation and resource sharing. Censorship, Copyright law & library legislation.

5. **Organizations of Library Materials (Classification)**

Purpose of classification; Knowledge & book classification. Criteria and principles of book classification, Notation, Criteria of a good notation.

6. **Organizations of Library Materials (Cataloguing)**

Purpose and functions of library catalogue and indices. Criteria of a good catalogue, Catalogue aids, Importance & types of indices. Rule Of indexing.

7. **Bibliography**

Importance of bibliographical control, Kinds of bibliography, Difference between bibliography & catalogue, Methods of preparing bibliography.

8. **Information Sources**

Information sources & their services in modern library and information centres.

9. **Documentation and Information Retrieval**

Difference between librarianship and documentation, -Active documentation and passive documentation, Documentation services and information retrieval in B.D. Library computerization.

10. **Recent development in library science and information technology.**

পদের নাম: প্রভাষক

বিষয় ঃ আরবি (কলেজ)-Arabic (College)

কোড ঃ ৪২৬

পূর্ণমান-১০০

(উচ্চ মাধ্যমিক বিদ্যালয়/কলেজ)

'ক' অংশ

১. **আল কুরআন ঃ** i. সুরা আল ফাত্হ। ii. সুরা আল হুজুরাত।

২. **আল হাদিস ঃ** i. কিতাবুল ঈমান ii. কিতাবুল ইল্ম।

৩. **আরবি সাহিত্য ঃ ক. গদ্য ঃ** i. আল গনি ওয়াল ফকীর -আল মানফালুতি ii. আল মাকামাতুল উলা-আল হারিরি iii. মিন ইয়াওমিল ইসলাম-আহমদ আমিন

খ. পদ্য ঃ i. মুয়ালাকা-জুহাইর বিন আবি সুলমা ii. বানাত সু'আদ-কাব বিন জুহাইর iii. ওয়াজিবুল মুয়ালিমিন- আহমদ শাওকি

৪. **আরবি ব্যাকরণ ঃ** ক. নাহ্ ও ছরফ খ. অনুবাদ বাংলা হতে আরবি

৫. পত্র/দরখাস্ত/রচনা।

'খ' অংশ

১. আল কুরআন ও উলুমুল কুরআন- ক. আল কুরআন

i. সুরা আল হুজুরাত ii. সুরা আন-নুর iii.সুরা আল ফাত্হ

খ. উলুমুল কুরআন ঃ (পরিচ্ছেদ ৭, ১৭, ২৬)

২. আল হাদিস ও উসুলুল হাদিস-

ক. আল হাদিস

i. কিতাবুল ঈমান ii. কিতাবুস সালাত।

iii. কিতাবুল মাগাজি।

খ. উসুলুল হাদিস

৩. আল ফিক্হ ও উসুলুল ফিক্হ-

ক.আল ফিক্হ

i. কিতাবুজ জাকাত ii. কিতাবুল বুজু

খ. উসুলুল ফিক্হ

৪. ইসলামি সভ্যতা - i. ইসলামে মানবাধিকার ii. বিজ্ঞান ও প্রযুক্তিতে মুসলমানদের অবদান iii. ইসলামে শিক্ষার গুরুত্ব iv. ইসলামে সামাজিক জীবন, পারিবারিক কল্যাণ, অর্থনীতি এবং ব্যাংক ব্যবস্থা v. পরিবেশ সম্পর্কে ইসলামের ধারণা vi. উপমহাদেশে ইসলাম।

পদের নাম: প্রভাষক

বিষয় ঃ ইসলাম শিক্ষা (Islamic Studies)

কোড ঃ ৪২৭

পূর্ণমান-১০০

(উচ্চ মাধ্যমিক বিদ্যালয়/কলেজ)

'ক' অংশ

১. **আল কুরআন ঃ** i. সুরা আল ফাত্হ। ii. সুরা আল হুজুরাত।

২. **আল হাদিস ঃ** i. কিতাবুল ঈমান ii. কিতাবুল ইল্ম।

৩. **আরবি সাহিত্য ঃ ক. গদ্য ঃ** i. আল গনি ওয়াল ফকীর -আল মানফালুতি ii. আল মাকামাতুল উলা-আল হারিরি iii. মিন ইয়াওমিল ইসলাম-আহমদ আমিন

খ. পদ্য ঃ i. মুয়ালাকা-জুহাইর বিন আবি সুলমা ii. বানাত সু'আদ-কাব বিন জুহাইর iii. ওয়াজিবুল মুয়ালিমিন- আহমদ শাওকি

৪. **আরবি ব্যাকরণ ঃ** ক. নাহ্ ও ছরফ খ. অনুবাদ বাংলা হতে আরবি

৫. পত্র/দরখাস্ত/রচনা।

'খ' অংশ

১. আল কুরআন ও উলুমুল কুরআন- ক. আল কুরআন

i. সুরা আল হুজুরাত ii. সুরা আন-নুর iii.সুরা আল ফাত্হ

খ. উলুমুল কুরআন ঃ (পরিচ্ছেদ ৭, ১৭, ২৬)

২. আল হাদিস ও উসুলুল হাদিস-

ক. আল হাদিস

i. কিতাবুল ঈমান ii. কিতাবুস সালাত।

iii. কিতাবুল মাগাজি।

খ. উসুলুল হাদিস

৩. আল ফিক্হ ও উসুলুল ফিক্হ-

ক.আল ফিক্হ

i. কিতাবুজ জাকাত ii. কিতাবুল বুজু

খ. উসুলুল ফিক্হ

৪. ইসলামি সভ্যতা - i. ইসলামে মানবাধিকার ii. বিজ্ঞান ও প্রযুক্তিতে মুসলমানদের অবদান iii. ইসলামে শিক্ষার গুরুত্ব iv. ইসলামে সামাজিক জীবন, পারিবারিক কল্যাণ, অর্থনীতি এবং ব্যাংক ব্যবস্থা v. পরিবেশ সম্পর্কে ইসলামের ধারণা vi. উপমহাদেশে ইসলাম।

পদের নাম: প্রভাষক

বিষয় ঃ পালি (Pali)

বিষয় কোড- ৪২৮

পূর্ণমান-১০০

১. পালি গদ্যাংশ

দীঘ নিকায় : বুদ্ধস্স অন্তিম আহার, বুদ্ধস্স অন্তিমবাণী, চত্তারি দস্সনীযানি।
মহাবর্গ : সীহ সেনাপতি, দীঘ কুমার কথা।
চূল্লবর্গ : ভিক্খুনী সংঘ পতিট্ঠা।
জাতক : সুপ্পারক জাতক, নিগোধমিগ জাতক, কুদ্দাল জাতক, কট্ঠহারি জাতক।
মিলিন্দপঞ্হ : সদ্ধা, বিরিয, পঞ্ঞা, কম্ম, নিব্বাণ, বুদ্ধো পূজং সাধিযতি।

২. পালি পদ্যাংশ

ধম্মপদ : অপ্পমাদ বগ্গ, চিত্ত বগ্গ, যমক বগ্গ।
সুত্তনিপাত : বাসেট্ঠ সুত্ত, কসি ভারদ্বাজ, কলহবিবাদ সুত্ত।
থেরগাথা : অঙ্গুলিমাল, সীলব, আনন্দ, মহাকচ্চাযন।
থেরী গাথা : পূন্নিকা, কিসা গোতমী, খেমা, পটাচারা।

৩. ত্রিপিটক বহির্ভূত সাহিত্যঃ

মহাসম্মত বংস, পঠম সংগীতি, দুতিয়ো সংগীতি, ততিযো সংগীতি।

৪. পালি ব্যাকরণ

বর্ণ, সন্ধি, কারক বিভক্তি, শব্দ প্রকরণ, সমাস, অসমাপিকা ক্রিয়া, উপসর্গ ও নিপাত, প্রত্যয়

পালি বিষয়ের মান বণ্টন; পূর্ণমান-১০০

গদ্যাংশঃ ২০

চারটি প্রশ্ন থাকবে। যে কোন ২টি প্রশ্নের উত্তর দিতে হবে। ১০×২=২০

পদ্যাংশঃ ২০

চারটি প্রশ্ন থাকবে। যে কোন ২টি প্রশ্নের উত্তর দিতে হবে। ১০×২=২০

ত্রিপিটক বহির্ভূত সাহিত্যঃ ২০

চারটি প্রশ্ন থাকবে। যে কোন ২টি প্রশ্নের উত্তর দিতে হবে। ১০×২=২০

ব্যাকরণঃ ২০

আটটি প্রশ্ন থাকবে। যে কোন ৪টি প্রশ্নের উত্তর দিতে হবে। ৫×৪=২০

অনুবাদ

ধম্মপদের অপ্পমাদ বগ্গ, চিত্ত বগ্গ, যমক বগ্গ, সুত্তনিপাতের কলহ বিবাদ সুত্ত, কসি ভারদ্বাজ সুত্ত, থেকে ৪টি উদ্ধৃতাংশ থাকবে। যে কোন দুটির বাংলা অনুবাদ লিখতে হবে। ৫×২=১০

টীকা

পালি গদ্যাংশ, পালি পদ্যাংশ ও বংসসাহিত্যের উপর চারটি টীকা থাকবে। যে কোন দুটি টীকা লিখতে হবে। ৫×২=১০

পদের নাম: প্রভাষক

বিষয় ঃ আরবি (মাদরাসা)-Arabic (Madrasa)

কোড ঃ ৪২৯

পূর্ণমান-১০০

ক. العربى **(আরবি) ঃ**

النثر গদ্য ঃ

১. ذوالاصبع العدوانى: وصية لابنه (যুল ইছবাইল আদাওয়ানী) ঃ ওয়াছিয়্যাতু লিইবনিহি)।
২. خطبة الذبصلى اللّه عليه وسلم فحجة الوداع (খুতবাতুন নাবী সালালাহু আলাইহি ওয়াসালাম ফি হিজ্জাতিল বিদা)।
৩. بديع الزمان الهمدانى – المقامة الكوفية (বাদিউজ্জামান আল-হামদানী ঃ আল মাকামাতুল কুফিয়্যাহ)।
৪. خطبة طارق بن زياد (খুতবাতু ত্বারিক বিন যিয়াদ)।
৫. الامثال والحكم العربية (আল আমছাল ওয়াল হিকামুল আরাবিয়্যাহ)।
৬. اول شهيدةفى الاسلام (আওয়ালু শাহদাতিন ফিল ইসলাম)।
৭. شهر رمضان – للثعالبى (শাহরু রামদান লিছছাআ'লাবী)।
৮. الصادق للرافعى (আস ছাদীক লির রাফিঈ)।

الذظم পদ্য ঃ

১. من معلقةامرا القيس (মিন মুয়ালাকাতি ইমরাইল কায়স)।
২. قصيدةكعب بن زهير (رض)(কাছীদাতু কা'ব বিন যুহাইর (রা)।
৩. شعر ابى تماء فى انتصار المعتصم (শে'রু আবি তামাম ফি ইনতিছারিল মু'তাছিম)।
৪. مدرسة البنات لحافظ ابراهيم (মাদরাসাতুল বানাত লি হাফিজ ইবরাহিম)।
৫. من اشعار ورقة بن نوفل (من السيرة النبوية لابن كثير) (মিন আশয়ারি ওয়ারাকা বিন নওফাল মিনাস সিরাতিন নাববিয়্যাহ লি ইবন কাছির)।
৬. من قصيدة كعب بن زهير (رض) (মিন কাছীদাতি কা'ব বিন যুহাইর (রা)।
৭. من ديوان الحماسة لابى تمام (মিন দিওয়ান হামাসা লি আবি তামাম)
৮. وصف الربيع للبحترى (ওয়াসফুর রাবী লিল বুহতারী)।

খ. التفسير (আত তাফসীর) ঃ

১. سورة البقرة (সূরা আল-বাকারা)। ২. سورة يس (সূরা ইয়াসীন)। ৩. سورة الحجرات (সূরা আল-হুজুরাত)।

গ. الحديث (আল-হাদীস) ঃ

১. كيف كان بدا الوحى (বাবুন কাইফা কানা বাদউল ওয়াহী)।
২. كتاب الايمان (কিতাবুল ঈমান)। ৩. كتاب العلم (কিতাবুল ইলম)।
৪. كتاب المناقب (কিতাবুল মানাকিব)। ৫. كتاب المغازى (কিতাবুল মাগাযী)।

ঘ. الفقه (ফিকহ) ঃ

১. كتاب البيوع (কিতাবুল বুয়ু)। ২. كتاب الكراهية (কিতাবুল কারাহিয়্যাহ)।

পদের নাম: প্রভাষক

বিষয় ঃ কৃষি (Agriculture)

