FEDERAL PUBLIC SERVICE COMMISSION
(Curriculum & Research Wing)

Schemes and Syllabi for Screening/Professional Tests as well as Descriptive Examination
Relating to Posts Advertised under Consolidated Advertisement No. 01/2023

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
1.	01/2023	**Assistant Private Secretary** (BS-16), in Different Ministries/ Divisions/ Departments	i. Second Class or Grade 'C' Bachelor's degree from a University recognized by HEC ii. Minimum shorthand speed: 100 w.p.m and typing speed: 50 w.p.m. iii. Must be Computer Literate.	• Typing Test with minimum Speed of 50 W.P.M **35 Marks** • Shorthand Test with minimum Speed of 100 W.P.M **35 Marks** • Computer Literacy Test: **i** Microsoft Word (Typing, Formatting) **10 Marks** **ii** Microsoft Excel (Typing, Graph, Calculations) **10 Marks** **iii** Microsoft Power Point (Typing, Formatting, Inserting Objects) **10 Marks**	
2.	02/2023	**Assistant Private Secretary** (BS-16), National Accountability Bureau.	i. Second Class or Grade 'C' Bachelor's degree (14-years education) from HEC recognized Institution. ii. Minimum shorthand speed: 100 w.p.m and typing speed: 50 w.p.m. iii. Certification in Computer operations.	• Typing Test with minimum Speed of 50 W.P.M **35 Marks** • Shorthand Test with minimum Speed of 100 W.P.M **35 Marks** • Computer Literacy Test: **i** Microsoft Word (Typing, Formatting) **10 Marks** **ii** Microsoft Excel (Typing, Graph, Calculations) **10 Marks** **iii** Microsoft Power Point (Typing, Formatting, Inserting Objects) **10 Marks**	
3.	03/2023	**Assistant Director** (BS-17), National Accountability Bureau.	At least Second Division Master's degree or 16 years education in Criminology/ Law/ Business Administration/ Economics/ Computer Sciences/ Defence and Strategic Studies form HEC recognized institution/ University. **OR** B.E/ B.Sc./ 16 years education in Civil/ Electrical/ Mechanical from HEC recognized Institution/ University.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** General Intelligence/ Professional Test=80 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II** ▪ Basic Arithmetic – Algebra – Ratios – Percentages – Arithmetic Means ▪ Current Affairs. – Issues/Challenges at National and International Level during the last 2 years ▪ Pakistan Affairs & Islamic Studies – Basic Level knowledge ▪ National Accountability Ordinance, 1999 ▪ Anti Money Laundering Act 2010 ▪ Functions of Financial Action Task Force (FATF)

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
4.	08/2023	**Civilian Assistant Security Officer, Grade-IV** (BS-16), Corps of EME, Ministry of Defence.	Second Class or Grade 'C' Bachelor's degree from a University recognized by the HEC. OR Retired Army Officers with Matric or equivalent qualification having two years post qualification experience relating to security matters.	Objective Type Test (MCQ) **Part-I** English **=** 20 marks **Part-II** Professional Test= **8**0 marks	**Part-I** Grammar Usage, Sentence Structuring. **Part-II** • Terrorism, Radicalism and War on Terror • Media's representation of Crime and the Criminal Justice System • Modern Law Enforcement and Crime Prevention System • Human Rights Abuses and Protection, • Money-laundering • Cyber Crime • Role of NAB, FIA, ANF • Security Measures to Maintain Law & Order
5.	09/2023	**Civilian Labour Officer, Grade-III** (BS-17), Corps of EME, Ministry of Defence.	Bachelor's degree in Law (LLB)/ Master's degree in Business Administration/ Public Administration or equivalent qualification from a University recognized by HEC. OR Major/ Captain (Retired) with requisite qualifications of the post.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** General Intelligence/ Professional Test=80 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II** ▪ Basic Arithmetic – Algebra – Ratios – Percentages ▪ Current Affairs. – Issues/Challenges at National and International Level during the last 2 years • Pakistan Labour Policy, 2010 • Labour welfare and safety laws, • Industrial health and safety problems related to labour welfare.
6.	10/2023	**Establishment & Cash Officer, Grade-III** (BS-17), Corps of EME, Ministry of Defence.	Second Class or Grade 'C' Master's degree in Mathematics/ Statistics/ Economics/ Business Administration/ Commerce or equivalent qualification from a University recognized by the HEC. OR Final Examination Certificate awarded by the ICMAP or ICAP/Membership of the ACCA, UK. OR Retired Army Officers of the rank of Captain/ Major with requisite qualifications of the post.	Objective Type Test (MCQ) **Part-I** English **=** 20 marks **Part-II** Professional Test= **8**0 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** • Civil Servant Act 1973 and Rules made thereunder • Public Procurement Rules 2004 • Rules of Business, 1973 as amended • Secretariat Instructions and Office Procedures • System of Financial Control and Budgeting 2006 • Human Resource Management • Basic Computer Operation in MS Office

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
7.	13/2023	**Lecturer (Male)** (BS-17), (A) Applied Psychology (B) Botany (C) Chemistry (D) Commerce (E) Computer Science (F) Economics (G) English (H) Geography (I) Islamic Studies (J) Mathematics (K) Pakistan Studies (L) Physics (M) Political Science (N) Sociology (O) Statistics (P) Zoology Islamabad Model Colleges, Federal Directorate of Education, Ministry of Federal Education and Professional Training.	Second Class or Grade 'C' Master's degree or equivalent in the relevant subject.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Subject Test = 50 marks **Part-III** Professional Test = 30 marks	**For (A) Applied Psychology** **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** ▪ Nature and Scope of Psychology ▪ Biological basis of Behaviour ▪ Developmental Psychology ▪ Social Psychology ▪ Educational Psychology ▪ Counselling Psychology ▪ Abnormal and Clinical Psychology ▪ Forensic Psychology ▪ Psychological Testing and Assessment **Part-III** ▪ Teaching Techniques and Methodology ▪ Classroom Management and Discipline ▪ Testing and Evaluation ▪ Knowledge of Bloom's Taxonomy **For (B) Botany** **Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II (Masters Level)** ▪ Algae, ▪ Fungi, ▪ Bryophytes ▪ Pteridophytes ▪ Gymnosperms, ▪ Angiosperms, ▪ Plant Physiology, ▪ Ecology, ▪ Cytology, ▪ Genetics, **Part-III** ▪ Teaching Techniques and Methodology ▪ Classroom Management and Discipline ▪ Testing and Evaluation ▪ Knowledge of Bloom's Taxonomy

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
					For (C) Chemistry **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** ▪ Nature, Properties & States of Matter, ▪ Electronic Structure, ▪ Bonding, ▪ Chemical Kinetics & Radioactivity, ▪ Synthetic Chemistry ▪ Polymers, ▪ Reaction Mechanism (electrophilic & nucleophilic substitution and addition reaction) ▪ Inorganic Chemistry, ▪ Thermodynamics, ▪ Electrochemistry, **Part-III** ▪ Teaching Techniques and Methodology ▪ Classroom Management and Discipline ▪ Testing and Evaluation ▪ Knowledge of Bloom's Taxonomy
					For (D) Commerce **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** • Auditing • Cost Accounting • Managerial Economics • Computer Application in Business • Islamic Principles of Banking & Finance • E-Commerce • Specialized financial Institutions • Salient features of Investment Analysis **Part-III** • Teaching Techniques and Methodology • Classroom Management and Discipline • Testing and Evaluation • Knowledge of Bloom's Taxonomy

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
					For (E) Computer Science **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** • Computer Hardware/Software, • Data Communication & Networking, • C/C++ Language, • Operating System Unix/Linux • Windows 8.1, Windows 10, • Oracle/PLSQL, • System Analysis & Design. • Web Programming, **Part-III** • Teaching Techniques and Methodology • Classroom Management and Discipline • Testing and Evaluation • Knowledge of Bloom's Taxonomy
					For (F) Economics **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** • Micro Economics: Determination of market demand and supply • Macro Economics: Basic Economic Concepts • International Trade: Theories, Trade Restrictions & Trade Policy, • WTO and Developing Economies, • Monetary Theory & Public Finance, • Industrial Development in Pakistan • Interest Free Banking in Pakistan **Part-III** • Teaching Techniques and Methodology • Classroom Management and Discipline • Testing and Evaluation • Knowledge of Bloom's Taxonomy

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
					For (G) English **Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II (Masters Level)** • Linguistics. • Syntax. • Diction. • **Drama:** Shakespeare (Hamlet; King Lear; Twelfth Night), William Congreve (The Way of the World), Shaw (Pygmalion; Heartbreak House), Harold Pinter (The Caretaker), Samuel Beckett (Waiting for Godot), Eugene O'Neill (Long Day's Journey into Night) **Part-III** • Teaching Techniques and Methodology, • Classroom Management and Discipline, • Testing and Evaluation, • Knowledge of Bloom's Taxonomy
					For (H) Geography **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** • Physical Geography • Landform development, climate, oceans & seas, factor of climate and environmental change • Geography of Pakistan, • Human Geography (Geographic pattern of culture, Ethnicities and Nationalities, Economic Indicators, Social Indicators, Health Indicators, Renewable Resources, Recycling Resources, Sustainable resources. The Demographic Transition) • Political Geography (State, National and the Nation-State Geopolitics of uneven development) • Statistical Geography, • Climatology/Metrology, • Environmental Geography, • GIS Techniques, **Part-III** • Teaching Techniques and Methodology, • Classroom Management and Discipline, • Testing and Evaluation, • Knowledge of Bloom's Taxonomy