কোড ঃ ৪৩০

পূর্ণমান ঃ ১০০

1. Factors affecting growth, development, yield and desirable qualities of crops. 2. Important morphological characters and production technology of some important (a) cereals, (b) pulses, (c) vegetables, (d) fruits, (e) sugar, (f) oil, (g) fibre, (h) narcotic, (i) beverage, (j) medicinal and (k) timber yielding plants of Bangladesh with their scientific name. 3. Concept on cropping pattern, multiple cropping, crop rotation, crop diversification, crop calendar, irrigation, drainage and other intercultural operations. 4. (a) Methods of vegetative propagation of some important vegetable crops and fruit trees, (b) Vegetable seed production techniques. 5. (a) Necessity and basis of classification of plant kingdom, (b) Salient features of natural and phylogenetic classification of plant kingdom, (c) Necessity of scientific naming of plants. 6. Cell & cell division: (a) Concept and structure of a plant cell, (b) Functions of different important organelles of cell, (c) Types and mechanism of different cell division and their importance. 7. Plant physiology: (a) Photosynthesis, (b) Respiration, (c) Transpiration, (d) Photopetiodism. 8. Environmental pollution: (a) Causes, harmful effects and remedies of different environmental pollution (air, water and soil), (b) Causes of green house effect and its remedies, (c) Possible causes of forest depletion in Bangladesh, its harmful effects and remedies. 9. (a) Concept of pest, pesticide and pest management, (b) Methods of pest control, (c) Integrated pest management system. 10. Scientific name with family, nature of damage and control measures of major insect pests of important (a) cereals, (b) pulses, (c) vegetables, (d) fruits, (e) sugar, (f) oil and (g) fibre yielding plants of Bangladesh. 11. Scientific name of the pathogen, symptoms and control measures of major diseases of important (a) cereals, (b) pulses, (c) vegetables, (d) fruits, (e) sugar, (f) oil and (g) fibre yielding plants of Bangladesh.12. Plant nutrition: (a) Essential plant nutrients, their deficiency symptoms and functions, (b) Different chemical fertilizers and organic manures, (c) Time and methods of fertilizer application, (d) Biological nitrogen fixation. 13. Soil fertility management: Soil fertility problems and possible means of improvement of soil fertility. 14. (a) Mendel's laws of inheritance and their major modifications, (b) Methods of plant breeding: Introduction, selection, hybridization, mutation, polyploidy, (c) Chemical composition of DNA & RNA, (d) Concept on heritability, heterosis and hybrid. (e) Methods of conservation of plant genetic resources, (f) Concept on a new variety release system. 15. Biotechnology and tissue culture: Concept, scope, application and importance in plant improvement. 16. The principles and practices of agricultural extension. 17. Agroforestry: Its concept, scope, importance and classification.

পদের নাম: Lecturer (Information and Communication Technology)

বিষয় ঃ কম্পিউটার বিজ্ঞান (Computer Science)

কোড ঃ ৪৩১

পূর্ণমান-১০০

Exam Duration: Three Hours

Instructions

Candidates will have to answer 10 questions prepared from 10 units each carrying 10 Marks. Each question will have 2 to 3 sub-items (e.g. a, b, c). The distribution of marks for each question can be 2+3+5, 3+3+4, 3+7, 2+2+6, 5+5 or 4+6. Questions will be prepared following Bloom's taxonomy of cognitive learning. A minimum of 20% marks should be allotted to higher order questions which require analyzing, evaluating, complex problem solving or creating/synthesizing. There will be alternatives for three questions; an alternative question must be prepared from the same unit with same structure covering same sub-domain and mark distribution.

Assessment targets The candidate will be able to -	**Contents**	**Marks**
• describe evolution of computer. • explain different functions of basic components of computer system • demonstrate basic understanding of recent information and communication technologies and their applications	**Unit 1: Introduction to Computer and Recent ICT Developments** ▪ History, types, and generations of computer; ▪ Basic organization of computer; ▪ Peripherals of computers and it's operations; ▪ Introduction to Robotics, Artificial Intelligence, Internet of Things (IoT), Augmented Reality, Virtual Reality, Biometrics, Nanotechnology and Cloud Computing.	10
• demonstrate a clear understanding of various data structures and their functions. • identify appropriate algorithm for solving a given problem with justifications in terms of time and memory complexity.	**Unit 2: Data Structure and Algorithm** ▪ Basics of data structure, big o notation, complexity of algorithm and time space tradeoff, pseudo code; ▪ Array, heap, stack, queue, linked list (singly and double) recursion, trees; ▪ Sorting algorithms (insertion sort, selection sort, bubble sort, quick sort, merge sort, radix sort, heap sort, etc.); ▪ Factorial and tower of hanoi problem; ▪ Searching techniques (linear and binary search); ▪ Tree traversal algorithm, greedy algorithms, graph searching, BFS, DFS; ▪ Divide and conquer algorithms: the greedy method; dynamic programming, basic traversal & search techniques, backtracking, branch and bound.	10
• explain basic concepts and terms regarding structured programming and object-oriented programming	**Unit 3: Programming Language** ▪ Structure Programming: overview of C, C++ and java, constants, variables and data types, operator & expression, managing input & output operators,	10

Assessment targets The candidate will be able to -	Contents	Marks
language. • solve various real-life problems using structured programming and object-oriented programming language.	decision making and branching, decision making and looping, arrays, handling of character string, user-defined function, structure and union, pointers, file management; ▪ Object Oriented Programming: principles of object-oriented programming, tokens, expressions and control structure, functions, arrays, strings, pointers, references, basic input/output, classes and objects, constructors and destructors, operator overloading, inheritance, polymorphism and encapsulation, interfaces, files and streams, exception handling, dynamic memory.	
• explain various concept of discrete mathematics and numerical analysis • analyze and evaluate different problems of discrete mathematics and numerical analysis • analyze and evaluate different applications of discrete mathematics and numerical analysis	**Unit 4: Discrete Mathematics and Numerical Analysis** ▪ Discrete Mathematics: set theory, relations, functions, graph theory, algebraic systems, group theory, homomorphism, mathematical reasoning, theories with induction. Recurrence function; ▪ Numerical Analysis: numerical solution of polynomials; ▪ Numerical Solution of Simultaneous Linear Equation: numerical solution of ordinary differential equation, direct methods for systems of linear equations, iterative techniques and advantages in solving systems of linear equations.	10
• analyze and evaluate a system having clear understanding of software engineering • explain compiler working principles. • construct compiler.	**Unit 5: Software Engineering and Computer Design** ▪ Software Engineering: paradigms, requirements analysis fundamentals, software design fundamentals, software testing techniques and strategies, software management and maintenance technique, case; ▪ Computer Design: introduction to compiler, a simple one pass compiler, lexical analysis, basic parsing technique, syntax directed translation, runtime environment, intermediate code generation, code generation, code optimization.	10
• explain various number systems, theorems, logic gates and memory management • perform conversion of different number systems • simplify boolean algebra • evaluate various logic gates • explain/differentiate computer architecture and	**Unit 6: Digital Logic Design and Computer Architecture** ▪ Number systems and codes; ▪ Boolean algebra, de morgan's theorems; ▪ Logic gates and their truth tables, karnaugh map method ▪ Combinational logic circuits, decoder, encoder, multiplexed, and de-multiplexer, flip flop; ▪ asynchronous and synchronous counters; ▪ D/A converter circuitry, A/D converter circuitry; ▪ Instruction sets, addressing modes and types of	10

Assessment targets The candidate will be able to -	Contents	Marks
it's application. • **.** design a particular circuit for practical applications	instruction; ▪ Memory organization, caching; ▪ Central processing unit, control units; ▪ Fundamentals of parallel and distributed processing; ▪ Pipelining and data flow; ▪ Array processing and vector processing.	
• explain concept and terms related to operating system and embedded programming • explain working principle of operating system and it's different elements • analyze and evaluate different operating system structure, working principles and it's usability in different cases • understand and explain embeded system	**Unit 7: Operating System and Embedded Programming** ▪ Operating System: definition and types OS, OS structures, processes, CPU scheduling, process synchronization, deadlocks, memory management, virtual memory, file concept, file system implementation ▪ Concept and applications of visual programming, system programming, general machine structures, internet programming, environments, multiple document interfaces, activex controls and activex components, API, web (Apache/IIS) server, OLE automation, web-based application development and state management, kernel programming, programming for memory management, interrupt handling, linux module programming;	10
• explain different concept and terms of dbms, e-commerce and web application engineering • explain working principle of different database management systems • analyze and evaluate different cases for building a real-life application	**Unit 8: DBMS, E-Commerce and Web Application Engineering** ▪ Database Management System (DBMS): data, database, database management, data abstraction, database model, database relation, database security, etc; ▪ Database Languages: data management; types of database, database system structure, relational algebra and SQL. Database design, indexing, normalization; ▪ Concept of e-government and its scope, unicode and ict in local languages, issues in transliteration and natural language translation, it workforce, concepts in bridging the digital divide, models of public-private partnerships (PPP), application scenarios for G2G, G2B and G2C categories of e-business (B2B, B2C, B2A, etc), electronic markets; ▪ Introduction to web and web application; ▪ Web Essential: client, server and protocols, http request and response message, web application, CGI, web server mode, logging, access control, HTML/XHTML, CSS, Javascript, W3C standard, pattern, service locator pattern, data access object pattern, persistent communication, web application security: policy, network-level security: SSL, etc	10

Assessment targets The candidate will be able to -	**Contents**	**Marks**
• explain different concept and terms • explain working principle of different computer network and distributed system • analyze and evaluate different cases for building a real-life application	**Unit 9: Computer Network and Distributed System** ▪ Basic computer network concept, network structure, network software, reference model, OSI model, TCP/IP model, x.25 networks, frame relay, atm network, medium access sub-layer, network layer, application layer, communication mediums, network topologies, communication devices, synchronous and asynchronous communication, transmission band; ▪ Introduction To Parallel and Distributed Systems: architecture, challenges, principle and paradigm; ▪ Security: threats and attacks, different malware and it's protection, policy and mechanism, design issue, cryptography and cryptographic algorithms, cryptographic protocols, key distribution, basic concept of naming services, dns, attribute based naming; ▪ Distributed File Systems: client perspective, server perspective, NFS, coda, google file system(GFS). Parallel programming: parallel computing, parallel programming structure	10
• explain different concept and terms related to artificial intelligence • explain and analyze different algorithms in developing artificial intelligence • analyze and evaluate different cases for building a real-life application	**Unit 10: Artificial Intelligence** ▪ Overview of AI; ▪ AI Programming Language: prolog, environment types, agent types, agent model, reactive agents; ▪ Perception: neurons-biological and artificial, perceptron learning, general search, local searches: hill climbing, simulated annealing, constraint satisfaction problems. Genetic algorithm; ▪ Game Theory: motivation, minimax search, resource limits and heuristic evaluation, α-β pruning, stochastic games, partially observable games; ▪ Neural Networks: multi-layer neural networks; ▪ Machine Learning: supervised learning, decision trees, reinforcement learning, general concepts of knowledge, knowledge representation.	10

পদের নাম: প্রভাষক

বিষয় ঃ কম্পিউটার অপারেশন-বিএম (Computer Operation-BM)

কোড ঃ ৪৩২

পূর্ণমান ঃ ১০০

আধুনিক ডিজিটাল কম্পিউটার কম্পিউটারের বেসিক অর্গানাইজেশন, স্টোরেজ ডিভাইস, ইনপুট/ আউটপুট ডিভাইস সিস্টেমম সফটওয়্যার সি প্রোগ্রামিং ল্যাংগুয়েজ ডাটা টাইপ, এ্যারো সংক্রান্ত প্রোগ্রাম এ্যালগরিদম এবং ফ্লোচার্ট। ফাংশনাল প্রোগ্রাম মাইক্রোপ্রসেসর, মাইক্রোপ্রসেসর ইনপুট ও আউট পুট, মেমোরি ইত্যাদির সার্পোটিং চিপ। ক্যাশ মেমোরি, RAM এবং ROM,কম্পিউটার হার্ডওয়্যার মেইনটেন্যান্স এবং ট্রাবল সুটিং। ডাটা প্রসেসিং এবং সিকিউরিটি। ডাটা ডাটাবেজ ম্যানেজমেন্ট, ডাটাবেজ ডিজাইন ও ডিজাইন টেবিল। ডাটা কমিউনিকেশন ও কমিউনিকেশন মিডিয়া কম্পিউটার নেটওয়ার্ক ও নেটওয়ার্কের প্রয়োগ। কম্পিউটার ভাইরাস ও এন্টি ভাইরাস।

পদের নাম: প্রভাষক

বিষয় ঃ হিসাবরক্ষণ-বিএম (Accounting-BM)