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
					For (I) Islamic Studies **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** ☆ قرآن کا بنیادی موضوع/ متن ☆ سیرت النبی ﷺ ☆ فقہ: جامعیت، اختلاف رائے اور عصرِ حاضر کے تناظر میں مذہب کی تشریح۔ ☆ تعارف اسلام ☆ انسانی زندگی میں دین کی اہمیت ☆ اسلام کے نمایاں پہلو ☆ اسلامی عقائد کے انفرادی اور اجتماعی اثرات ☆ انسانی حقوق ۔ اسلام کی نظر میں ☆ اسلام اور عصرِ حاضر کے چیلنجز ☆ اسلامی نظامِ حکمرانی کا ڈھانچہ ☆ سرکاری ملازمین کی ذمہ داریاں ☆ اسلامی ضابطہ ءِ حیات **Part-III** • Teaching Techniques and Methodology • Classroom Management and Discipline • Testing and Evaluation • Knowledge of Bloom's Taxonomy
					For (J) Mathematics **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** • Calculus/Differentiation, Integration, Limits of continuity • Communication Skills for Mathematicians, • Computing Tools for Mathematicians, • Classical Mechanics, • Mathematical Statistics, • Mathematical Spaces (Sets, Vector Spaces, Metric Spaces, topological spaces Tensors, • Differential Equations. **Part-III** • Teaching Techniques and Methodology • Classroom Management and Discipline • Testing and Evaluation • Knowledge of Bloom's Taxonomy

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi

					For (K) Pakistan Studies
					
					Part-I
					Vocabulary, Grammar Usage, Sentence Structuring.
					Part-II (Masters Level)
					• Ideology of Pakistan in light of speeches and statements of Allama Iqbal and Quaid-e-Azam
					• Pakistan Movement 1857-1947
					• Current Issues of Pakistan (challenges to National Security, Economic Challenges, Pakistan's War on Terror,
					• Geography of Pakistan
					   ✓ Land and People of Pakistan
					   ✓ Pakistan and CPEC
					   ✓ Natural Resources of Pakistan,
					• Latest Constitutional Amendments,
					
					Part-III
					• Teaching Techniques and Methodology
					• Classroom Management and Discipline
					• Testing and Evaluation
					• Knowledge of Bloom's Taxonomy

					For (L) Physics **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** • Mechanics • Heat and Thermodynamics, • Waves and Optics, • Electrostatic, • Electricity and Magnetism, • Modern and Quantum Physics, • Nuclear Physics, • Basic Solid State Physics, **Part-III** • Teaching Techniques and Methodology • Classroom Management and Discipline • Testing and Evaluation • Knowledge of Bloom's Taxonomy

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
					For (M) Political Science **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** • Western Political Thought (Plato, Aristotle, Machiavelli, Montesquieu, Hobbes, Locke, Rousseau, Marx, Lenin, Frances Fukuyama) • Muslim Political Thought (Al-Farabi, Al-Mawardi, Imam Ghazali, Ibn Khaldun, Shah Waliullah, Allama Muhammad Iqbal) • State System: Nature and Emergence, Islamic Concept • Political Institutions and Role of Government • Analysis of 1956, 1962, 1973 Constitutions and Constitutional Amendments • Comparative Study of Political System (Turkey, India, Malaysia and China) **Part-III** • Teaching Techniques and Methodology, • Classroom Management and Discipline, • Testing and Evaluation, • Knowledge of Bloom's Taxonomy
					For (N) Sociology **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** • Meaning, Characteristics and Elements of Culture • Society: Meaning and Characteristics • Social Contract Theory & Organismic Theory • Sociological Theories (Ibn-i-Khaldun, Spencer, Max Weber, Karl Marx) • Methods of Sociological Research, • Social Institutions: Nature, Genesis & Function • Mechanism of Social Control: Formal & Informal • Social and Cultural Change & Social Policy: Processes & Effects • Community organization and development • Social Problems in Pakistan

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
					Part-III • Teaching Techniques and Methodology, • Classroom Management and Discipline, • Testing and Evaluation, • Knowledge of Bloom's Taxonomy **For (O) Statistics** **Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II (Masters Level)** • Measures of Central Tendency, • Measures of Dispersion or Variation, • Regression and Correlation, • Index Numbers, • Probability Theory, • Probability Distributions, • Presentation of Data • Time Series Analysis, • Statistical Inference, • Sampling Theory and Techniques, • Analysis of Variance, • Experimental Design **Part-III** • Teaching Techniques and Methodology • Classroom Management and Discipline • Testing and Evaluation • Knowledge of Bloom's Taxonomy

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
					For (P) Zoology **Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Masters Level)** • Eco System, • Classification of Fish, Reptiles, Mammals, • Classification of Mollusks, Edinodermata, • Mammalian Hormonal System, • Membrane System, • Mammalian Gametogensis and Fertilization, • Multiple Alleles. • Mendelian laws of inheritance, • Reproduction and Development, **Part-III** • Teaching Techniques and Methodology, • Classroom Management and Discipline, • Testing and Evaluation, • Knowledge of Bloom's Taxonomy
8.	16/2023	**Assistant Network Administrator** (BS-16), Federal Public Service Commission.	Second Class or Grade 'C' Bachelor's Degree in Computer Science or Information Technology or equivalent qualification from a University recognized by the HEC. **NOTE:** A competency test in IT/ Computer shall be conducted as prescribed by the Commission.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test=80 marks	**Part-I** Grammar usage, Sentence Structuring. **Part-II** • Types of networks (LAN, WAN, Internet, Intranet etc.) • Network Topologies, • Network Management • Communication Protocols • OSI model • Operating Systems (Windows, Linux) • Transmission Mediums, Direction and Modes • Network Devices (Switch, Routers, and Modem), • Network security issues (Viruses, Firewall and unauthorized access),

Schemes and Syllabi for Written Examination (Descriptive) for Posts in BS-20 advertised under Consolidated Advertisement No. 01/2023

Case No.	F.4-04/2023-R
Particulars of post	**Chief Statistician** (BS-20), Agriculture Policy Institute, Ministry of National Food Security & Research.
Minimum Qualification & Experience:	(i) Second Class or Grade 'C' Master's degree in Statistics/ Econometrics/ Agriculture Economics/ Economics with Statistics or equivalent qualification from a University recognized by the HEC. (ii) Seventeen (17) years post qualification experience of Statistical Modelling and Analysis.

PAPER: PROFESSIONAL (100 MARKS)

Analysis Paper: Candidates will be required to analyse a situation related to advertised post and suggest/draw suitable solution comprising approximately **1000 words**. Candidate's research based knowledge as well as articulation, expression and technical treatment of the situation will be examined.

OR

Case Study: Candidates will be given real situation case studies related to advertised posts/ organization concerned and will be expected from the candidates to present (i) identification of issues (ii) evaluation of issues (iii) legal or case related theories (iv) evaluation of case facts if required and (v) possible solution of the case or writing judicial order, if the case so requires.

Schemes and Syllabi for Written Examination (Descriptive) for All Posts in BS-18 & BS-19 included in Consolidated Advertisement No. 01/2023

PAPER-I: ENGLISH

Max Marks: 100   Time Allowed: 3 Hours

(i) **English Essay-50 Marks:**   Candidates will be required to write an Essay in English comprising **1500 words** from a set of **six given topics.** Candidates are expected to reflect comprehensive and research based knowledge on a selected topic. Candidate's articulation, expression and technical approach to the style of English Essay writing will be examined.

(ii) **English (Composition and Précis)-50 Marks:**

The examination will test the candidate's abilities to handle Précis Writing, Reading Comprehension, Sentence Structuring, Translation, Grammar and Vocabulary, etc.

Précis Writing (10 marks): A selected passage with an orientation of generic understanding and enough flexibility for compression shall be given for précising and suggesting an appropriate title.

Reading Comprehension (10 marks): A selected passage that is rich in substance but not very technical or discipline-specific shall be given, followed by five questions, each carrying 2 marks.

Grammar and Vocabulary (10 marks): Correct usage of Tense, Articles, Prepositions, Conjunctions, Punctuation, Phrasal Verbs, Synonyms and Antonyms etc.

Sentence Correction (5 marks):   Ten sentences shall be given each having a clear structural flaw in terms of grammar or punctuation. The candidates shall be asked to rewrite them with really needed correction only, without marking unnecessary alterations. No two or more sentences should have exactly the same problem, and 2-3 sentences shall be based on correction of punctuation marks.

Grouping of Words (5 marks):   A random list of ten words of moderate standard (neither very easy nor utterly unfamiliar) shall be given, to be grouped by the candidates in pairs of those having similar or opposite meaning, as may be clearly directed in the question.

Pairs of Words (5 marks): Five pairs shall be given of seemingly similar words with different meanings, generally confused in communication, for bringing out the difference in meaning of any five of them by first explaining them in parenthesis and then using them in sentences.

Translation (5 marks): Ten short Urdu sentences involving structural composition, significant terms and figurative/idiomatic expressions shall be given, to be accurately translated in English.

SUGGESTED READINGS

Sr. No.	Title	Author
1.	English Grammar in Use	Raymond Murphy
2.	Practical English Usage	M. Swan
3.	Practical English Grammar and Composition	S.C. Gupta
4.	Improve your Punctuation & Grammar	Marion Field
5.	The Little, Brown Handbook	H. Ramsey Flower & Jane Aaron
6.	A University English Grammar	R. Quirk & S. Greenbaum
7.	Write Better, Speak Better	Readers Digest Association
8.	Modern English in Action	Henry Christ
9.	Exploring the World of English	Syed Saadat Ali Shah

PAPER-II: PROFESSIONAL

Max Marks: 100   Time Allowed: 3 Hours

Case No.	F.4-05/2023-R
Particulars of post	**General Staff Officer, Grade-I (Classified Radiologist)** (BS-19), Women Imaging/ Breast Clinic/ Body Imaging Department, Armed Forces Institute of Radiology and Imaging, Ministry of Defence.
Minimum Qualification & Experience:	i) MBBS or equivalent qualification from a University recognized by PM&DC. ii) FCPS (Radiology) or equivalent qualification recognized/ registered by the PM&DC. iii) One (1) year Fellowship degree/ OJT in Breast/ Body imaging. iv) Seven (7) years post qualification working experience at any renowned medical imaging setup.

Part-I: 25 Marks (MCQ)

25 MCQ Questions on Part-II & Part-III.

Part-II: (Qualification Based) (Descriptive)   25 Marks

Core courses of **MBBS Degree**

Part-III: (Professional) (Descriptive)   50 Marks

i. Core courses of FCPS in **Radiology.**
ii. Core Courses of Specialization in **Breast/Body Imaging**

Note: (Equal weightage for each topic at Part-III)

PAPER-II: PROFESSIONAL

Max Marks: 100   Time Allowed: 3 Hours

Case No.	F.4-06/2023-R
Particulars of post	**Senior Research Officer** (BS-18), MVRDE, Ministry Of Defence Production.
Minimum Qualification & Experience:	Bachelor's Degree of Engineering in Mechanical / Mechatronics with minimum 5 years post qualification experience in one or more branches of research/ design/ development/ production.
	OR
	Retired Major of EME having Engineering degree in Mechanical / Mechatronics.
	OR
	Second Class or Grade 'C' M.Sc in Physics/ Maths / Chemistry or Metallurgy with five (5) years post qualification experience of research in the relevant subject in reputable organization.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

Part-II (Professional):   50 Marks (Subjective)

I.   Electricity & Electronics

Electricity & Magnetism; Electrical potential, Resistance, Laws of resistance, Conductance, Conductivity, Impedance, Ohm law, Resistance in series and in parallel, practical resistors, work, power, Energy, Joule's law of electric field intensity, Gauss's Theorem, Capacitor, Capacitance, Capacitors in parallel and series. Force on a conductor in a magnetic field, electrical and magnetic circuits, leakage flux, Relation between magnetism and electricity, Induced emf, induced current and directions, Faraday's laws of electromagnetic inductions, Lenz's law, dynamically induced emf, Self inductance, mutual inductance and inductance in series/parallel, magnetic hysteresis, Energy stored in magnetic field, Generation of alternating currents and voltages.

II.   Electrical Machines

DC Motors: Shunt, Series and Compound Motors, Speed and Torque Relations. Transformers: Principle, Construction, Voltage transformation ratio, Step-up/ step- down transformers, Copper & Iron Losses, Transformer connections; delta and star.
AC Motors: Induction motor, Synchronous motor, Performance, Efficiency. Single phase and three phase Motors.
Generators: Principle,   Construction, Different   components of generators. AC Generators, DC Generators.

III.   Electronics:

Transistors: types, calculations of voltages and currents in simple transistor circuits.
Amplifier & Oscillators: Working and classification of amplifiers, Class A and Class B Amplifiers, Feedback Amplifiers, Types of Feedback, RC Oscillators.
Integrated Circuits: OP Amps, timers, flip flop, converters, filters.

Telecommunications: EM theory, antennas, antenna gain, free space loss, fading. Modulations (AM, FM, PM, PWM, Delta, FSK, ASK, PSK), Error correction, Demodulation, Detectors, Transmitter, Receivers.

IV. Electricity and Magnetism

Electric field due to point charges, Gauss' law Electric potential and Poisson and Laplace's equation Dielectric medium and Polarization; Capacitance; Moving charges and resulting magnetic field; Ampere's law; Vector potential; Magnetic properties of matter; Transient current; Faraday's law of electromagnetic induction; Alternating current and LRO circuit. Maxwell's equations; Poynting theorem and Poynting Vector. Maxwell's equations in integral and differential form.

V. Mechanical Engineering Fundamentals

Mechanics and Strength of Materials: Concept of Stress and Strain, bending, torsion, geometric properties of areas, principal stresses, Tensile testing, Stress- Strain curve, Difference between Engineering and True Stress & Strain, Shear Stress & Strain, Concept of elastic and plastic deformation, Yield & ultimate Tensile strengths, Elongation, Toughness and Resilience, Ductility and Malleability, Hardness Testing, Brinell and Rock well Hardness test, bending moment,
Fluid Mechanics: Properties and basics of fluid mechanics, loss of head, power transformation by fluids, pumps, turbines. Fluid static's, Fluid dynamics, Types of flow: Turbulent and Laminar, Reynold's number.
Heat and Thermodynamics : Perfect gas and Vander Waals equation; Three Laws of Thermodynamics, internal energy, temperature, entropy. Thermal properties of Simple system production and measurement of low temperatures; kinetic theory of gases; Maxwellian distribution of molecular velocities; Brownian motion, Transport phenomena. Classical Maxwell-Boltzmann Statistics and its application; Quantum Bose—Einstein and Fermi—Dirac Statistics.
Manufacturing: Different manufacturing processes like Casting, Forging, Machining, Rolling, Extrusion, Wire-drawing, welding, Turning (lathe), Milling, Shaping, Gear cutting, Drilling, Fitting.

Part-III: 25 Marks (Subjective)
(Human Resource, Financial Management and Quality Management)

I. Human Resource and Financial Management

Definition, Significance and Scope of Human Resource Management; Organization—Types of Organization, Theory of Organization, Principles of Organization, Organization of the Federal and Provincial Governments, Public Sector Enterprises; Approaches to Human Resource Management. Personnel Administration—Tools of Personnel Management: Selection, Training, Promotion, Compensation, Discipline; Communication, Communication Channels and Principles of Public Relations; Human Behaviour and Organizations Administration.—Elements of Financial Administration, Performance Programmed Budgeting, Capital Budget, Principles of Budgeting, Auditing and Accounting.

II. Basic Concept of Quality Management

ISO-9000, ISO-13000, other certifications regarding quality measurement; management, management for Results, Setting Performance Goals and Targets; Job Analysis: Job Description, Job Specification, Performance Evaluation;

SUGGESTED READINGS

S. No.	Title	Author
1.	Electrical Technology	B.L. Theraja
2.	Electronic Devices and Circuits.	Bogart
3.	DC Machines	P.C. Sen
4.	Semiconductors	Manzar Saeed
5.	Modern Digital and Analog Communication	B.P.Lathi
6.	Fluid mechanics with engineering applications	Finnemore/ Franzini.
7.	Schaum Outline Series; Strength of Materials	William A. Nash
8.	Fluid Mechanics	Lewitt
9.	Manufacturing Processes for Engineering Materials	Kalpakjian
10.	Human Resource Management	H.T.Graham &Roger Bennett
11.	Management	James A.F.Stoner, R.Eward Freeman, Daniel R.Gilbert Jr.

PAPER-II: PROFESSIONAL

Max Marks: 100   Time Allowed: 3 Hours

Case No.	F.4-07/2023-R
Particulars of post	**Director (Planning & Statistics)** (BS-19), Marine Fisheries Department, Ministry of Maritime Affairs.
Minimum Qualification & Experience:	i. Second Class or Grade 'C' Master's Degree in Economics with Statistics/ Statistics/ Mathematics with Statistics. ii. Twelve (12) years post qualification experience in Economics Development/ Research/ Statistical Analysis and Evaluation.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & Part-III.

Part-II (Research and Planning) (Subjective)   : 25 Marks

I.   Project Management

Project Management, Processes Integration Management, Project Plan Development, Project Plan Execution and Overall Change Control, PERT, Gantt Chart, CPM

II. Scope Management

Initiation, Scope Planning, Scope Definition, Scope Verification and Scope Change Control.

III. Communications Management

Communications Planning, Information Distribution, Performance Reporting and Administrative Closure.

IV. Risk Management

Risk Identification, Risk Quantification, Risk Response Development and Risk Response Control.

V. Statistical Techniques

All statistical techniques related to Planning & Research

Part-III (Professional) (Subjective)   : 50 Marks

I.   Probability Distributions

Discrete and continuous Probability Distributions. Properties, applications of Binomial, Poisson, Hyper-geometric, Normal Distribution and its properties, Standard Normal Curve, Normal approximation to Binomial and Poisson distribution.