কোড ঃ ৪৩৩

পূর্ণমান ঃ ১০০

হিসাব বিজ্ঞানের ক্রমবিকাশের সংক্ষিপ্ত ইতিহাস, হিসাব বিজ্ঞানের সার্বজনগাহ্য নীতিসমূহ, জাবেদার শ্রেণীবিন্যাস, হস্তান্তরযোগ্য দলিল, বিনিময় বিলে লেনদেন, অ-ব্যবসায়ী প্রতিষ্ঠান এবং ব্যবসায়ী প্রতিষ্ঠানের পার্থক্য। অনাদায়ী এবং সন্দেহযুক্ত পাওনার হিসাব প্রক্রিয়া। অংশীদারী ব্যবসায়ের হিসাব প্রক্রিয়া, ব্যবসায়িক লেনদেনের প্রকৃতি ও বৈশিষ্ট্য বিভিন্ন প্রকার দলিলের ব্যবহার ও ছক। উৎপাদন ব্যয় হিসাব এর উদ্দেশ্য ও আওতা, উৎপাদন ব্যয়ের উপাদান, শ্রেণীবিন্যাস ব্যয় বিবরণী প্রস্তুতকরণ, টেন্ডার বা দরপত্র প্রস্তুতকরণ কাচামাল ক্রয় গুদামজাতকরণ। খতিয়ান হিসাব ও বিন কার্ড, শ্রম ব্যয় ও এর প্রকারভেদ, উপরি ব্যয়/পরোক্ষ ব্যয় এর শ্রেণী বিভাগ ও এর গুরুত্ব।

পদের নাম: প্রভাষক

বিষয় ঃ ব্যাংকিং -বিএম (Banking-BM)

কোড ঃ ৪৩৪

পূর্ণমান ঃ ১০০

ব্যাংক ও ব্যাংকের শ্রেণী বিভাগ, বিভিন্ন শ্রেণীর ব্যাংক হিসাব। বিশেষায়িত ব্যাংক ও আর্থিক প্রতিষ্ঠানসমূহ। ব্যবসায়ী ও অব্যবসায়ী প্রতিষ্ঠানের পার্থক্য। অনাদায়ী এবং সন্দেহযুক্ত পাওনার হিসাব প্রক্রিয়া অংশীদারি ব্যবসায়ের হিসাব প্রক্রিয়া ব্যবসায়িক লেনদেনের প্রকৃতি ও বৈশিষ্ট্য। বিভিন্ন প্রকার দলিলের ব্যবহার ও ছক। উৎপাদন ব্যয় হিসাব এর উদ্দেশ্য ও আওতা, উৎপাদন ব্যয়ের উপাদান, শ্রেণীবিন্যাস, ব্যয় বিবরণী প্রস্তুতকরণ। টেন্ডার বা দরপত্র প্রস্তুতকরণ। কাচামাল ক্রয় গুদামজাতকরণ, মাল খতিয়ান হিসাব ও বিন কার্ড। শ্রম ব্যয় ও এর প্রকার ভেদ, উপরি ব্যয় এর পরোক্ষ শ্রেণী বিভাগ ও এর গুরুত্ব।

পদের নাম: প্রভাষক

বিষয় ঃ উদ্যোক্তা উন্নয়ন-বিএম (Entrepreneur Development-BM)

কোড ঃ ৪৩৫

পূর্ণমান ঃ ১০০

সংগঠন বিভিন্ন শ্রেণীর সংগঠনের শ্রেণীবিভাগ। লক্ষ ও পরিকল্পনা প্রণয়ন, কর্মী ব্যবস্থাপনা, কর্মী বাছাই, প্রশিক্ষণ ও কর্মফল মূল্যায়ন। উৎপাদন সিডিউল, উৎপাদন ব্যয় নিরূপণ ও মান নিয়ন্ত্রণ। উদ্দ্যোগ ও প্রেষণা, আত্মকর্মসংস্থান, পেশার চাহিদা নিরূপণ। সেবা সৃষ্টি, সেবা প্রদান ও সেবার মান নিয়ন্ত্রণ। নেতৃত্বের প্রয়োজনীয়তা, নেতার শ্রেণীবিন্যাস ও গুণাবলি। শিল্প বিরোধ, শিল্প বিরোধ সংক্রান্ত সমস্যা ও সমাধান এবং এ সংক্রান্ত সিদ্ধান্ত গ্রহণ। আর্থিক ব্যবস্থাপনা, কাঁচামাল ক্রয় ও গুদামজাতকরণ। পরিসংখ্যান তথ্য, তথ্যের শ্রেণী বিভাগ ও তথ্য সংগ্রহের পদ্ধতি। চিত্র ও লেখ। সূচক সংখ্যা ও সূচক নির্ণয়।

পদের নাম: গ্রন্থাগার প্রভাষক
বিষয়: গ্রন্থাগার ও তথ্য বিজ্ঞান (Library and Information Science)
বিষয় কোড: ৪৩৬
পূর্ণমান: ১০০
Exam Duration: 03 (Three) Hours

Instructions
Candidates will have to answer 10 questions prepared from 10 units each carrying 10 Marks. Each question will have 2 to 3 sub-items (e.g. a, b, c). The distribution of marks for each question can be 2+3+5, 3+3+4, 3+7, 2+2+6, 5+5 or 4+6. Questions will be prepared following Bloom's taxonomy of cognitive learning. A minimum of 20% marks should be allotted to higher order questions which require analyzing, evaluating, complex problem solving or creating/synthesizing. There will be alternatives for three questions; an alternative question must be prepared from the same unit with same structure covering same sub-domain and marks distribution.

Assessment Targets The Candidate will be able to -	**Contents**	**Marks**
• **explain** the basic terminologies associated with data and information • **analyze** and **apply** knowledge organization tools	**Unit 1: Introduction to Library and Information Science** • Data, information, knowledge and wisdom; • Qualitative vs. quantitative information; • Types and parameters of information; • Research data, big data and data analytics; • Information processing cycle; • ISBN, ISSN, DOI, etc.; • ISBN-10 and ISBN-13: check digit and missing digit calculation; • Resolving DOIs; • Metadata standards and protocols; • Taxonomy and ontology; • Thesaurus and subject headings; • System context in knowledge organization.	10
• **identify** different information sources and their characteristics • **evaluate** the sources of information using specific criteria • **develop** various tools for exploring information resources • **describe** the process of providing reference and information services	**Unit 2: Information Sources and Services** • Major information sources and their characteristics; • Formal and informal sources; • Documentary and non-documentary information sources, reference apparatus and informal channels; • Primary, secondary and tertiary sources of information; • Difference between credible and non-credible information sources; • Evaluation of information sources; • Compilation of bibliography and reading list; • Referencing tools and citation styles; • Distinction between information and reference service; • Reference questions and their categories: answering reference questions; • Techniques for providing information services including CAS, SDI, etc.; • Referral service and document delivery.	10

• **identify** information resources that support the goals, missions and requirements of the library • **apply** collection development policies, principles and procedures • **explain** the process of maintaining a balanced library collection	**Unit 3: Information Resources Development** • Identify different types of publications and their appropriate uses; • Traditional and electronic information resources in libraries; • Five Laws of Library Science and their relation to information resources development; • Book selection policies and principles; • Procedures and methods of acquisition of books and other reading resources; • Book selection tools and guides; • Evaluating book values; • Communication with publishers, book sellers and concerned agencies; • Ordering and subsequent activities; • Problems of acquisition of books and periodicals in Bangladesh; • Accession register and its purposes; • Overview of collection development and evaluation; • Criteria and methods of collection evaluation; • Copyright, censorship and other legal issues; • Nature, scope, principles and methods of stock taking and weeding; • Need for stock taking and weeding; • Barriers to weeding.	10
• **demonstrate** the basic understanding of knowledge classification • **identify** the special features of book classification • **compare** the schemes of library classification	**Unit 4: Organization of Knowledge (Classification)** • Purpose and functions of classification; • Knowledge classification and book classification; • Principles of book classification; • Five predicable and Porphyry's tree in library classification; • Special features of book classification: generalia class, standard subdivisions, form division and relative index; • Notation and its types; • Qualities of an ideal notation; • DDC: history, principles, tables, notations, number building process in DDC; • UDC: origin, auxiliaries in UDC, application in special libraries; • LC: growth and development, principles and application in libraries; • CC: evolution, principles and features of CC; • Analysis and applications of DDC, UDC and web DDC.	10
• **demonstrate** the basic understanding of catalogue and cataloguing • **identify** the bibliographic information for cataloguing	**Unit 5: Organization of Knowledge (Cataloguing)** • Concept, definition, objectives and purposes, functions and characteristics of a good catalogue; • Cataloguing codes: AACR2, RDA; • Physical structure of a book; • Technical reading of a book;	10

• **recognize** the types and forms of catalogues • **prepare** main entry and added entries	• Bibliographical information of a book; • Catalogue vs. bibliography: entry patterns, methods, differences; • Types of information included in library catalogue; • Access points and catalogue entries; • Filing: rules for catalogue entries; • Basic skeleton of a card catalogue; • Types and forms of catalogue: inner and outer forms of library catalogue; • Dictionary and classified catalogues: differences and their appropriateness in different types of libraries; • Union catalogue: functions, planning for union catalogue; • Shelf list catalogue: functions and uses, shelf list vs. public access catalogue; • Preparation of main entry and added entries; • Rules for making entry under oriental Muslim, Buddhist and Hindu names; • Application of MARC-21 and Dublin Core Metadata in library cataloging; • Subject headings: definition, tools, steps to subject determination, choice of subject headings, principles of construction, types and forms of subject headings; • Guidelines for using Sears List of Subject Headings: types of subdivisions and their use in constructing subject headings; • Computerized and online catalogue: definition, importance of computerized catalogue.	
• **explain** the concept of library automation and digitization • **apply** tools for automated and digital libraries	**Unit 6: Library Automation** • Library automation and digitalization; • Trends in automation and digitalization of libraries; • Need for and barriers to library automation and digitalization; • Nature and salient features of automated libraries, digital libraries and virtual libraries; • Sub-system and integrated models of library automation; • Various modules of library automation: acquisition, processing, circulation and serials control; • Digitization of traditional print media; • Hardware and software requirements for library automation and digitalization; • Criteria for choosing hardware and software for library automation and digitalization; • Commercial databases and services; • Merits and demerits of customized or tailor made and prewritten software or ready-made software, open source software.	10

• **explain** the basic concepts of management and evolution of management thoughts • **analyze** the internal organization and operations of library services • **apply** management techniques to achieve the organizational goal	**Unit 7: Library Administration and Management** • Definition of management, management functions, level of management, difference between administration and management; The classical approaches by Henri Fayol, Max Weber, Urwick, Luther Gulick, scientific management, Management by Objectives (MBO), Total Quality Management (TQM); • Library in-house operations: acquisition, processing, circulation and references services; • Library rules and regulations; • Library committee: functions and responsibilities; • Application of scientific management to libraries; • Strategic planning: defining the mission and vision of the library, identifying existing customers or users, determining current and future needs, formulating strategic plan; • Personnel management: theories and styles of personnel management, manpower planning, staff recruitments, job description, staff supervision, training and development, public relations, etc.; • Library budgets and finances: sources of income and heads of expenditure, budget and budgeting, preparation of budget, cost-benefit analysis; • Resources management: acquisition and resource utilization and handling technical operations; • Performance appraisal: library user surveys, assessing service quality, use of SEVRQUAL, LibQUAL, etc.; • Library records and statistics: usage report, downloads, circulation statistics, annual report, etc.	10
• **explain** the basic concepts of documentation • **prepare** index and abstract for documentation • **describe** the information retrieval process • **differentiate** browsing from searching • **evaluate** the effectiveness of retrieval performance	**Unit 8: Documentation and Information Retrieval** • Concepts, nature and functions of documentation; documentation work and documentation services, active and passive documentation, documentation process; • Bibliometrics, scientometrics and webometrics and their applications; • Indexing methods, construction of inverted files, t-d matrix, index compression and query processing; • Abstracting: types, principles, and qualities of an abstract; • Language and information retrieval; controlled vocabularies, controlled vocabulary in retrieval; problems with controlled vocabulary; • Introduction to information retrieval;	10

	components of IR systems; • Retrieval models: Boolean, vector space model, probabilistic model, etc.; • Information search process, types of searches, choosing sources; • Online searching: planning and performing the search, modifying the search, selecting results, search scenarios and strategies; • Browsing versus searching, browsing strategies, types of browsing, browsing tools, advantages and limitations of browsing, user interfaces for browsing; • Retrieval performance evaluation: recall and precision, criticisms of recall and precision as evaluation measures; • Other measurement scales: accuracy, MAP, F-measures, etc., user-centred design and evaluation**.**	
• **explain** the fundamentals of library cooperation and resources sharing • **describe** resource sharing programmes and activities • **evaluate** different configurations of library networks • **prepare** agreements for library networking and resource sharing	**Unit 9: Library Resource Sharing** • Objectives of library cooperation and resource sharing; • Reasons and importance of library cooperation and resource sharing; • Areas of library cooperation and resource sharing; • Components of library resource sharing; • Functions and activities of information resource sharing; • Components of information resource sharing; • Role of union catalogue in information resource sharing; • Resource sharing in online environment; • Factors influencing library resource sharing; • Barriers to resource sharing; • Types of library and information networks; • Configurations of library and information network; • Agreements for resource sharing; • Negotiation and licensing; • Necessary tools and for bibliographical control in resource sharing.	10
• **identify** the nature and functions of information literacy • **determine** the information literacy skills • **explain** the ethical use of information resource	**Unit 10: Information Literacy** • Definition, objectives, functions and scope of information literacy; • Media literacy, digital literacy and other forms of literacies; • International alliance and partnerships on media and information literacy competencies; • Information literacy models and theories: The Seven Faces of Information Literacy, The SCONUL Seven Pillars of Information Literacy; Big6; PLUS, etc.; • Information literacy standards and practices; • Identification of the extent of information	10

	needed, access the information effectively and efficiently, evaluate the information and its sources critically and creatively use that information in a responsible manner; • Measuring information literacy skills among college students; • Improving information literacy competencies; • Information ethics: ethical use of library and information resources; • Avoiding academic dishonesty/plagiarism, assignment and class lecture; • Use of plagiarism detection tools.	

পদের নাম: প্রভাষক

বিষয়: ANIMAL TREATMENT AND PRODUCTION

Code: 437

Full Marks: 100

ANIMAL TREATMENT

Etiology, pathogenesis, clinical findings, post-mortem lesions, diagnosis, treatment, prevention and control of common livestock, pet and poultry diseases.Vaccination schedule for poultry, farm and pet animals.Rectal palpation, heat detection, pregnancy diagnosis, parturition, newborn management. Treatment & management of dystocia, anestrous, retention of placenta, uterine prolapse, abortion, pyometra and metritis. Anesthesia, wound and abscess management, amputation of tail, Cesarean section, spaying, hernia operation, castration and dehorning. Characteristics, staining properties, cultural characteristics, biochemical activities & laboratory diagnosis of different Bacteria, Viruses and Fungi.Morphology, biology, transmission & Controls of some Nematodes, Cestodes, Trematodes, Protozoa and Ectoparasites.Mode of action of Antibiotic, Antihistaminic, Anti-inflammatory drugs.Antimicrobial resistance.Inflammation, post-mortem examination of large animals and birds, clinical test for feces, urine and blood, Insurance of animals, registration of pet animals, legislation against animal diseases.Veterinary medical ethics for registered vet practitioners.Food contamination, spoilage & preservation, food borne infection & intoxication, food sanitation & legislation, public health aspect of animal product and by-product.

ANIMAL PRODUCTION

Role of livestock in the farming system of Bangladesh.Prospects, potentialities and constraints of livestock farming in Bangladesh.Classification and different breeds of common farm animals.Judging and selection of farm animals for milk and meat purposes.Housing of farm animal production.Farm planning for commercial livestock production.Feeding behavior, nutrient requirement and ration formulation of livestock. Feed processing and feed industry.Requirement and role of animal products in human nutrition.Genetic diversity and animal genetic resources.Breeding strategy of different farm animals.Reproduction of farm animals and biotechnology.Care and management at different stages of livestock production.General management practices of dairy and meat animal.Quality milk production and sanitation.Processing and preservation of milk and milk products.Dairy food technology.Animal slaughtering and meat processing.Storage and preservation of meat. Value added meat products.Marketing strategies of different animal products and by-products.Animal waste management.Animal behavior, welfare and Animal rights.Various improved technologies associated with production and reproduction of farm animals.Origin, domestication and distribution of different poultry species.Classes, breeds, varieties andstrains of different poultry species.Housing principles of poultry. Poultry feed ingredients, their classificationand nutritive value.Artificial incubation, fertility and hatchability eggs.Grand parent stock, parent stock, broiler and commercial layer production.Management of different stages of poultry.Egg and poultry meat marketing.

পদের নাম: প্রভাষক
Subject: Fisheries
Code: 438
Total marks: 100

1. Fish Biology and Breeding Management (মৎস্য জীববিদ্যা ও প্রজনন ব্যবস্থাপনা)

(a) Morphology and classification of fish and shrimp (b) Biology of fish and shellfish (Age, sex, maturity, fecundity and natural breeding of different species) b) Fish biodiversity and conservation (c) Selection as breeding program (d) Hybridization, genetic drift and inbreeding (e) Brood stock management (f) Components of fish hatchery: hatchery proper (spawning and incubation facilities), brood rearing ponds, nursery ponds etc. (g) Hatchery operation (h) Larvae and fry rearing (i) Breeding of aquarium fish (j) Transportation of live fish (k) Layout of a typical carp hatchery and a shrimp hatchery.

2. Aquaculture (মৎস্য চাষ)

(a) Principle of aquaculture (b) Aquaculture systems (extensive/traditional, improved traditional, semi-intensive and intensive culture; monoculture, polyculture, composite culture and integrated aquaculture; pond, tank, raceway, cage and pen culture) (c) Selection of sites, design and construction of fish pond and aquafarms (d) Water quality for aquaculture (e) Preparation and Management of ponds (f) Selection and stocking of fish (g) Nutrition and feeding (h) Nursery Management (i) Microalgae and live food culture (j) Ornamental fish rearing (k) Fish parasites and disease control (l) Harvesting and marketing of fish (m) Aquaculture economics.

3. Open water Fisheries Management (উন্মুক্ত জলাশয়ে মৎস্য ব্যবস্থাপনা)

(a) Fisheries resources (b) Aquatic Environment (c) Freshwater, marine and estuarine ecology: Ecosystem and its components, food chain and trophic levels, primary and secondary productivity (d) Concept of species, community, population and stock (e) Assessment of stocks (f) Mortality, growth and recruitment (g) Fish population dynamics (h) Objectives and ways of fisheries management (banning of fishing, fish sanctuary, MPA, beel nursery, community based management etc.) (i) Fishing gears and crafts (j) Commercial fishing methods and fishing grounds (k) Fish acts and regulation.

4. Fish Processing and Quality Control (মৎস্য প্রক্রিয়াজাতকরণ ও মান নিয়ন্ত্রণ)

(a) Fish spoilage and principles of fish preservation (b) Handling, transportation and distribution of fish (c) Methods of fish curing and processing: Chilling, freezing, canning, drying, salting, smoking, fermenting and pickling (d) Fishery products and by-products (FPC, fish meal, fish oils, fish silage etc.) etc. (e) Planning and design of cold storage and fish processing plant (f) Chemical composition and nutritional values of fish and fish products (g) Quality control methods of fish and fishery products (SOP, SSOP, HACCP, fish inspection etc.) (h) Sanitation and hygiene of fish processing plants (i) International code of hygiene practice for fish processing.

568(09)/18

SYLLABUS FOR NTRCA (WRITTEN) EXAMINATION

Subject: Agricultural Engineering
Code: ..439.... Marks – 100

Agricultural Power, Machinery and Mechanization (Answer 03 x 10 = 30) : Present status and scope of utilization of tractors, power tillers and other power sources at the farm level of Bangladesh. Engines and its type, diesel-petrol, 2 and 4-strokes engines and their working principles and its different systems working inside, engine terminology and mathematical problems solution on engines, troubles shooting of engines. Types of agricultural machinery; mould board and disc ploughs, forces acting on tillage implements, harrows, types of linkages, hitching, drafts and drawbar power, seed drill, calibration of drills, combination drill, trans planters and potato trans planters, sprayers and weeder, centrifugal pumps, reapers, threshers, combine harvester, potato, sugar beet, cotton, hay and forage harvester, related problems solution. Principle of mechanization – myths of mechanization, meaningful mechanization, productivity, technology versus productivity, factors influencing mechanization, negative factors associated with mechanization, machine performance, machine and power selection and machine replacement. Status and scope of mechanization in Bangladesh.

Post Harvest Technology (Answer 01 from 02) x 10 = 10 : Grain drying, importance of drying, moisture content of grains and equilibrium moisture content, methods of determination of moisture contents, theory of thin layer and deep bed drying, methods of drying, psychometry, principles of refrigeration and air conditioning, refrigeration cycle, refrigeration calculations for air conditioning including cooling load calculation. origin of foods, classification of foods, food compositions, rheology of foods, storage of perishable commodities, principles of food processes and preservation by various methods.

Irrigation and Water Management (Answer 03 x 10 = 30) : Necessity, scope and history of irrigation development, sources and storage of irrigation as an agricultural operation, role of agricultural engineers in irrigation. Reasons for drainage, benefits of drainage in irrigated land, different methods of irrigation, factors affecting water requirement at various growth stages of crops, crop-water-yield relationship, flow of water through orifices and tubes, notches and weirs, pipes and channel, fundamentals of fluid flow; flow of fluids, path lines and stream tubes, laminar and turbulent flow, steady and unsteady flow, uniform and non-uniform flow, one, two and three dimensional flow, canal layout, design of earthen channel, lined canal and materials for canal lining, maintenance of canals, irrigation efficiencies, pumping terminology; continuity equation of flow, velocity-friction and total head of liquid, Euler's and Bernaulli's equations, irrigation pumps and tube wells, pump classification, installation of pumps, LLP, STW and DTW, working principle of centrifugal pump, characteristics curves, pump troubles and their remedial causes.

Agricultural constructions and Environmental Engineering (Answer 02 from 03) x 10 = 20 : Selection of engineering materials; bricks, cement, sand, concrete, steel and timber, estimation and costing of earth work, building, irrigation drains and canals, CC and RCC works, roads and culverts and timber works, work scheduling ; tender, quotation, surveying of irrigation canal projects, structural forces, shear force and bending moment diagrams, soil consistency, compaction and stabilization, bearing capacity. Pollutions, radioactive wastes, green house effects, biogas production, incineration.

Computer Science in Agriculture (Answer 01 from 02) x 10 = 10 : Computer fundamentals, logic gates, boolean algebra and their applications, design of combination and sequential circuits, programming fundamentals, problem solving using numerical methods, introduction to object oriented programming and assembly language programming, web page design using front page, HTML tools and its resources, linking style and publishing, java basics and networking using java, java classes, java script, java's security.

এনটিআরসিএ কর্তৃক চারুকলা (ফাইন আর্ট) বিষয়ে **নিবন্ধন পরীক্ষার প্রস্তাবিত সিলেবাস**

প্রভাষকঃ ড্রইং এন্ড পেইন্টিং (অঙ্কন ও চিত্রায়ণ বিভাগ)
বিষয় কোড- [redacted] 440
পূর্নমান: ১০০

ক)	ড্রইং	মান: ২০
খ)	বিশেষায়িত অনুশীলন (চিত্রকলা বিষয়ক)	মান: ২০
গ)	চিত্রকলা বিষয়ক বিভিন্ন উপকরণ, করণ-কৌশল ও এর ইতিহাস	মান: ২০
	• জলরং, তেলরং, এক্রেলিক বিভিন্ন মাধ্যমের উপকরণ ও কৌশল	
ঘ)	শিল্পকলার ইতিহাস	মান: ৪০
•	প্রাচীন যুগ (প্রাগৈতিহাসিক, মিশর, মেসোপটেমিয়া, সিন্ধু, গ্রীক ও রোমান)	মান: ১০
•	পাশ্চাত্য (প্রাক রেঁনেসা থেকে উত্তরাধুনিক)	মান: ১০
•	প্রাচ্য (১.চীন, জাপান ও কোরিয়া ২.পারস্য ৩. ভারত উপমহাদেশ)	মান: ১০
•	বাংলাদেশের শিল্পকলার ইাতহাস ও চিত্রকলা	মান: ১০

১. ঐতিহ্যবাহী লোক ও নাগরিক শিল্প
২. সমকালীন শিল্পকলা

প্রভাষকঃ প্রিন্ট মেকিং (ছাপচিত্র বিভাগ)
বিষয় কোড- 441
পূর্নমান: ১০০

ক)	ড্রইং	মান: ২০
খ)	বিশেষায়িত অনুশীলন (ছাপচিত্র বিষয়ক)	মান: ২০
গ)	ছাপচিত্র বিষয়ক বিভিন্ন উপকরণ, করণ-কৌশল ও এর ইতিহাস	মান: ২০
	• রিলিফপ্রসেস, প্লেনোগ্রাফি, ইন্টাগ্লিও, সেরিগ্রাফি প্রভৃতি ছাপচিত্র বিষয়ক মাধ্যমের উপকরণ ও কৌশল	
ঘ)	শিল্পকলার ইতিহাস	মান: ৪০
•	প্রাচীন যুগ (প্রাগৈতিহাসিক, মিশর, মেসোপটেমিয়া, সিন্ধু, গ্রীক ও রোমান)	মান: ১০
•	পাশ্চাত্য (প্রাক রেঁনেসা থেকে উত্তরাধুনিক)	মান: ১০
•	প্রাচ্য (১.চীন, জাপান ও কোরিয়া ২.পারস্য ৩. ভারত উপমহাদেশ)	মান: ১০
•	বাংলাদেশের শিল্পকলার ইতিহাস ও ছাপচিত্র	মান: ১০