II. Regression Analysis & Correlation Analysis

Concepts of Regression and Correlation and their application, Simple and Multiple Linear Regression (upto three variables), Estimation of the Parameters, Method of least square, Inference regarding regression parameters. Correlation, Correlation Coefficient, Properties of Correlation Coefficient, Inference regarding correlation coefficient, Partial Correlation and Multiple Correlation (upto three variables).

III. **Sampling & Sampling Distributions**

Population and Sample, Advantages of Sampling, Sampling Design, Probability &Non-Probability Sampling techniques. Brief Concepts of Simple Random, Stratified, Systematic, Cluster, Multiple and Multistage Sampling. Purposive, Quota Sampling, Convenience & Accidental Sampling. Sampling with and without replacement, Application of Central Limit Theorem in Sampling, Sampling Distribution of Mean, difference between two Means, Proportion, difference between two Proportion and Variance.

IV. **Statistical Inferences**

Estimation: Point Estimation, Properties of a good Estimator. Interval Estimation. Interval Estimation of Population mean. Large and small sample confidence intervals for Population Mean. Hypothesis Testing: Types of errors. Hypothesis Testing for Population Mean. Inferences for Two Population Means. Inferences for the Mean of Two Normal Populations using Independent Samples (variances are assumed Equal). Inference for Two Populations Mean using Paired Samples. Inferences for Population Proportions. Confidence Intervals and hypothesis Testing for Population Proportion. Inferences for Two Populations Proportions using Independent Samples, Estimation of sample size. Analysis of categorized data. Goodness of fit tests. Contingency tables. Test of independence in contingency tables.

V. **Design of Experiments**

One-way and Two-way Analysis of Variance, Design of Experiments, Concepts of Treatment, Replication, Blocking, Experimental Units and Experimental Error, Basic Principles of Design of Experiments, Description, Layout and Statistical Analysis of Completely Randomized Design (CRD), Randomized Complete Block Design (RCBD), Multiple Comparison tests (LSD test).

SUGGESTED READINGS

S. No.	Titles	Author
1.	Project Management Body of Knowledge,	Project Management Institute (PMI) standards committee
2.	Software Project Management	S.A. Kelkar, A Concise Study, Prentice Hall of India.
3.	Principles and Procedures of Statistics	Steel, R and Torrie, J.H.
4.	Introduction to Statistical Theory, Part-I & II	Chaudhry, S.M. and Kamal, S.
5.	Fundamentals of Modern Statistical Methods	Wilcox, R.
6.	Statistical Methods	Aggarwal, Y.P.

PAPER-II: PROFESSIONAL

<u>Max Marks: 100</u>   <u>Time Allowed: 3 Hours</u>

Case No.	F.4-11/2023-R
Particulars of post	**Works Manager, Grade-II** (BS-18), Corps of EME, Ministry of Defence.
Minimum Qualification & Experience:	B.Sc. Engineering in Electrical/ Mechanical/ Electronics/ Telecommunication/ Chemical/ Metallurgical/ Aeronautical from a University recognized by the PEC with Five (05) years post qualification experience in the relevant field of Engineering works in a Government/ Semi-Government/ Autonomous/ Public/ Private Organization. OR Lieutenant Colonel/ Major (Retired) from EME Corps with requisite qualifications and experience of the post.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

Part-II (Engineering) (Subjective) : 50 Marks

I. Electricity & Electronics:

Electricity & Magnetism; Electrical potential, Resistance, Laws of resistance, Conductance, Conductivity, Impedance, Ohm law, Resistance in series and in parallel, practical resistors, work, power, Energy, Joule's law of electric field intensity, Gauss's Theorem, Capacitor, Capacitance, Capacitors in parallel and series. Force on a conductor in a magnetic field, electrical and magnetic circuits, leakage flux, Relation between magnetism and electricity, Induced emf, induced current and directions, Faraday's laws of electromagnetic inductions, Lenz's law, dynamically induced emf, Self inductance, mutual inductance and inductance in series/parallel, magnetic hysteresis, Energy stored in magnetic field, Generation of alternating currents and voltages.

II. Electrical Machines:

<u>DC Motors:</u> Shunt, Series and Compound Motors, Speed and Torque Relations. Transformers: Principle, Construction, Voltage transformation ratio, Step-up/step-down transformers, Copper & Iron Losses, Transformer connections; delta and star.

<u>AC Motors:</u> Induction motor, Synchronous motor, Performance, Efficiency. Single phase and three phase Motors.

<u>Generators:</u> Principle, Construction, Different components of generators. AC Generators, DC Generators.

III. Electronics:

<u>Transistors</u>: types, calculations of voltages and currents in simple transistor circuits.

<u>Amplifier & Oscillators:</u> Working and classification of amplifiers, Class A and Class B Amplifiers, Feedback Amplifiers, Types of Feedback, RC Oscillators.

<u>Integrated Circuits:</u> OP Amps, timers, flip flop, converters, filters.

Telecommunications: EM theory, antennas, antenna gain, free space loss, fading. Modulations (AM, FM, PM, PWM, Delta, FSK, ASK, PSK), Error correction, Demodulation, Detectors, Transmitter, Receivers.

DSP and Controls; filters, stability, Z-transform, Nyquist criteria, S domain, transfer functions.

IV. Power Systems:

Power network analysis, Polyphase circuits, Transients, Transmission Lines, Losses.

V. Costing, Accounting and Budgeting:

Net present value, Net future value, cash flows, auditing, income statement, balance sheet, taxation, financial risk management, cost analysis.

VI. Project Management:

Time lines, milestones, resources allocation, dependency, Gant Charts,

VII. Inventory Management:

FIFO models, LIFI models, Identification Schemes, Inventory management systems.

VIII. Quality Management Systems:

QA models. Deming, Juran Crosby, Quality circles, management responsibility, quality planning, purchasing, design process and design validation, quality audit, corrective and preventive measures.

Part-III: 25 Marks (Descriptive)
(Human Resource, Financial Management
and Information Technology)

I. Human Resource and Financial Management

Definition, Significance and Scope of Human Resource Management; Organization—Types of Organization, Theory of Organization, Principles of Organization, Organization of the Federal and Provincial Governments, Public Sector Enterprises; Approaches to Human Resource Management. Personnel Administration—Tools of Personnel Management: Selection, Training, Promotion, Compensation, Discipline; Communication, Communication Channels and Principles of Public Relations; Human Behaviour and Organizations Administration.—Elements of Financial Administration, Performance Programmed Budgeting, Capital Budget, Principles of Budgeting, Auditing and Accounting.

II. Information Technology and MS Office

Fundamentals of Computer: CPU, Memory Devices, Types of Computers, Characteristics of Computer and related material; Application Software: Microsoft Word, Microsoft Power Point, Microsoft Excel; Search Engines, Web Design, Email, Internet Surfing, Social Networking (Facebook, Twitter, etc); General Introduction to Virus and Antivirus utilities; Programming Languages

SUGGESTED READINGS

S. No.	Title	Author
1.	Electrical Technology	B.L. Tharaja
2.	Electronic Devices and Circuits.	Bogart
3.	DC Machines	P.C. Sen
4.	Semiconductors	Manzar Saeed
5.	Modern Digital and Analog Communication	B.P.Lathi
6.	Computers, tools for an Information age,	H.L. Captron, Addison Wesley
7.	Handbook of Engineering Management	Dennis Lock.
8.	Human Resource Management	H.T.Graham &Roger Bennett
9.	Management	James A.F.Stoner, R.Eward Freeman, Daniel R.Gilbert Jr.
10.	Understanding Computer: Today and Tomorrow	Deborah Morley, Charles Parker
11.	MS Office 365 Handbook: 2013 Edition	Kevin Wilson

PAPER-II: PROFESSIONAL

<u>Max Marks: 100</u>   <u>Time Allowed: 3 Hours</u>

Case No.	F.4-12/2023-R
Particulars of post	**Civilian Labour Officer, Grade-II** (BS-18), Corps of EME, Ministry of Defence.
Minimum Qualification & Experience:	Bachelors of Law (LLB) or Second Class or Grade 'C' Master's degree in Business Administration/ Public Administration/ Human Resource Management or equivalent qualification from a University recognized by the HEC with Five (5) years post qualification experience relating to Legal/ Administrative/ Management/ Service matters in a Government/ Semi-Government/ Autonomous/ Public/ Private Organization. OR Colonel/ Lieutenant Colonel (Retired) with requisite qualification and experience of the post.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

Part-II: 50 Marks (Descriptive)
(Public Administration, Office Management & Professional)

I. **Public Administration**: Nature and scope, Role of Public Administration in a modern Welfare State;

II. **Bureaucracy**: Concept of Bureaucracy, Theories of Bureaucracy, Ecology of Bureaucracy; Bureaucracy; of Pakistan as a Change Agent;

III. **Administrative Leadership:** Approaches to the study of Leadership, Forms of Leadership, Leadership qualities;

IV. **Administrative Accountability:** Internal and External Controls; Executive Control, Legislative Control, Judicial Control, Ombudsman, Public Opinion and Pressure Groups; Problems of Administrative Accountability in Pakistan;

V. **Controlling and Co-Ordination:** Forms of Controls, Control Mechanism, the process of Control, Principles of Controlling; Principles Coordination; Machinery for Coordination; Problems of Coordination in Public Administration in Pakistan.