১. ঐতিহ্যবাহী লোক ও নাগরিক শিল্প
২. সমকালীন শিল্পকলা

প্রভাষকঃ কমার্শিয়াল আর্ট ও কম্পিউটার গ্রাফিক্স (এ্যাপ্লাইড আর্ট)
বিষয় কোড- ৪৪৪
পূর্নমানঃ ১০০

ক) ড্রইং	মানঃ ২০
খ) বিশেষায়িত অনুশীলন (গ্রাফিক ডিজাইন বিষয়ক)	মানঃ ২০
গ) গ্রাফিক ডিজাইন বিষয়ক বিভিন্ন উপকরণ, করণ-কৌশল ও এর ইতিহাস	মানঃ ২০
• গ্রন্থ অলংকরণ ও মুদ্রণ, পোষ্টার ও বিজ্ঞাপন সংক্রান্ত নকশা ও মুদ্রণ, এনিমেশনের বিভিন্ন প্রক্রিয়া, বিভিন্ন ধরনের মুদ্রণ প্রণালী, টাইপোগ্রাফি ইত্যাদি মাধ্যমের উপকরণ ও করণ-কৌশল	
ঘ) শিল্পকলার ইতিহাস	মানঃ ৪০
• প্রাচীন যুগ (প্রাগৈতিহাসিক, মিশর, মেসোপটেমিয়া, সিন্ধু, গ্রীক ও রোমান)	মানঃ ১০
• পাশ্চাত্য (প্রাক রেঁনেসা থেকে উত্তরাধুনিক)	মানঃ ১০
• প্রাচ্য (১.চীন, জাপান ও কোরিয়া ২.পারস্য ৩. ভারত উপমহাদেশ	মানঃ ১০
• বাংলাদেশের শিল্পকলার ইতিহাস ও গ্রাফিক ডিজাইন	মানঃ ১০
১. ঐতিহ্যবাহী লোক ও নাগরিক শিল্প	
২. সমকালীন শিল্পকলা	

প্রভাষকঃ ওরিয়েন্টাল আর্ট (প্রাচ্যকলা বিভাগ)
বিষয় কোড- ৪৪২
পূর্নমানঃ ১০০

ক) ড্রইং	মানঃ ২০
খ) বিশেষায়িত অনুশীলন (প্রাচ্যকলা বিষয়ক)	মানঃ ২০
গ) প্রাচ্যকলা বিষয়ক বিভিন্ন উপকরণ, করণ-কৌশল ও এর ইতিহাস	মানঃ ২০
• ফ্রেস্কো, ওয়াশ, মিনিয়েচার সম্পর্কিত টেম্পরা ও গোয়াশ, ক্যালিগ্রাফি প্রভৃতি মাধ্যমের উপকরণ ও কৌশল	
ঘ) শিল্পকলার ইতিহাস	মানঃ ৪০
• প্রাচীন যুগ (প্রাগৈতিহাসিক, মিশর, মেসোপটেমিয়া, সিন্ধু, গ্রীক ও রোমান)	মানঃ ১০
• পাশ্চাত্য (প্রাক রেঁনেসা থেকে উত্তরাধুনিক)	মানঃ ১০
• প্রাচ্য (১.চীন, জাপান ও কোরিয়া ২.পারস্য ৩. ভারত উপমহাদেশ)	মানঃ ১০
• বাংলাদেশের শিল্পকলার ইতিহাস ও প্রাচ্যশিল্প	মানঃ ১০
১. ঐতিহ্যবাহী লোক ও নাগরিক শিল্প	
২. সমকালীন শিল্পকলা	

প্রভাষকঃ সিরামিক (মৃৎশিল্প বিভাগ)
বিষয় কোড- 446
পূর্নমানঃ ১০০

ক) ড্রইং — মানঃ ২০
খ) বিশেষায়িত অনুশীলন (মৃৎশিল্প বিষয়ক) — মানঃ ২০
গ) মৃৎশিল্প বিষয়ক বিভিন্ন উপকরণ, করণ-কৌশল ও এর ইতিহাস — মানঃ ২০
- টেরাকোটা, গ্লেজ, স্টোনওয়ার, পোরসিলিন প্রভৃতি মাধ্যমের উপকরণ ও কৌশল

ঘ) শিল্পকলার ইতিহাস — মানঃ ৪০
- প্রাচীন যুগ (প্রাগৈতিহাসিক, মিশর, মেসোপটেমিয়া, সিন্ধু, গ্রীক ও রোমান) — মানঃ ১০
- পাশ্চাত্য (প্রাক রেঁনেসা থেকে উত্তরাধুনিক) — মানঃ ১০
- প্রাচ্য (১.চীন, জাপান ও কোরিয়া ২.পারস্য ৩. ভারত উপমহাদেশ) — মানঃ ১০
- বাংলাদেশের শিল্পকলার ইতিহাস ও মৃৎশিল্প — মানঃ ১০

১. ঐতিহ্যবাহী লোক ও নাগরিক শিল্প
২. সমকালীন শিল্পকলা

প্রভাষকঃ স্কাল্পচার (ভাস্কর্য বিভাগ)
বিষয় কোড- 443
পূর্নমানঃ ১০০

ক) ড্রইং — মানঃ ২০
খ) বিশেষায়িত অনুশীলন (ভাস্কর্য বিষয়ক) — মানঃ ২০
গ) ভাস্কর্য বিষয়ক বিভিন্ন উপকরণ, করণ-কৌশল ও এর ইতিহাস — মানঃ ২০
- মাটি, প্লাষ্টার, বিভিন্ন ধাতু মডেলিং, ওয়েল্ডিং, কাস্টিং, কার্ভিং প্রভৃতি মাধ্যমের উপকরণ ও কৌশল

ঘ) শিল্পকলার ইতিহাস — মানঃ ৪০
- প্রাচীন যুগ (প্রাগৈতিহাসিক, মিশর, মেসোপটেমিয়া, সিন্ধু, গ্রীক ও রোমান) — মানঃ ১০
- পাশ্চাত্য (প্রাক রেঁনেসা থেকে উত্তরাধুনিক) — মানঃ ১০
- প্রাচ্য (১.চীন, জাপান ও কোরিয়া ২.পারস্য ৩. ভারত উপমহাদেশ) — মানঃ ১০
- বাংলাদেশের শিল্পকলার ইতিহাস ও ভাস্কর্য — মানঃ ১০

১. ঐতিহ্যবাহী লোক ও নাগরিক শিল্প
২. সমকালীন শিল্পকলা

প্রভাষকঃ ক্রাফটস (কারুকলা বিভাগ)
বিষয় কোড- 445
পূর্নমানঃ ১০০

ক) ড্রইং	মানঃ ২০
খ) বিশেষায়িত অনুশীলন (কারুকলা বিষয়ক)	মানঃ ২০
গ) কারুশিল্প বিষয়ক বিভিন্ন উপকরণ, করণ-কৌশল ও এর ইতিহাস	মানঃ ২০
• বয়নশিল্প ও ট্যাপেস্ট্রি, বাটিক ও টাই-ডাই, স্ক্রিনপ্রিন্ট, দারুশিল্প, ধাতুশিল্প প্রভৃতি মাধ্যমের উপকরণ ও কৌশল	
ঘ) শিল্পকলার ইতিহাস	মানঃ ৪০
• প্রাচীন যুগ (প্রাগৈতিহাসিক, মিশর, মেসোপটেমিয়া, সিন্ধু, গ্রীক ও রোমান)	মানঃ ১০
• পাশ্চাত্য (প্রাক রেঁনেসা থেকে উত্তরাধুনিক)	মানঃ ১০
• প্রাচ্য (১.চীন, জাপান ও কোরিয়া ২.পারস্য ৩. ভারত উপমহাদেশ)	মানঃ ১০
• বাংলাদেশের শিল্পকলার ইতিহাস ও কারুশিল্প	মানঃ ১০
১. ঐতিহ্যবাহী লোক ও নাগরিক শিল্প	
২. সমকালীন শিল্পকলা	

প্রভাষকঃ সভ্যতার ইতিহাস ও শিল্পকলার ইতিহাস/ Art History
বিষয় কোড- 447
পূর্নমানঃ ১০০

ক) প্রাচীন যুগ (প্রাগৈতিহাসিক, মিশর, মেসোপটেমিয়া, সিন্ধু, গ্রীক ও রোমান)	মানঃ ২০
খ) পাশ্চাত্য (প্রাক রেঁনেসা থেকে উত্তরাধুনিক)	মানঃ ২০
গ) প্রাচ্য (১.চীন, জাপান ও কোরিয়া ২.পারস্য ৩. ভারত উপমহাদেশ)	মানঃ ২০
ঘ) বাংলাদেশের শিল্পকলার ইতিহাস (প্রাচীন যুগ থেকে সমকালীন)	মানঃ ২০
১. ঐতিহ্যবাহী লোক ও নাগরিক শিল্প শিল্পচর্চার গতি-প্রকৃতি	
২. সমকালীন শিল্পকলা	
ঙ) বিভিন্ন মাধ্যমের উপকরণ, করণ-কৌশল ও এর ইতিহাস	মানঃ ২০

পদের নাম: প্রভাষক
Subject : Banking and Insurance
Code : 448
Full Marks : 100

Part A : Banking

1. **Introduction:** Definition of banking, evolution of banks, surplus and deficit units, financial intermediation by banks, classification of banks, banking and economic development, banking systems in Bangladesh
2. **Commercial Banking:** Meaning of commercial banking, features of commercial banks, objectives and functions of commercial banks, principles of commercial banking, services rendered by banks
3. **Bankers, Customers and Customers' Accounts:** Definition of a customer, general relationship between banker and customer, obligations of a banker, obligations of a customer, Garnishee Order, banker's rights; types of deposit accounts, opening and closing of a bank account; special types of customers
4. **Cheque and Its Crossing:** Definition of a cheque, features of a valid cheque, parties to a cheque, meaning of crossing, types of crossing, liability of paying banker on crossed cheques, not negotiable crossing, account payee crossing, double crossing, obliterating a crossing, opening of crossing
5. **Payment and Collection of Cheques:** Precautions for payment of cheques, proper form of the cheque, material alterations, statutory protection to the paying banker, when the banker must refuse payment of cheques; collecting banker as holder for value, conversion by the collecting banker, statutory protection to collecting banker, liability of the collecting banker, duties of the collecting banker
6. **Loans and Advances:** Principles of sound lending, creditworthiness of borrowers, collection of credit information, types of credit, consortium advances, factors limiting the level of a bank's advances; secured advances–modes of creating charge: lien, pledge, hypothecation and mortgage
7. **Letters of Credit:** Traveler's letter of credit, letter of commercial credit, types of letters of commercial credit, transfer guarantee for the confirming bank, liabilities of the issuing banker, opening of a letter of credit, uniform customs and practice for documentary credits

Part B : Insurance

8. **Introduction:** Insurance, nature, functions and characteristics of insurance, characteristics of an ideally insurable risk, adverse selection and insurance, insurance vs. gambling, insurance vs. hedging, social benefits and costs of insurance, international insurance, insurance in Bangladesh
9. **Insurance and Risk:** Risk, chance of loss, peril and hazard, classification of risk- pure risk vs. speculative risk, particular risk vs. fundamental risk, major personal and commercial risks, burden of risk on society, types of private insurers, agents and brokers, management of risk
10. **Principles of Insurance:** Principle of utmost good faith, principle of insurable interest, principle of indemnity, principle of subrogation, principle of contribution, principle of proximate cause, insurance contract
11. **Insurance Company Operations:** Rating and rate making, underwriting, production, claim settlement, reinsurance, investment, other insurance company functions, reinsurance, insurance pricing: calculation of insurance premium, surrender value and reserve
12. **Classification of Insurance:** Life insurance: whole life insurance policies, endowment life insurance policies, term life insurance policies, property insurance: fire, marine, motor, homeowner policy, and aviation insurance; liability insurance: general liability loss exposures, commercial general liability policy, workers compensation insurance, aircraft insurance, Islamic insurance (Takaful), micro-insurance
13. **Insurance Acts:** Reasons for insurance regulation, current issues in insurance regulation, methods for regulating insurers, insolvency of insurers, Bangladesh Insurance Act 2010, Insurance Development and Regulatory Authority (IDRA) Act 2010.