VI. Civil Servant Act 1973 and Rules made thereunder;

VII. Secretariat Instructions and Office Procedures;

VIII. Public Procurement Ordinance and Rules 2004.

IX. Labour welfare and safety laws,

X. Industrial health and safety problems related to labour welfare.

XI. Analysis of Child Labour and Abuse as well as Bonded Labour.

XII. Pakistan Labour Policy, 2010 as amended from time to time

Part-III: 25 Marks (Descriptive)
(Human Resource, Financial Management
and Information Technology)

I. Human Resource and Financial Management

Definition, Significance and Scope of Human Resource Management; Organization—Types of Organization, Theory of Organization, Principles of Organization, Organization of the Federal and Provincial Governments, Public Sector Enterprises; Approaches to Human Resource Management. Personnel Administration—Tools of Personnel Management: Selection, Training, Promotion, Compensation, Discipline; Communication, Communication Channels and Principles of Public Relations; Human Behaviour and Organizations Administration.—Elements of Financial Administration, Performance Programmed Budgeting, Capital Budget, Principles of Budgeting, Auditing and Accounting.

II. Information Technology and MS Office

Fundamentals of Computer: CPU, Memory Devices, Types of Computers, Characteristics of Computer and related material; Application Software: Microsoft Word, Microsoft Power Point, Microsoft Excel; Search Engines, Web Design, Email, Internet Surfing, Social Networking (Facebook, Twitter, etc); General Introduction to Virus and Antivirus utilities; Programming Languages

SUGGESTED READINGS

S. No.	Title	Author
1.	An Introduction to the Public Administration	E.N. Cladden
2.	Bureaucracy: Modern Society	Pebr, M. Blau.
3.	Public Administration for a Welfare State	Paul Abbleby
4.	The Bureaucracy of Pakistan	Charles F. Kennedy
5.	Human Resource Management	H.T.Graham &Roger Bennett
6.	Management	James A.F.Stoner, R.Eward Freeman, Daniel R.Gilbert Jr.
7.	Understanding Computer: Today and Tomorrow	Deborah Morley, Charles Parker
8.	MS Office 365 Handbook: 2013 Edition	Kevin Wilson

PAPER-II: PROFESSIONAL

<u>Max Marks: 100</u>   <u>Time Allowed: 3 Hours</u>

Case No.	F.4-14 (A)/2023-R
Particulars of post	**Associate Professor/Vice Principal (Male) (Chemistry)** (BS-19), Islamabad Model Colleges, Federal Directorate of Education, Ministry of Federal Education and Professional Training.
Minimum Qualification & Experience:	Ph. D degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

Part-II: (Chemistry)   50 Marks (Descriptive)

I. **Atomic structure.**—Quantum theory, Schrodinger equation, Particle in box, hydrogen atom. Hydrogen molecule ion, hydrogen molecule. Theories of hydrogen and metallic bonding.

II. **Electrochemistry.**—Ionic equilibria, theory of strong electrolytes; ebye-Huckel theory of activity coefficients, galvanic cells, membrane equilibria and fuel cells. Theories of Acids and Bases, glass electrode, measurement of pH. Electrolysis, overvoltage and corrosion.

III. **Thermodynamics.**—First law of thermodynamics, internal energy, enthalpy functions. Thermochemistry, Entropy and second law of Thermodynamics, Free energy and chemical equilibrium.

IV. **Chemistry of Following Elements.**—Oxygen, Carbon, Chlorine, Silicon, Nitrogen, Phosphorus.

V. **Inorganic Chemical Industries.**—Sulphuric Acid, Fixation of Nitrogen, Chemical Fertilizers, Semi-conductivity devices. Cement, Glass and Ceramics.

VI. **Chemical Kinetics.**—Rate law and its determination Order of reaction. Experimental methods. Temperature Dependence of rate constants. Study of mechanism of a few selected reactions (1st and 2nd under reaction only).

VII. **Surface Chemistry and Catalysis.**—Physical adsorption and chemisorption. Surface area determination. Homogeneous and Heterogeneous Catalysis. Acid-base and Enzyme Catalysis.

VIII. **Physical Organic Chemistry.**—Elements of Organic reaction mechanism. Optical and Geometric Isomerism. Conformational analysis. Resonance. H—Bond and its effects on the properties of Organic Compounds.

IX. **Aromatic Chemistry.**—Structure of Benzene with particular reference to Mechanism of Electrophilic Substitution Reactions.

X. Chemistry of Natural Products.—Elementary study of Carbohydrates. Oils and Fats. Alkaloids and Vitamins.

XI. Industrial Organic Chemistry.—Organic Polymers. Fermentation processes including preparation of Anti-Biotics. Petro-Chemical Industry.

Part-III: (Professional) 25 Marks (Descriptive)

I. Development of Curriculum and Instructional Material
- Elements of Curriculum.
- Curriculum Development Process: Need Assessment, Formulation of Aims and Objectives, Taxonomies of Educational Objectives, Selection of Content, Development of Curricular Materials.

II. Process of Teaching and Teaching Strategies
- Process of Classroom Communication
- Factors affecting Classroom Communication
- Barriers to Classroom Communications
- Use of Instructional Materials and Media

III. Educational Assessment and Evaluation
- Concept of Classroom Assessment and Evaluation
- Distinction between Assessment, Evaluation and Measurement
- Approaches to Evaluation: Formative Evaluation; Summative Evaluation
- Types of Test: Essay Type; Objective Type: Multiple Choice, True-False Items, Matching Type; Principles of Construction of these Test
- Characteristics of a Good Test: Validity, Reliability, Objectivity, Usability

IV. Research Methods in Education
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing
-

SUGGESTED READINGS

S. No.	Title	Author
1.	Advanced Inorganic Chemistry 3rd Ed.	Cotton. F.A. and Wilkinson Groffrey
2.	Inorganic Chemistry, 3rd Ed. 1983	Hukeavy, James E.
3.	Physical Chemistry 5th Ed.	Moore, Walter J.
4.	Mechanism & Structure in Organic Chemistry	Gould, Edwards
5.	Organic Chemistry 2nd Ed.	Morrison, Robert Thornton & Boyd R.N.
6.	Research in Education	JW Best
7.	Integrating Education Technology into Teaching	Roblyer
8.	Curriculum Development	S. M. Shahid
9.	Educational Measurement and Evaluation	S. M. Shahid
10.	Educational Administration	S. M. Shahid

PAPER-II: PROFESSIONAL

Max Marks: 100   Time Allowed: 3 Hours

Case No.	F.4-14 (B)/2023-R
Particulars of post	**Associate Professor/Vice Principal (Male) (Commerce) (BS-19)**, Islamabad Model Colleges, Federal Directorate of Education, Ministry of Federal Education and Professional Training.
Minimum Qualification & Experience:	Ph Ph. D degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & Part-III.

Part-II: (Commerce)   50 Marks (Descriptive)

I. **Introduction to Business Finance:** Nature and Scope of a Business Entity, Contemporary Challenges posed to a Business, Common Legal Forms of a Business Entity, Meaning, Nature and Scope of Finance and Financial Management, Common Modes (Types) of Business Finance – Short- Medium- and Long-term Financing,

II. **Auditing:** Nature and Purpose of Auditing, Audit Planning and Control, Audit Procedures and Techniques, Audit Evidence and Documentation,

III. **Role and Responsibilities of an Auditor:** Auditor's professional and legal Rights, Responsibilities & Duties, and Liabilities, Auditor's Opinion and Report and their classification (Types), as specified under the Companies Ordinance 1984 and in the handbook of IFAC.

IV. **Cost Accounting:** Concepts and Scope of Cost Accounting, Cost Classification and Flows, Material Costing and Control, Labour Costing and Control, Factory Overhead Costing and Control, Types of Costing Systems

V. **Managerial Economics:** The Nature and Scope of Managerial Economics, Optimization Techniques and new Management Tools, Demand Theory, Demand Estimation, Demand Forecasting, Production and Cost Analysis, Cost Theory and Estimation, Linear Programming, Risk Analysis

VI. **Financial Management:** Elements of Financial Administration, Performance and Programmed Budgeting, Capital Budget, Principles of Budgeting, Auditing and Accounting.

Part-III: (Professional) 25 Marks (Descriptive)

I.   Development of Curriculum and Instructional Material
- Elements of Curriculum.
- Curriculum Development Process: Need Assessment, Formulation of Aims and Objectives, Taxonomies of Educational Objectives, Selection of Content, Development of Curricular Materials.

II.   Process of Teaching and Teaching Strategies
- Process of Classroom Communication
- Factors affecting Classroom Communication
- Barriers to Classroom Communications
- Use of Instructional Materials and Media

III. Educational Assessment and Evaluation
- Concept of Classroom Assessment and Evaluation
- Distinction between Assessment, Evaluation and Measurement
- Approaches to Evaluation: Formative Evaluation; Summative Evaluation
- Types of Test: Essay Type; Objective Type: Multiple Choice, True-False Items, Matching Type; Principles of Construction of these Test
- Characteristics of a Good Test: Validity, Reliability, Objectivity, Usability

IV.   Research Methods in Education
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing

SUGGESTED READINGS

S. No.	Title	Author
1.	Fundamentals of Accounting Principles	Wild. Larson. Chiappetta
2.	Principles of Accounting, and Advanced Accounting	Sohail Afzal
3.	Cost Accounting	Nisar ur Din.
4.	Advanced Auditing	Prof. Dr. Khuaja Amjad Saeed
5.	Managerial Economics	Micheal Baye
6.	Research in Education	JW Best
7.	Integrating Education Technology into Teaching	Roblyer
8.	Curriculum Development	S. M. Shahid
9.	Educational Measurement and Evaluation	S. M. Shahid
10.	Educational Administration	S. M. Shahid

PAPER-II: PROFESSIONAL

<u>Max Marks: 100</u>   <u>Time Allowed: 3 Hours</u>

Case No.	F.4-14 (C)/2023-R
Particulars of post	**Associate Professor/Vice Principal (Male) (Mathematics)** (BS-19), Islamabad Model Colleges, Federal Directorate of Education, Ministry of Federal Education and Professional Training.
Minimum Qualification & Experience:	Ph. D degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & Part-III.

Part-II: (Mathematics) (Subjective)   :50 Marks

I.   Vector Calculus

Vector algebra; scalar and vector products of vectors; gradient divergence and curl of a vector; line, surface and volume integrals; Green's, Stokes' and Gauss theorems.

II. Statics

Composition and resolution of forces; parallel forces and couples; equilibrium of a system of coplanar forces; centre of mass of a system of particles and rigid bodies; equilibrium of forces in three dimensions.

III. Dynamics

- Motion in a straight line with constant and variable acceleration; simple harmonic motion; conservative forces and principles of energy.
- Tangential, normal, radial and transverse components of velocity and acceleration; motion under central forces; planetary orbits; Kepler laws;

IV. Ordinary differential equations

- Equations of first order; separable equations, exact equations; first order linear equations; orthogonal trajectories; nonlinear equations reducible to linear equations, Bernoulli and Riccati equations.
- Equations with constant coefficients; homogeneous and inhomogeneous equations; Cauchy-Euler equations; variation of parameters.
- Ordinary and singular points of a differential equation; solution in series; Bessel and Legendre equations; properties of the Bessel functions and Legendre polynomials.

V. Fourier series and partial differential equations

- Trigonometric Fourier series; sine and cosine series; Bessel inequality; summation of infinite series; convergence of the Fourier series.
- Partial differential equations of first order; classification of partial differential equations of second order; boundary value problems; solution by the method of separation of variables; problems associated with Laplace equation, wave equation and the heat equation in Cartesian coordinates.

VI. Numerical Methods

- Solution of nonlinear equations by bisection, secant and Newton-Raphson methods; the fixed- point iterative method; order of convergence of a method.
- Solution of a system of linear equations; diagonally dominant systems; the Jacobi and Gauss-Seidel methods.
- Numerical solution of an ordinary differential equation; Euler and modified Euler methods; Runge- Kutta methods.

Part-III (Professional) (Subjective)   : 25 Marks

I. Development of Curriculum and Instructional Material
- Elements of Curriculum.
- Curriculum Development Process: Need Assessment, Formulation of Aims and Objectives, Taxonomies of Educational Objectives, Selection of Content, Development of Curricular Materials.

II. Process of Teaching and Teaching Strategies
- Process of Classroom Communication
- Factors affecting Classroom Communication
- Barriers to Classroom Communications
- Use of Instructional Materials and Media

III. Educational Assessment and Evaluation
- Concept of Classroom Assessment and Evaluation
- Distinction between Assessment, Evaluation and Measurement
- Approaches to Evaluation: Formative Evaluation; Summative Evaluation
- Types of Test: Essay Type; Objective Type: Multiple Choice, True-False Items, Matching Type; Principles of Construction of these Test
- Characteristics of a Good Test: Validity, Reliability, Objectivity, Usability

IV. Research Methods in Education
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing.

SUGGESTED READINGS

S. No.	Title	Author
1.	An Introduction to Vector Analysis	Khalid Latif,
2.	Introduction to Mechanics	Q.K. Ghori
3.	An Intermediate Course in Theoretical Mechanics	Khalid Latif,
4.	Differential Equations with Boundary Value Problems	D. G. Zill and M. R. Cullen
5.	Elementary Differential Equations	E.D. Rainville, P.E. Bedient and R.E. Bedient
6.	Elements of Numerical Analysis	F. Ahmad and M.A Rana
7.	Mathematical Methods	S. M. Yousaf, Abdul Majeed and Muhammad Amin
8.	Mathematical Techniques	Karamat H. Dar
9.	Research in Education	JW Best
10.	Integrating Education Technology into Teaching	Roblyer
11.	Curriculum Development	S.M. Shahid
12.	Educational Measurement and Evaluation	S.M. Shahid
13.	Educational Administration	S.M. Shahid

PAPER-II: PROFESSIONAL

<u>Max Marks: 100</u>   <u>Time Allowed: 3 Hours</u>

Case No.	F.4-14 (D)/2023-R
Particulars of post	**Associate Professor/Vice Principal (Male) (Physics)** (BS-19), Islamabad Model Colleges, Federal Directorate of Education, Ministry of Federal Education and Professional Training.
Minimum Qualification & Experience:	Ph. D degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & Part-III.

Part-II: (Physics) (Subjective)   : 50 Marks

I.   Mechanics

- Vectors—Dots, Cross and triple products, Gradient, divergence and applications.
- Newtonian laws of motion; calculus based approach to kinematics, forces and dynamics, conservation law of energy; conservation of linear and angular momentum; Dynamics of rigid body; spin and precession; gyroscope; Gravitation; planetary motion and satellites; Kepler's laws; centripetal forces
- Special theory of relativity. Mischelson—Morley experiment and Einstein's postulates; Lorentz transformation; time dilation and length contraction; equivalence of mass and energy.

II.   Fluid Mechanics

Surface tension; Viscosity; Elasticity; fluid motion and Bernoulli's theorem.

III.   Waves and Oscillation

- Free oscillation with one and two degrees of freedom; forced and damped oscillations and phenomenon of resonance. Simple harmonic motion. Traveling waves and transmission of energy; Phase and Group velocity; standing waves. Basics of sound waves.
- Reflection, Refraction, Interference, Diffraction and Polarization of waves; interfero-meter and Newton's rings; Diffraction Gratings and their resolving power; spectro-meters. Electromagnetic wave equation; normal and anamolous dispersion; coherence, lasers and applications.

IV.   Heat and Thermodynamics

Perfect gas and Van der Waals equation; Three Laws of Thermodynamics, internal energy, temperature, entropy. Thermal properties of Simple system

production and measurement of low temperatures; kinetic theory of gases; Maxwellian distribution of molecular velocities; Brownian motion; Transport phenomena. Classical Maxwell-Boltzmann Statistics and its application; Quantum Bose—Einstein and Fermi—Dirac Statistics.

V. Electricity and Magnetism

Electric field due to point charges, Gauss' law Electric potential and Poisson and Laplace's equation Dielectric medium and Polarization; Capacitance; Moving charges and resulting magnetic field; Ampere's law; Vector potential; Magnetic properties of matter; Transient current; Faraday's law of electromagnetic induction; Alternating current and LRO circuit. Maxwell's equations; Poynting theorem and Poynting Vector. Maxwell's equations in integral and differential form.

VI. Modern and Quantum Physics

Operators and quantum states, observables, time dependent and independent Schrodinger equation, angular momentum, spin-1/2 particle in a magnetic field, wave mechanics, particle in a box, tunneling, one-dimensional harmonic oscillator, Heisenber's uncertainty relationship and indeterminacy based on commutation properties of operators, Bohr theory and quantum numbers including electron spin; Pauli's exclusion principle; Spectra of simple systems with one or two valence electrons. Photo electric effect Compton scattering; pair production; Lande's g factor and Zeeman effect. Raman effect; Waves and particles and De Broglie's Hypothesis.

VII. Solid State Physics

Crystal lattice and structure, Bravais lattice, free electron model, Band theory and electron in a periodic potential, Fermi energy and density of states, n and p type semiconductors, physics of the transistor and MOSFET, dielectric properties, magnetic properties and origin of magnetism.

VIII. Nuclear Physics

Structure of Nuclei; Radioactivity α, β and γ decay. Methods of detection, Mass Sepectrometer. Accelerators. Phenomenon of fission; reactor and nuclear power, nuclear fusion and its application, Elementary particles and their properties.

Part-III (Professional) (Subjective)   : 25 Marks

I. Development of Curriculum and Instructional Material
- Elements of Curriculum.
- Curriculum Development Process: Need Assessment, Formulation of Aims and Objectives, Taxonomies of Educational Objectives, Selection of Content, Development of Curricular Materials.