পদের নাম: প্রভাষক
Subject: International Business
Code: 449
Full Marks 100

A. Theory and Practice of International Business:
Globalization: meaning of globalization, the main drivers of globalization, debate on globalization. **External Environment of International Business:** political, legal, economic, social, cultural, and technological environment and the role of innovation. **The Political Economy of International Trade:** instruments of trade policy, the case of government intervention, the development of world trading system and its implication for managers. **Regional Economic Integration and Cooperative Agreements:** levels of economic integration, economic and political arguments for and against regional economic integration, analyses on the major regional economic integration agreements and the implication for managers. **International Business Operation:** managing business function internationally, review of different business function of a firm that operate internationally, the economic, political, social, cultural, and technological differences in various countries and their effect on global business. **The Strategy of International Business:** concept of strategy and profitability, value activities and value chain of a firm, global expansion, profitability and profit growth, business strategies of international firms, global expansion strategies. **Entry Strategy and Strategic Alliances:** basic entry decisions, analyses of different entry modes and strategic alliance firm use to enter foreign markets, and factors that influence firm's choice of entry mode. **Ethics in International Business:** ethical issues and ethical dilemma, causes of unethical behavior by managers, different philosophical approaches to ethics, ways to incorporate ethical consideration in decision making.

B. International Economics
Theories of International Trade: reasons for nations to trade with one another, the Absolute Advantage Theory, Comparative Advantage Theory, role of government in promoting comparative advantage, Heckschere-Ohlin Model and Leontief paradox, and Factor Price Equalization Theorem. **International Trade Policy:** theories of tariff, tariff in a partial equilibrium setting, impact of tariff on domestic production, prices, imports, income distribution and consumption, tariffs and tariff vs. non-tariff barriers, policy of import substitution and export promotion etc. **International Trade Issues:** terms of trade, balance of payment (BoP) analysis, the exchange rate systems and modern foreign exchange policies, the international movement of labor, direct foreign investment and the multinationals.

C. International Financial Management
Markets and linkages in international financial management; Financing from international sources; Currency risks, money market hedging and hedging through derivatives; Risk measurement and management in international environment; International capital budgeting; International taxation and transfer pricing.

D. International Marketing
The Scope and Challenge of International Marketing; Internationalization of business; Emerging Markets, Multinational Market Regions and Market Groups; Global markets and multinational market group; Global Marketing Management; Products and services for consumers across the world; International marketing channels and logistics; Integrated marketing communications and international advertising; Negotiating with International customers, partners, and regulators.

পদের নাম: প্রভাষক
বিষয়: গণিত, পরিমিতি ও পরিসংখ্যান
কোড: ৪৫০
পূর্ণমান: ১০০

Part-I
Fundamental of Mathematics (Including Trigonometry): A. Set theory, Relations and functions, Real number system. **B.** Summation of algebraic and trigonometric series. **C.** Theory of equations: Relations between roots and co-efficients, Symmetric functions of roots, Simple transformations. **D.** Linear algebra with vector spaces, Eigen values and Eigenvectors.

Part-II
Geometry (Analytical Geometry of two three dimensions): A. Pair of straight lines. **B.** General Equation of second the degree: Reduction of standard forms, Properties of Parabola, Ellipse and Hyperbola. **C.** Rectangular co-ordinates, Planes and Straight lines in three dimensions, shortest distance between two Straight lines. **D.** Vectors in three dimensional space with applications to geometry.

Part-III
Differential Calculus and Integral Calculus: A. Functions, Limit, Continuity and Differentiability. **B.** Maxima and Minima. **C.** Tangents and Normal's. **D.** Techniques of Indefinite integration. **E.** Determination of areas. **F.** Multiple integral.

Part-IV
Different equations: Ordinary differential equations of first order and first degree, Ordinary differential equations with initial and boundary value problems, Laplace Transform, Legendre differential equation and Bessel differential equation.

Part-V
Functions of Complex variable: Complex numbers, Analytic functions, Contour integration.

Part-VI
Statistics:
Measures of central tendency: Mean Median, Mode and Relationship between different means.

Measures of dispersion: Mean deviation, Standard deviation, Variance, Relation between deferent Measures of dispersion.

Probability: Concepts of Probability, Different approach of probability, Theorem of probability (with problem solving).

Note: The paper will consists of five parts, having three questions of equal value in each part. Candidates will required to answer ten questions in all, taking at least one question from each part but not more than two questions from any one part.

পদের নাম: প্রভাষক
বিষয়ঃ কৃষি বিজ্ঞান (Agriculturel Science)
কোডঃ ৪৫১
পূর্ণমানঃ ১০০

1. Factors affecting growth, development, yield and desirable qualities of crops. 2. Important morphological characters and production technology of some important (a) cereals, (b) pulses, (c) vegetables, (d) fruits, (e) sugar, (f) oil, (g) fibre, (h) narcotic, (i) beverage, (j) medicinal and (k) timber yielding plants of Bangladesh with their scientific name. 3. Concept on cropping pattern, multiple cropping, crop rotation, crop diversification, crop calendar, irrigation, drainage and other intercultural operations. 4. (a) Methods of vegetative propagation of some important vegetable crops and fruit trees, (b) Vegetable seed production techniques. 5. (a) Necessity and basis of classification of plant kingdom, (b) Salient features of natural and phylogenetic classification of plant kingdom, (c) Necessity of scientific naming of plants. 6. Cell & cell division: (a) Concept and structure of a plant cell, (b) Functions of different important organelles of cell, (c) Types and mechanism of different cell division and their importance. 7. Plant physiology: (a) Photosynthesis, (b) Respiration, (c) Transpiration, (d) Photopetiodism. 8. Environmental pollution: (a) Causes, harmful effects and remedies of different environmental pollution (air, water and soil), (b) Causes of green house effect and its remedies, (c) Possible causes of forest depletion in Bangladesh, its harmful effects and remedies. 9. (a) Concept of pest, pesticide and pest management, (b) Methods of pest control, (c) Integrated pest management system. 10. Scientific name with family, nature of damage and control measures of major insect pests of important (a) cereals, (b) pulses, (c) vegetables, (d) fruits, (e) sugar, (f) oil and (g) fibre yielding plants of Bangladesh. 11. Scientific name of the pathogen, symptoms and control measures of major diseases of important (a) cereals, (b) pulses, (c) vegetables, (d) fruits, (e) sugar, (f) oil and (g) fibre yielding plants of Bangladesh.12. Plant nutrition: (a) Essential plant nutrients, their deficiency symptoms and functions, (b) Different chemical fertilizers and organic manures, (c) Time and methods of fertilizer application, (d) Biological nitrogen fixation. 13. Soil fertility management: Soil fertility problems and possible means of improvement of soil fertility. 14. (a) Mendel's laws of inheritance and their major modifications, (b) Methods of plant breeding: Introduction, selection, hybridization, mutation, polyploidy, (c) Chemical composition of DNA & RNA, (d) Concept on heritability, heterosis and hybrid. (e) Methods of conservation of plant genetic resources, (f) Concept on a new variety release system. 15. Biotechnology and tissue culture: Concept, scope, application and importance in plant improvement. 16. The principles and practices of agricultural extension. 17. Agroforestry: Its concept, scope, importance and classification.

পদের নাম: প্রভাষক
Subject: Information and Communication Technology (ICT)
Code: 452
Marks: 100

Structured and Object Oriented Programming (OOP) Concept (Answer 02x10=20):
Fundamentals of C programming; Introducing C's Program Control Statements; Data types, Variables and Expressions; Exploring Arrays and Strings; Understanding Pointers and Functions; Console and File I/O; Structures and Unions.

Topics include object-oriented programming concepts, such as classes, objects, methods, interfaces, packages, inheritance, encapsulation, and polymorphism.

Introduction to Software Engineering (Answer 01x10=10): history, nature, relation of software engineering to other discipline, software development life cycle, Programming language; Software nature and qualities: product qualities, project qualities, correctness, robustness, usability, maintainability, portability, quality measurements; Software development life cycle: requirement, design, development, testing, maintenance; Software development model: waterfall, agile, spiral, RDD, V model; Software engineering principles: modularity, abstraction, generality, object oriented, component oriented, structured.; Specification and Verification: requirement specification, descriptive specification, testing, analysis, debugging; Modeling and Design: basics of modeling diagram, UI design. Software Project Management: concepts, project metrics, estimation, risks management.

Data Structure and Algorithm & Combinatorial Optimization (Answer 02x10=20):
Introduction - Data Structures and Complexity of Algorithms, Time Space Tradeoff, Searching Techniques- Linear and Binary Searching; Sorting and Recursion - Discussion of Common Sorting Techniques: Insertion Sort, Selection Sort, Bubble Sort, Quick Sort, Merge Sort, Radix Sort; Factorial and Tower of Hanoi Problem; Linked Lists - Abstract Data Types, List ADTs, and Linked Lists: Singly, Two Way and Circular Linked Lists; Stacks and Queues - Stacks and Queues and their Implementation Strategies; Prefix, Infix and Postfix Expressions, their Transformation and Evaluation Algorithms; Hashing - Hash Indices and Hash Functions, Static and Dynamic Hashing, Collisions in Hash Indices and Collision Resolving Techniques; Trees - Tree Concepts, Binary Tree, BST, Heaps, Heap Sort, Huffman Encoding Technique, AVL Tree, B Tree and B+ Tree; Graphs - Graph Terminologies, Representing Graphs, Graph Searching: BFS and DFS, Shortest Path Problems, Minimum Spanning Tree, Minimum Spanning Tree Algorithms, and Topological Sorting; Problem Solving Strategy - Greedy Algorithms, Divide and Conquer Strategy, Dynamic Programming and Backtracking. Introduction - Algorithms, Analyzing & Designing Algorithms, Correctness of Algorithms; Greedy Algorithms - Introduction to Greedy Algorithms, Greedy Choice Property, Greedy vs. Dynamic Programming, Fractional Knapsack Problem, Activity Selection Problem, Huffman Encoding, Task Scheduling Problem, Coin Changing Problem, Kruskal's and Prim's Minimum Spanning Tree Algorithms; Divide and Conquer Algorithms - Introduction to Divide and Conquer Design Technique, Quick Sort, Merge Sort, Proof of Correctness, and Run Time Analysis; Dynamic Programming - Introduction to Dynamic Programming Technique, Principle of Optimality, Optimal Substructure Property, Assembly Line Scheduling, Matrix Chain Multiplication, LCS, Viterbi Algorithm, Bitonic Euclidean Traveling Salesperson Problem and Runtime Analysis; Graph Searching and Shortest Path Problems - Breadth First Search, Depth First Search, Flow Networks, Single Source and All Pair Shortest Path Algorithms

Web Technology (Answer 01x10=10): Introduction to Html, Java Script & CSS, Server Side Programming: HTTP Server, Application Server, MVC Web Framework, Web Services, Database Access: Object Relational Mapping, Lambda Expression, Language Integrated Query, Data Reader, Writer, Web Security: Denial of Service, Buffer Overflow, Cross Site Scripting, Authentication and Access Control

Operating System (Answer 01x10=10): Overview of operating systems, functionalities and characteristics of OS. Hardware concepts related to OS, CPU states, I/O channels, memory hierarchy, and microprogramming. The concept of a process, operations on processes, process states, concurrent processes, process control block, process context. UNIX process control and management, PCB, signals, forks and pipes. Interrupt processing, operating system organization, OS kernel FLIH, dispatcher. Job and processor scheduling, scheduling algorithms, process hierarchies. Problems of concurrent processes, critical sections, mutual exclusion, synchronization, deadlock. Mutual exclusion, process co-operation, producer and consumer processes. Semaphores: definition, init, wait, signal operations. Use of semaphores to implement mutex, process synchronization etc., implementation of semaphores. Critical regions, Conditional Critical Regions, Monitors, Ada Tasks. Interprocess Communication (IPC), Message Passing, Direct and Indirect, Deadlock: prevention, detection, avoidance, banker's algorithm. Memory organization and management, storage allocation. Virtual memory concepts, paging and segmentation, address mapping. Virtual storage management, page replacement strategies. File organization: blocking and buffering, file descriptor, directory structure, File and Directory structures, blocks and fragments, directory tree, inodes, file descriptors, UNIX file structure.

Database Management System (Answer 02x10=20): Introduction to Database Systems: Evolution of file processing systems, role of databases in organizations, core components of a database

environment; Data Modeling: the Entity-Relationship Diagram and its symbols and constructs; The Relational Model and Normalization: relational model, normalization, transformation of an entityrelationship data diagram into a relational model; SQL - A Standard Navigation Language for Relational Databases; Overview of Object-Oriented Databases: object-oriented data model, implementation of object persistence using relational databases. Indexing and Hashing: Basic Concepts, Ordered Indices, B+-Tree Index Files, B-Tree Index Files, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing; Query Processing: Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Evaluation of Expressions; Query Optimization: Introduction, Transformation of Relational Expressions, Catalog Information for Cost Estimation, Statistical Information for Cost Estimation, Cost-based optimization; Transactions: Transaction Concept, Transaction State, Concurrent Executions, Serializability; Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols; Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Recovery With Concurrent Transactions; Data Analysis and Mining: Data Mining, Decision tree, Bayes theory, Randomize tree; Database System Architectures: Centralized and Client-Server Systems, Server System Architectures, Parallel Systems, Distributed Systems, Network Types; Parallel Databases: Introduction, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism; Distributed Databases: Heterogeneous and Homogeneous Databases: Distributed Data Storage, Distributed Transactions, Commit Protocols; Additional should be included: Database Design, Database Tuning Security and Authorization, Multidimensional query.