II. Process of Teaching and Teaching Strategies
- Process of Classroom Communication
- Factors affecting Classroom Communication
- Barriers to Classroom Communications
- Use of Instructional Materials and Media

III. Educational Assessment and Evaluation
- Concept of Classroom Assessment and Evaluation
- Distinction between Assessment, Evaluation and Measurement
- Approaches to Evaluation: Formative Evaluation; Summative Evaluation
- Types of Test: Essay Type; Objective Type: Multiple Choice, True-False Items, Matching Type; Principles of Construction of these Test
- Characteristics of a Good Test: Validity, Reliability, Objectivity, Usability

IV. Research Methods in Education
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing.

SUGGESTED READINGS

S. No.	Title	Author
1.	Perspectives of Modern Physics.	A. Beiser.
2.	Fundamentals of Physics.	Halliday & Resnick
3.	Introduction to Electromagnetic Fields and Waves	D. Corson & P. Lorrain.
4.	Heat and Thermodynamics.	D. Zemansky
5.	Introduction to Quantum Mechanics	D. Griffiths
6.	Modern Physics	Serway, Moses, Moyer.
7.	Solid State Physics	C. Kittel
8.	The Cosmic Code: Quantum Physics as the Language of Nature	Heinz R. Pagets
9.	Physics of the Life Science	Jay Newman
10.	Research in Education	JW Best
11.	Integrating Education Technology into Teaching	Roblyer
12.	Curriculum Development	S. M. Shahid
13.	Educational Measurement and Evaluation	S. M. Shahid
14.	Educational Administration	S. M. Shahid

PAPER-II: PROFESSIONAL

<u>Max Marks: 100</u>   <u>Time Allowed: 3 Hours</u>

Case No.	F.4-15 (A)/2023-R
Particulars of post	**Associate Professor/Vice Principal (Female) (Biology)** (BS-19), Islamabad Model Colleges, Federal Directorate of Education, Ministry of Federal Education and Professional Training.
Minimum Qualification & Experience:	Ph. D degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

Part-II: (Biology) (Subjective)   50 Marks

I. Anatomy and Embryology

- Primary and secondary tissues. Meristems. Secondary growth in dicot stem. Anatomy of leaf, stem and root.
- Micro and mega sporogenesis, pollination mechanism, fertilization, development of Embryo and Endosperm, Seed dispersal.

II. Plant Physiology

- Plant water relations, Osmotic Quantities, component potentials of water and their role in transport, water absorption by roots, transpiration. Role of essential mineral elements and their uptake. Plant hormones. Photoperiodism, Vernalization. Dormancy and Seed germination. Enzymes.
- Photosynthesis: Plant pigments, Light reaction, CO_2 fixation, Mechanism of photophosphorylation.
- Respiration: Glycolysis, Kreb cycle, Mechanism of oxidative phosphorylation.

III. Genetics & Evolution

- Mendelian Genetics, Multiple Alleles, Polygenic inheritance, Gene interaction, Epistasis and pleiotropy, Sex-linked inheritance, Chromosomal aberrations, Mutations, DNA repair.
- Evolution of life, Convergent Evolution, Divergent Evolution, Parallel Evolution and Natural selection

IV. Molecular Biology

- Nucleic acids, DNA as hereditary material, DNA replication, Transcription, Genetic code, Protein synthesis, Genetic engineering and its application, Genetically Modified Organisms (GMO).

V. Animal Form and Function

- Protection, Support and Movement: Integumentary system of invertebrates and vertebrates; Animal muscles: the muscular system of invertebrates and vertebrates.

- Digestion and Nutrition: Feeding mechanism, Digestion, Organization and regional function of alimentary canal, Regulation of food intake, Nutritional requirements
- Internal Fluids and Respiration: Internal fluid environment, Composition of blood, Circulation and respiration mechanisms

Part-III (Professional) (Subjective)   : 25 Marks

I.   Development of Curriculum and Instructional Material
- Elements of Curriculum.
- Curriculum Development Process: Need Assessment, Formulation of Aims and Objectives, Taxonomies of Educational Objectives, Selection of Content, Development of Curricular Materials.

II.   Process of Teaching and Teaching Strategies
- Process of Classroom Communication
- Factors affecting Classroom Communication
- Barriers to Classroom Communications
- Use of Instructional Materials and Media

III.   Educational Assessment and Evaluation
- Concept of Classroom Assessment and Evaluation
- Distinction between Assessment, Evaluation and Measurement
- Approaches to Evaluation: Formative Evaluation; Summative Evaluation
- Types of Test: Essay Type; Objective Type: Multiple Choice, True-False Items, Matching Type; Principles of Construction of these Test
- Characteristics of a Good Test: Validity, Reliability, Objectivity, Usability

IV.   Research Methods in Education
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing.

SUGGESTED READINGS

S. No.	Title	Author
1.	Comparative Morphology of the Vascular Plants	Foster, A.S. and E.H. Gifford.
2.	Genetics: A Conceptual Approach.	Pierce, B. A.
3.	Molecular Cell Biology	Lodish,H., A. Berk, S.L. Zipursky, P. Matsudaira, D. Baltimore and J. Darnell
4.	Ilmi Biomolecules, Cell Biology and Genetics.	Cheema, T.A. and Cheema Z.T. 2009
5.	Growth and Differentiation in Plants	Phillips and Wareings
6.	Animal behavior:- An Evolutionary Approach	John Alcock
7.	Biology	Campbell, N.A.
8.	Research in Education	JW Best
9.	Integrating Education Technology into Teaching	Roblyer
10.	Curriculum Development	S. M. Shahid
11.	Educational Measurement and Evaluation	S. M. Shahid
12.	Educational Administration	S. M. Shahid

PAPER-II: PROFESSIONAL

<u>Max Marks: 100</u>   <u>Time Allowed: 3 Hours</u>

Case No.	F.4-15 (B)/2023-R
Particulars of post	**Associate Professor/Vice Principal (Female) (Chemistry)** (BS-19), Islamabad Model Colleges, Federal Directorate of Education, Ministry of Federal Education and Professional Training.
Minimum Qualification & Experience:	Ph. D degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

Part-II: (Chemistry)   50 Marks (Descriptive)

I. Atomic structure.—Quantum theory, Schrodinger equation, Particle in box, hydrogen atom. Hydrogen molecule ion, hydrogen molecule. Theories of hydrogen and metallic bonding.

II. Electrochemistry.—Ionic equilibria, theory of strong electrolytes; ebye-Huckel theory of activity coefficients, galvanic cells, membrane equilibria and fuel cells. Theories of Acids and Bases, glass electrode, measurement of pH. Electrolysis, overvoltage and corrosion.

III. Thermodynamics.—First law of thermodynamics, internal energy, enthalpy functions. Thermochemistry, Entropy and second law of Thermodynamics, Free energy and chemical equilibrium.

IV. Chemistry of Following Elements.—Oxygen, Carbon, Chlorine, Silicon, Nitrogen, Phosphorus.

V. Inorganic Chemical Industries.—Sulphuric Acid, Fixation of Nitrogen, Chemical Fertilizers, Semi-conductivity devices. Cement, Glass and Ceramics.

VI. Chemical Kinetics.—Rate law and its determination Order of reaction. Experimental methods. Temperature Dependence of rate constants. Study of mechanism of a few selected reactions (1st and 2nd under reaction only).

VII. Surface Chemistry and Catalysis.—Physical adsorption and chemisorption. Surface area determination. Homogeneous and Heterogeneous Catalysis. Acid-base and Enzyme Catalysis.

VIII. Physical Organic Chemistry.—Elements of Organic reaction mechanism. Optical and Geometric Isomerism. Conformational analysis. Resonance. H—Bond and its effects on the properties of Organic Compounds.

IX. Aromatic Chemistry.—Structure of Benzene with particular reference to Mechanism of Electrophilic Substitution Reactions.

X. Chemistry of Natural Products.—Elementary study of Carbohydrates. Oils and

Fats. Alkaloids and Vitamins.

XI. Industrial Organic Chemistry.—Organic Polymers. Fermentation processes including preparation of Anti-Biotics. Petro-Chemical Industry.

Part-III: (Professional) 25 Marks (Descriptive)

I. **Development of Curriculum and Instructional Material**
- Elements of Curriculum.
- Curriculum Development Process: Need Assessment, Formulation of Aims and Objectives, Taxonomies of Educational Objectives, Selection of Content, Development of Curricular Materials.

II. **Process of Teaching and Teaching Strategies**
- Process of Classroom Communication
- Factors affecting Classroom Communication
- Barriers to Classroom Communications
- Use of Instructional Materials and Media

III. **Educational Assessment and Evaluation**
- Concept of Classroom Assessment and Evaluation
- Distinction between Assessment, Evaluation and Measurement
- Approaches to Evaluation: Formative Evaluation; Summative Evaluation
- Types of Test: Essay Type; Objective Type: Multiple Choice, True-False Items, Matching Type; Principles of Construction of these Test
- Characteristics of a Good Test: Validity, Reliability, Objectivity, Usability

IV. **Research Methods in Education**
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing

SUGGESTED READINGS

S. No.	Title	Author
1.	Advanced Inorganic Chemistry 3rd Ed.	Cotton. F.A. and Wilkinson Groffrey
2.	Inorganic Chemistry, 3rd Ed. 1983	Hukeavy, James E.
3.	Physical Chemistry 5th Ed.	Moore, Walter J.
4.	Mechanism & Structure in Organic Chemistry	Gould, Edwards
5.	Organic Chemistry 2nd Ed.	Morrison, Robert Thornton & Boyd R.N.
6.	Research in Education	JW Best
7.	Integrating Education Technology into Teaching	Roblyer
8.	Curriculum Development	S. M. Shahid
9.	Educational Measurement and Evaluation	S. M. Shahid
10.	Educational Administration	S. M. Shahid

PAPER-II: PROFESSIONAL

<u>Max Marks: 100</u>   <u>Time Allowed: 3 Hours</u>

Case No.	F.4-15 (C)/2023-R
Particulars of post	**Associate Professor/Vice Principal (Female) (Physics)** (BS-19), Islamabad Model Colleges, Federal Directorate of Education, Ministry of Federal Education and Professional Training.
Minimum Qualification & Experience:	Ph. D degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & Part-III.