Data Communications and Networking (Answer 01x10=10): Introduction: Overview of the Internet, Overview of Networking Protocols, Network Edge, Network Core, Protocol Layers / Service Model, General Networking Example; Application Layer: Principles of Networking Applications, Web and HTTP, FTP, E-mail, DNS; Transport Layer: Transport Layer Services, Multiplexing and De multiplexing, Connectionless Transport: UDP, Principles of Reliable Data Transport, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control; Network Layer: Datagram Networks, Inside a Router, Details of the Internet Protocol (IP), IP Sub netting, Routing Algorithms (Link State, Distance Vector), Routing in the Internet (Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Border Gateway Protocol (BGP)).

বেসরকারি শিক্ষক নিবন্ধন ও প্রত্যয়ন কর্তৃপক্ষ (NTRCA)
কামিল (স্নাতকোত্তর) মাদরাসার ক্ষেত্রে
প্রভাষক 'হাদীস' পদের সিলেবাস

পূর্ণমান : ১০০
সময় : ৩ ঘণ্টা

বিষয় কোড: ৪৫৬

توزيع الدرجات

(الف) دراسة الحديث : ١٥×٤=٦٠
(ب) علوم الحديث : ١٠×٢=٢٠
(ج) تاريخ علم الحديث : ١٠×٢=٢٠
المجموع : ١٠٠

المنهج الدراسى

(الف) دراسة الحديث : الدرجات - ٦٠

١ - الترجمة باللغة البنغالية والأسئلة الموجزة

الملحقة : (٤ من ٦) ١٥×٤=٦٠

إجابة أربعة من بين ستة أسئلة، كل سؤال يتضمن ترجمة حديث وإجابة سؤالين متعلقين به. ترجمة الحديث ٧ درجات، كل سؤال ٤ درجات.
المجموع (٧+٤+٤) =١٥×٤=٦٠ درجة.

١- الكتاب المقرر : الصحيح للبخارى
تفصيل المادة : كتاب العلم ، كتاب المناقب ، كتاب المغازى
٢- الكتاب المقرر : الصحيح لمسلم
تفصيل المادة : كتاب الإيمان، كتاب الزكوة، كتاب النكاح
٣- الكتاب المقرر : الجامع للترمذى
تفصيل المادة : ابواب الطهارة، ابواب الصوم، ابواب تفسير القران

٤ - الكتاب المقرر : السنن للنسائى
تفصيل المادة : كتاب مناسك الحج، كتاب البيوع، كتاب الصيد والذبائح
٥- الكتاب المقرر : السنن لابى داؤد
تفصيل المادة : كتاب الفرائض، كتاب الاشربة، كتاب الاطعمة
٦- الكتاب المقرر : السنن لإبن ماجة
تفصيل المادة : كتاب التجارات - كتاب اللباس، كتاب الادب،
٧- الكتاب المقرر : شرح معانى الأثار
تفصيل المادة : كتاب الصلوة، كتاب الشفعة، كتاب الوصايا

المصادر والمراجع

١ - ابن حجر العسقلانى : فتح البارى
٢ - بدر الدين عينى : عمدة القارى
٣- أنوار شاه الكشميري : فيض البارى
٤- شبير أحمد عثمانى : فتح الملهم
٥- ملا على القارى : مرقاة المفاتيح

(ب) علوم الحديث : الدرجات - ٢٠

إجابة سؤالين باللغة العربية من اربعة،
كل سؤال درجة ١٠ ، المجموع ١٠×٢=٢٠

تفصيل المادة :
١- علم مصطلح الحديث
٢ - علم اسماء الرجال
٣ - علم الجرح والتعديل
٤ - علم ناسخ الحديث ومنسوخه
٥- علم غريب الحديث
٦- علم علل الحديث
٧- علم اطراف الحديث
٨- علم مختلف الحديث ومشكل الحديث

المصادر والمراجع

١ـ د. محمود طحان : مصطلح الحديث
٢ـ د. صبحي الصالح : علوم الحديث
٣ـ الحاكم النيسابوري : معرفة علوم الحديث
٤ ـ د. محمد عجاج الخطيب : اصول الحديث: علومه ومصطلحه
٥ ـ د. مصطفى السباعي : السنة ومكانتها فى التشريع الإسلامي
٦ـ خلدون الأحدب : أسباب اختلاف المحدثين
٧ـ محمد أديب الصالح : لمحات فى أصول الحديث
٨ـ ابن الجوزي : غريب الحديث

(ج) تاريخ علم الحديث : الدرجات ـ ٢٠

إجابة سؤالين باللغة العربية من اربعة،
كل سؤال درجة ١٠ ، المجموع ١٠×٢ =٢٠

تفصيل المادة :

١ـ علم الحديث، نشاته وتطوره عبر القرون
٢ـ السنة فى عهد النبى
٣ـ السنة فى عهد الصحابة وخدمة الصحابيات فى نشر السنة
٤ـ السنة فى عهد التدوين (القرن الثانى)
٥ـ التدوين فى القرن الثالث الهجرى
٦ـ التدوين فى القرن الرابع الهجرى
٧ـ التدوين بعد القرن الرابع الهجرى
٨ـ الحديث فى شبه القارة الهندية
٩ـ علم الحديث وتطوره فى بنغلاديش

المصادر والمراجع

١ـ د. العجاج الخطيب : السنة قبل التدوين
٢ـ محمد ابو زهو : الحديث والمحدثون
٣ـ د. اكرم ضياء العمري : بحوث فى تاريخ السنة المشرفة
٤ ـ محمد بن جعفر الكتاني : الرسالة المستطرفة
٥ ـ أحمد أمين : فجر الإسلام
٦ـ عبد العزيز الخولى : مفتاح السنة
٧ـ محمد أبو شيبة : الوسيط فى علوم ومسطلح
٨ـ د. محمد إسحاق : خدمة الهند فى علم الحديث

০৬/০১/১৯
মোঃ রুহুল কুদ্দুস চৌধুরী
আই.ডি নং-৩৯৯৭
উপ-পরিচালক (পাঠ্যসূচি প্রণয়ন)
এনটিআরসিএ, ঢাকা।

06/01/2019
মোঃ হারুন আর রশিদ
আইডি নং-০১৩৬০৬
বি সি এস (সাধারণ শিক্ষা)
সহকারী অধ্যাপক, ইসলামি শিক্ষা
বিভাগীয় প্রধান, হাদিস বিভাগ
সরকারি মাদ্‌রাসা-ই-আলিয়া, ঢাকা
(01818357255)

06/01/19
Md Shaheen Alam Chowdhur
Deputy Director
Non-Government Teachers'
Registration and Certificatio
Authority (NTRCA)
Ministry of Education, Dhak

০৬/০১/১৯
মাসির উদ্দিন আহমেদ (যুগ্মসচিব)
সদস্য (শিক্ষাতত্ত্ব ও শিক্ষামান)
বেসরকারি শিক্ষক নিবন্ধন ও প্রত্যয়ন
কর্তৃপক্ষ (এনটিআরসিএ)
শিক্ষা মন্ত্রণালয়, ঢাকা।

০৬/০১/২০১৯
অতিরিক্ত সচিব
সিনিয়র সহকারী সচিব
মাধ্যমিক ও উচ্চ শিক্ষা বিভাগ
শিক্ষা মন্ত্রণালয়
গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

বেসরকারি শিক্ষক নিবন্ধন ও প্রত্যয়ন কর্তৃপক্ষ (NTRCA)
কামিল (স্নাতকোত্তর) মাদরাসার ক্ষেত্রে
প্রভাষক 'তাফসীর' পদের সিলেবাস

বিষয় : তাফসীর
বিষয় কোড : ৪৫৪
পূর্ণমান : ১০০
সময় : ৩ ঘণ্টা

توزيع الدرجات

(الف) دراسة التفسير	: ١٥×٤=٦٠
(ب) علوم القران	: ١٠×٢=٢٠
(ج) تاريخ التفسير	: ١٠×٢=٢٠
المجموع	: ١٠٠

المنهج الدراسى

(الف) دراسة التفسير : الدرجات ــ ٦٠

ترجمة الايات باللغة البنغالية وإجابة الأسئلة المؤجزة الملحقة بها : (٤ من ٦) ١٥×٤=٦٠

(إجابة أربعة من بين ستة أسئلة، كل سؤال يتضمن ترجمة الأيات وإجابة سؤالين متعلقين بها - ترجمة الأيات ٩ درجات، كل سؤال ٣ درجات. المجموع (٩+٣+٣) =١٥×٤ =٦٠ درجة.)

الكتب و الدروس المقررة :

١- ابو الفداء حافظ عماد الدين ابن كثير : تفسير القرآن العظيم -
(أ) سورة الفاتحة (ب) سورة البقرة (ج) سورة آل عمران
٢- الزمخشرى : الكشاف عن حقائق غوامض التنزيل وعيون الاقاويل فى وجوه التأويل - (أ) سورة مريم (ب) سورة طه

٣- القاضى ناصر الدين البيضاوى : انوار التنزيل واسرار التأويل -
(أ) سورة المؤمن (ب) سورة الدخان (ج) سورة الفتح
٤- جلال الدين السيوطى وجلال الدين المحلى : تفسير الجلالين -
(أ) سورة يٰس (ب) سورة الصافات

(ب) علوم القران : الدرجات - ٢٠

إجابة سؤالين باللغة العربية من اربعة،
كل سؤال درجة ١٠ ، المجموع ١٠×٢ =٢٠

الدروس المقررة :

١- القرآن الكريم : تعريفه وكيفية نزوله
٢ - اول ما نزل من القرآن واخر ما نزل منه
٣ - تعريف المكى والمدنى وخصائصهما
٤ - جمع القرآن وترتيبه
٥- المحكم والمتشابه
٦- الناسخ والمنسوخ
٧- العموم والخصوص
٨- الحقيقة والمجاز
٩- اعجاز القرآن
١٠- امثال القرآن
١١- قصص القرآن
١٢- اداب تلاوة القرآن وكيفيتها
١٣- ما يتعلق باحكام القرآن الكريم

المصادر والمراجع

١ - جلال الدين السيوطى : الاتقان فى علوم القرآن
٢ - عبد العظيم الزرقانى : مناهل العرفان فى علوم القرآن
٣- برهان الدين الزركشى : البرهان فى علوم القرآن

٤- محمد على الصابونى : التبيان فى علوم القرآن
٥- منا ع القطان : مباحث فى علوم القرآن
٦- السيد عميم الاحسان : التنوير فى اصول التفسير
٧- د. شفيق الاسلام : البيان فى علوم القرآن

(ج) تاريخ التفسير : الدرجات - ٢٠

إجابة سؤالين باللغة العربية من اربعة،
كل سؤال درجة ١٠ ، المجموع ١٠×٢ =٢٠

الدروس المقررة :

١- نشأة التفسير والتأويل وتطورهما
٢- التفسير فى العهد النبوى صلى الله عليه وسلم وعهد الصحابة والتابعين
٣- مصادر التفسير فى العهد النبوى صلى الله عليه وسلم وعهد الصحابة والتابعين
٤- مدارس التفسير
٥- اشهر المفسرين من الصحابة والتابعين وحياتهم المؤجزة
٦- تاريخ تدوين كتب التفسير
٧- طبقات المفسرين ومراحل التفسير
٨- اشهر المفسرين وحياتهم المؤجزة
٩- انواع التفسير واقسامه

المصادر والمراجع

١ - محمد حسين الذهبى : التفسير والمفسرون
٢ - د. صبحى صالح : مباحث فى علوم القرآن
٣- ابن تيمية : مقدمة فى اصول التفسير
٤- تقى عثمانى : علوم القرآن
٥. تاريخ شاস্ত্রের ইতিহাস : ড. মুহাম্মদ মাহবুবুর রহমান
৬. মুফাস্‌সির পরিচিতি ও পর্যালোচনা : ড. মোহাম্মদ বেলাল হোসেন
৭. ড. এনামুল হক : কালজয়ী তিন তাফসীর