Part-II: (Physics) (Subjective)   : 50 Marks

I. Mechanics

- Vectors—Dots, Cross and triple products, Gradient, divergence and applications.
- Newtonian laws of motion; calculus based approach to kinematics, forces and dynamics, conservation law of energy; conservation of linear and angular momentum; Dynamics of rigid body; spin and precession; gyroscope; Gravitation; planetary motion and satellites; Kepler's laws; centripetal forces
- Special theory of relativity. Mischelson—Morley experiment and Einstein's postulates; Lorentz transformation; time dilation and length contraction; equivalence of mass and energy.

II. Fluid Mechanics

Surface tension; Viscosity; Elasticity; fluid motion and Bernoulli's theorem.

III. Waves and Oscillation

- Free oscillation with one and two degrees of freedom; forced and damped oscillations and phenomenon of resonance. Simple harmonic motion. Traveling waves and transmission of energy; Phase and Group velocity; standing waves. Basics of sound waves.
- Reflection, Refraction, Interference, Diffraction and Polarization of waves; interfero-meter and Newton's rings; Diffraction Gratings and their resolving power; spectro-meters. Electromagnetic wave equation; normal and anamolous dispersion; coherence, lasers and applications.

IV. Heat and Thermodynamics

Perfect gas and Van der Waals equation; Three Laws of Thermodynamics,

internal energy, temperature, entropy. Thermal properties of Simple system production and measurement of low temperatures; kinetic theory of gases; Maxwellian distribution of molecular velocities; Brownian motion; Transport phenomena. Classical Maxwell-Boltzmann Statistics and its application; Quantum Bose—Einstein and Fermi—Dirac Statistics.

V. Electricity and Magnetism

Electric field due to point charges, Gauss' law Electric potential and Poisson and Laplace's equation Dielectric medium and Polarization; Capacitance; Moving charges and resulting magnetic field; Ampere's law; Vector potential; Magnetic properties of matter; Transient current; Faraday's law of electromagnetic induction; Alternating current and LRO circuit. Maxwell's equations; Poynting theorem and Poynting Vector. Maxwell's equations in integral and differential form.

VI. Modern and Quantum Physics

Operators and quantum states, observables, time dependent and independent Schrodinger equation, angular momentum, spin-1/2 particle in a magnetic field, wave mechanics, particle in a box, tunneling, one-dimensional harmonic oscillator, Heisenber's uncertainty relationship and indeterminacy based on commutation properties of operators, Bohr theory and quantum numbers including electron spin; Pauli's exclusion principle; Spectra of simple systems with one or two valence electrons. Photo electric effect Compton scattering; pair production; Lande's g factor and Zeeman effect. Raman effect; Waves and particles and De Broglie's Hypothesis.

VII. Solid State Physics

Crystal lattice and structure, Bravais lattice, free electron model, Band theory and electron in a periodic potential, Fermi energy and density of states, n and p type semiconductors, physics of the transistor and MOSFET, dielectric properties, magnetic properties and origin of magnetism.

VIII. Nuclear Physics

Structure of Nuclei; Radioactivity α, β and γ decay. Methods of detection, Mass Sepectrometer. Accelerators. Phenomenon of fission; reactor and nuclear power, nuclear fusion and its application, Elementary particles and their properties.

Part-III (Professional) (Subjective) : 25 Marks

I. Development of Curriculum and Instructional Material
- Elements of Curriculum.
- Curriculum Development Process: Need Assessment, Formulation of Aims and Objectives, Taxonomies of Educational Objectives, Selection of Content, Development of Curricular Materials.

II. Process of Teaching and Teaching Strategies
- Process of Classroom Communication
- Factors affecting Classroom Communication
- Barriers to Classroom Communications
- Use of Instructional Materials and Media

III. Educational Assessment and Evaluation
- Concept of Classroom Assessment and Evaluation
- Distinction between Assessment, Evaluation and Measurement
- Approaches to Evaluation: Formative Evaluation; Summative Evaluation
- Types of Test: Essay Type; Objective Type: Multiple Choice, True-False Items, Matching Type; Principles of Construction of these Test
- Characteristics of a Good Test: Validity, Reliability, Objectivity, Usability

IV. Research Methods in Education
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing.

SUGGESTED READINGS

S. No.	Title	Author
1.	Perspectives of Modern Physics.	A. Beiser.
2.	Fundamentals of Physics.	Halliday & Resnick
3.	Introduction to Electromagnetic Fields and Waves	D. Corson & P. Lorrain.
4.	Heat and Thermodynamics.	D. Zemansky
5.	Introduction to Quantum Mechanics	D. Griffiths
6.	Modern Physics	Serway, Moses, Moyer.
7.	Solid State Physics	C. Kittel
8.	The Cosmic Code: Quantum Physics as the Language of Nature	Heinz R. Pagets
9.	Physics of the Life Science	Jay Newman
10.	Research in Education	JW Best
11.	Integrating Education Technology into Teaching	Roblyer
12.	Curriculum Development	S. M. Shahid
13.	Educational Measurement and Evaluation	S. M. Shahid
14.	Educational Administration	S. M. Shahid

PAPER-II: PROFESSIONAL

<u>Max Marks: 100</u>   <u>Time Allowed: 3 Hours</u>

Case No.	F.4-17/2023-R
Particulars of post	**Civilian Labour Officer, Grade-I** (BS-19), Corps of EME, Ministry of Defence.
Minimum Qualification & Experience:	Bachelors of Law (LLB) or Second Class or Grade 'C' Master's degree in Business Administration/ Public Administration/ Human Resource Management or equivalent qualification from a University recognized by the HEC with Twelve (12) years post qualification experience relating to Legal/ Administrative/ Management/ Service matters in a Government/ Semi-Government/ Autonomous/ Public/ Private Organization. OR Colonel/ Lieutenant Colonel (Retired) with requisite qualification and experience of the post.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

Part-II: 50 Marks (Descriptive)
(Public Administration, Office Management & Professional)

I. **Public Administration**: Nature and scope, Role of Public Administration in a modern Welfare State;

II. **Bureaucracy**: Concept of Bureaucracy, Theories of Bureaucracy, Ecology of Bureaucracy; Bureaucracy; of Pakistan as a Change Agent;

III. **Administrative Leadership:** Approaches to the study of Leadership, Forms of Leadership, Leadership qualities;

IV. **Administrative Accountability:** Internal and External Controls; Executive Control, Legislative Control, Judicial Control, Ombudsman, Public Opinion and Pressure Groups; Problems of Administrative Accountability in Pakistan;

V. **Controlling and Co-Ordination:** Forms of Controls, Control Mechanism, the process of Control, Principles of Controlling; Principles Coordination; Machinery for Coordination; Problems of Coordination in Public Administration in Pakistan.

VI. Civil Servant Act 1973 and Rules made thereunder;

VII. Secretariat Instructions and Office Procedures;

VIII. Public Procurement Ordinance and Rules 2004.

IX. Labour welfare and safety laws,

X. Industrial health and safety problems related to labour welfare.

XI. Analysis of Child Labour and Abuse as well as Bonded Labour.

XII. Pakistan Labour Policy, 2010 as amended from time to time

Part-III: 25 Marks (Descriptive)
(Human Resource, Financial Management,
and Information Technology)

I. Human Resource and Financial Management

Definition, Significance and Scope of Human Resource Management; Organization—Types of Organization, Theory of Organization, Principles of Organization, Organization of the Federal and Provincial Governments, Public Sector Enterprises; Approaches to Human Resource Management. Personnel Administration—Tools of Personnel Management: Selection, Training, Promotion, Compensation, Discipline; Communication, Communication Channels and Principles of Public Relations; Human Behaviour and Organizations Administration.—Elements of Financial Administration, Performance Programmed Budgeting, Capital Budget, Principles of Budgeting, Auditing and Accounting.

II. Information Technology and MS Office

Fundamentals of Computer: CPU, Memory Devices, Types of Computers, Characteristics of Computer and related material; Application Software: Microsoft Word, Microsoft Power Point, Microsoft Excel; Search Engines, Web Design, Email, Internet Surfing, Social Networking (Facebook, Twitter, etc); General Introduction to Virus and Antivirus utilities; Programming Languages

SUGGESTED READINGS

S. No.	Title	Author
1.	An Introduction to the Public Administration	E.N. Cladden
2.	Bureaucracy: Modern Society	Pebr, M. Blau.
3.	Public Administration for a Welfare State	Paul Abbleby
4.	The Bureaucracy of Pakistan	Charles F. Kennedy
5.	Human Resource Management	H.T.Graham &Roger Bennett
6.	Management	James A.F.Stoner, R.Eward Freeman, Daniel R.Gilbert Jr.
7.	Understanding Computer: Today and Tomorrow	Deborah Morley, Charles Parker
8.	MS Office 365 Handbook: 2013 Edition	Kevin Wilson