01712792632
Mohammad Masum Billah (17415)
BCS (General Education)
Assistant Professor (Arabic & Islamic Studies)
Govt. Madrasah-E-Alia, Dhaka.
মোঃ রুহুল কুদ্দুস চৌধুরী
আই.ডি নং-৩৯৯৭
উপ-পরিচালক (পাঠ্যসূচি প্রণয়ন)
এনটিআরসিএ, ঢাকা
Md Shaheen Alam Chowdhur
Deputy Director
Non-Government Teachers
Registration and Certificatio
Authority (NTRCA)
Ministry of Education, Dhaka
নাসির উদ্দিন আহমেদ (যুগ্মসচিব)
সদস্য (শিক্ষাতত্ত্ব ও শিক্ষামান)
বেসরকারি শিক্ষক নিবন্ধন ও প্রত্যয়ন
কর্তৃপক্ষ (এনটিআরসিএ)
শিক্ষা মন্ত্রণালয়, ঢাকা।

কামিল (মাস্টার্স) মাদ্‌রাসার প্রভাষক (ফিক্‌হ) পদের সিলেবাস

বিষয়ঃ ফিক্‌হ

পূর্ণমানঃ ১০০

'ক' বিভাগ

১. আল ফিক্‌হ

(তিনটি প্রশ্নের যে কোন দু'টির উত্তর) ২×১০=২০

(ক) কিতাবুত তাহারাত

(খ) কিতাবুস সালাত

(গ) কিতাবুল হাজ্জ

(ঘ) কিতাবুয যাকাত

(ঙ) কিতাবুন নিকাহ্‌

(চ) কিতাবুত তালাক

(ছ) কিতাবুল বুয়ূ

(জ) কিতাবুল কারাহিয়্যাহ

২. তারিখু ইলমিল ফিক্‌হ (ফিক্‌হ শাস্ত্রের ইতিহাস)

(তিনটি প্রশ্নের যে কোন দু'টির আরবিতে উত্তর) ২×১০=২০

(ক) ফিক্‌হ শাস্ত্রের উৎপত্তি, ক্রমবিকাশ ও প্রয়োজনীয়তা।

(খ) মাযহাব সমুহের উৎপত্তি, ক্রমবিকাশ ও প্রয়োজনীয়তা।

(গ) তাবাকাতুল ফুকাহা (ফকিহগণের স্তর)- সাহাবি, তাবেয়ি ও চার মাযহাবের ইমামগণের জীবনী ও অবদান।

৩. মুসলিম আইন

(দু'টি প্রশ্নের যে কোন একটির উত্তর) ১×১০=১০

(ক) উত্তরাধিকার ও সম্পদের বিলি-বন্টন।

(খ) ফারাইজের অংক।

(গ) উত্তরাধিকার সম্পর্কিত হানাফি আইন।

(ঘ) উইল।

(ঙ) ওয়াক্‌ফ

(চ) মুসলিম পারিবারিক আইন-১৯৬১।

[১০৭] [৩২৭]

'খ' বিভাগ

১. উসূলুল ফিক্‌হ

(দু'টি প্রশ্নের যে কোন একটির উত্তর) ১×১০=১০

(ক) কিতাবুল্লাহ

(খ) সুন্নাহ

(গ) ইজমা

(ঘ) কিয়াস

২. আল কাওয়া'ইদুল ফিক্‌হিয়্যাহ (ফিক্‌হী মাসআলার নিয়মকানুন)

(দু'টি প্রশ্নের যে কোন একটির উত্তর) ১×১০=১০

(ক) সংজ্ঞা, উৎপত্তি, ক্রমবিকাশ ও বৈশিষ্ট্য।

(খ) শ্রেণি বিভাগ।

(গ) ইলমুলফিক্‌হ ও ইলমু উসূলিল ফিক্‌হ ও ইলমু কাওয়াইদিল ফিক্‌হিয়্যাহর মধ্যে পার্থক্য

(ঘ) দশটি উল্লেখযোগ্য কাওয়াইদ

৩. ফাত্‌ওয়া

(দু'টি প্রশ্নের যে কোন একটির উত্তর) ১×১০=১০

(ক) ফাতওয়ার সংজ্ঞা, হুক্‌ম

(খ) ফাতওয়া দেওয়ার নিয়ম, শর্ত ও আদবসমূহ

(গ) ফাতওয়া দেওয়ার অধিকার

(ঘ) মুফতি ও বিচারকের মধ্যে পার্থক্য

৪. আল-ইকতিসাদ আল-ইসলামী

(তিনটি প্রশ্নের যে কোন দু'টির উত্তর) ২×১০=২০

(ক)ইসলামি অর্থনীতির সংজ্ঞা, প্রকৃতি ও পরিধি।

(খ) ইসলামি অর্থনীতি মূলনীতি সমূহ।

(গ) ইসলামি অর্থনীতির মৌলিক উপাদান (যাকাত, সাদাকাহ, খারাজ, জিযিয়া ও উশর)

(ঘ) সুদ ও মুনাফা।

(ঙ) ইসলামি ব্যাংকের সংজ্ঞা, উৎপত্তি, ক্রমবিকাশ ও কার্যক্রম।

(চ) ইসলামি বীমার সংজ্ঞা, উৎপত্তি, ক্রমবিকাশ ও কার্যক্রম।

০৬/০২/১৯

ঃ রুহুল কুদ্দুস চৌধুরী
আই.ডি নং-৩৯১৭
পরিচালক (পাঠ্যসূচি প্রণয়ন)
এনটিআরসিএ, ঢাকা।

০৬/০২/১৯

Md Shaheen Alam Chowdhury
Deputy Director
Non-Government Teachers' Registration and Certification Authority (NTRCA)
Ministry of Education, Dhaka

নাসির উদ্দিন আহমেদ (যুগ্মসচিব)
সদস্য (শিক্ষাতত্ত্ব ও শিক্ষামান)
বেসরকারি শিক্ষক নিবন্ধন ও প্রত্যয়ন
কর্তৃপক্ষ (এনটিআরসিএ)
শিক্ষা মন্ত্রণালয়, ঢাকা।

০৬/০২/১৯

অসীম কুমার কর্মকার
সিনিয়র সহকারী সচিব
মাধ্যমিক ও উচ্চ শিক্ষা বিভাগ
শিক্ষা মন্ত্রণালয়
গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

০৬/০২/১৯

মোঃ মনজুরুর রহমান (২৩৯০)
সহযোগী অধ্যাপক (ই.শি.)ও
বিভাগীয় প্রধান,
দাওয়াহ এন্ড ইসলামিক স্টাডিজ
সরকারি মাদরাসা-ই-আলিয়া, ঢাকা
01552340399,

২- الزبيدي : التجريد الصريح (مختصر صحيح البخارى) كتاب بدء الوحي ، كتاب الإيمان -

৩ - الحريري : المقامات : المقامة الأولى

النثر العربي الحديث :

১ - الدكتور طه حسين : الأيام

২ - نجيب محفوظ : هذا القرن

৩ - مصطفى لطفي المنفلوطي : العبارات

الشعر العربي القديم :

১ - امرؤ القيس : المعلقة (১-২০) بيتا

২ - كعب بن زهير : بانت سعاد : أنبئت أن رسول الله أوعدني .... إلى آخر القصيدة

৩ - أبو تمام : ديوان الحماسة : باب الحماسة : ১-২০ بيتا

الشعر العربي الحديث :

১ - احمد شوقى بك : ديوان احمد شوقى : الهمزة النبوية (১-২০) بيتا

২ - حافظ ابراهيم : ديوان حافظ ابراهيم : اللغة العربية تنعى حظها بين اهلها

৩ - معرف الرصافى : ديوان الرصافى : العلم

تاريخ الأدب العربي

الدروس المقررة : (Topics to be read)

১ - الأدب العربي في العصر الجاهلي والأموي والعباسى

২ - أثر القرآن الكريم والحديث فى الأدب العربي

৩ - حياة الأدباء والشعراء الكبار فى فترة النهضة

বেসরকারি শিক্ষক নিবন্ধন ও প্রত্যয়ন কর্তৃপক্ষ (NTRCA)
কামিল (স্নাতকোত্তর) মাদরাসার ক্ষেত্রে
প্রভাষক 'আদব' পদের সিলেবাস

পূর্ণমান : ১০০, বিষয় কোড : ৪৫৬
সময় : ৩ ঘণ্টা

توزيع الدرجات : (Distribution of Marks)

(الف) النثر العربي القديم والحديث - الشعر العربي القديم والحديث : الدرجات - ٦٠

১ - الترجمة باللغة البنغالية : (٢ من ٤) من النثر والشعر والأسئلة الموجزة الملحقة باللغة العربية - ١٥×٢=٣٠

(الترجمة - ١٠ والأسئلة - ٥ = ١٠+٥=١٥)

২ - التشريح باللغة العربية من النثر والشعر (٢ من ٤) ٥×٢=١٠

৩ - الأسئلة المفصلة باللغة العربية من النثر والشعر (١ من ٣) ١٠

৪ - الأسئلة من تاريخ الأدب العربي : (١ من ٣) ١٠

(ب) قواعد اللغة العربية والتصنيف
الدرجات - ٤٠

৫ - قواعد اللغة العربية : (٢ من ٤) ١٠×٢=٢٠

৬ - الترجمة من اللغة البنغالية إلى اللغة العربية : (١ من ٢) ٥

৭ - التصنيف : (٣ من ٥) ٥×٣=١٥

المنهج الدراسي : (Syllabus)

(الف) النثر العربي القديم والحديث - الشعر العربي القديم والحديث

النثر العربي القديم

الكتب المقررة : (Books prescribed)

১ - الزمخشرى : الكشاف : سورة يٰس (١- ٤٤) آية

المصادر والمراجع (Books Recommended)

١ - أحمد حسان الزيات : تاريخ الأدب العربي
٢ - جرجى زيدان : تاريخ اللغة العربية
٣ - حنا الفخوري : تاريخ الأدب العربي

(ب) قواعد اللغة العربية والتصنيف

قواعد اللغة العربية

الدروس المقررة (Topics to be read)

١ - الإعراب والبناء
٢ - المرفوعات
٣ - المنصوبات
٤ - المجرورات
٥ - التوابع

المصادر والمراجع (Books Recommended)

١ - ابن الحاجب : الكافية
٢ - رشيد الشرتونى : مبادئ العربية
٣ - سراج الدين عثمان : هداية النحو

التصنيف (Composition)

الدروس المقررة (Topics to be read)

١ - الترجمة من اللغة البنغالية إلى اللغة العربية -

٢ - **كتابة الطلب :** طلب الالتحاق بالجامعة ، طلب الشهادة العلمية من مكتب مراقب الامتحانات ، وطلب التزكية من رئيس القسم بالجامعة، العريضة إلى مدير المدرسة -

٣ - **كتابة الرسالة :** رسالة الولد إلى الوالد، رسالة إلى الصديق ورسالة الدعوة إلى حفلة الزواج -

٤ - **كتابة الحوار :** الحوار فى حرم المدرسة فى أول اللقاء ، الحوار بين الطبيب والمريض - الحوار بين البائع والمشتري -

٥ - **كتابة الفقرة :** استقلال بنغلاديش، يوم اللغة الأمية العالمي أهمية التعليم ، حقوق المرأة فى الإسلام ، فرائض الطلاب ، واجب الولد إلى الوالدين -

المصادر والمراجع (Books Recommended)

١ - جامعة الملك سعود، الرياض : العربية بين يديك
٢ - د. ف. عبد الرحيم : دروس اللغة العربية لغير الناطقين بها (الجامعة الإسلامية بالمدينة المنورة)
٣ - العربية للناشئين (كتاب التلميذ : الجزء الثاني والثالث والرابع)

০৬/০২/২০১৭
মোঃ রুহুল কুদ্দুস চৌধুরী
আই.ডি নং-৩৯৯৭
উপ-পরিচালক (পাঠ্যসূচি প্রণয়ন)
এনটিআরসিএ, ঢাকা।

০৬/০২/২০১৭
Md Shaheen Alam Chow
Deputy Director
Non-Government Teacher
Registration and Certificatio
Authority (NTRCA)
Ministry of Education, Dhaka

০৬/০২/২০১৭
নাসির উদ্দিন আহমেদ (যুগ্মসচিব)
সদস্য (শিক্ষাতত্ত্ব ও শিক্ষামান)
বেসরকারি শিক্ষক নিবন্ধন ও প্রত্যয়ন
কর্তৃপক্ষ (এনটিআরসিএ)
শিক্ষা মন্ত্রণালয়, ঢাকা।

০৬/০২/২০১৭
মোহাম্মদ মোস্তাফিজুর রহমান (৮৫২৪)
বিসিএস (সাধারণ শিক্ষা)
সহযোগী অধ্যাপক ও বিভাগীয় প্রধান
আরবী ভাষা ও সাহিত্য বিভাগ,
সরকারি মাদরাসা-ই-আলিয়া, ঢাকা।
01712646819

০৬/০৪/২০১৭
অসীম কুমার কর্মকার
সিনিয়র সহকারী সচিব
মাধ্যমিক ও উচ্চ শিক্ষা বিভাগ
শিক্ষা মন্ত্রণালয়
গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

০৬/০৪/২০১৭