

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. 11/2018

| S. No | Case No. F.4- | Particulars of Post(s) | Qualifications for Posts | Test Specification | Topics of Syllabi |
|-------|---------------|--|--|---|--|
| 1. | 192/2018 | Assistant Director (MIS) (BS-17), Federal Board of Revenue, Revenue Division. | Second Class or Grade 'C' Master's Degree in Computer Science/ Information Technology or equivalent from a University recognized by HEC. OR Second Class or Grade 'C' Bachelor's Degree in Computer Science/ BIT (4 year's duration) or equivalent from a University recognized by HEC. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Vocabulary, Grammar Usage, Sentence Structuring. Part-II • Computer Hardware & Software, , • Data Communication & Networking, • C/C++ Language, • Visual Basic, • Relational Database Management System (RDBMS), • Operating System Unix/Linux • Oracle/PLSQL, |
| 2. | 219/2018 | Assistant Private Secretary (BS-16), Directorate General, Pakistan Post Office, Ministry of Communication | 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. Note: Computer literacy means proficiency in M.S Office (M.S Word, Power Point & Excel). | • Typing Test with minimum Speed of 50 W.P.M • Shorthand Test with minimum Speed of 100 W.P.M • Computer Literacy Test: i Microsoft Word (Typing, Formatting) ii Microsoft Excel (Typing, Graph, Calculations) iii Microsoft Power Point (Typing, Formatting, Inserting Objects) | 35 Marks 35 Marks 10 Marks 10 Marks 10 Marks |
| 3. | 221/2018 | Senior Auditor (BS-16), Pakistan Audit Department, Office of the Auditor General of Pakistan. | Second Class or Grade 'C' Bachelor's Degree in Business Administration (Finance/ Accounting)/ Commerce/ Economics/ Statistics/ Mathematics or equivalent from a University recognized by HEC. OR Second Class or Grade 'C' Bachelor's Degree with ICMA one year post graduate Certificate or CA (Foundation) or ACCA (knowledge level qualified) | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 Marks | Part-I Grammar Usage, Sentence Structuring Part-II • Accounting Principles & Procedures, • Scrutiny of Record for Audit Purposes, • Journal, Ledger & Cash Book, • Financial Planning & Cost Accounting, • Heads of Account, Re-appropriation of Funds and Supplementary Grant, • Procedure for settlement of Audit Objections • Public Procurement Rules, 2004 |

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|-------|---------------|---|--|--|--|
| 4. | 222/2018 | Drug Inspector (BS-17 plus 25% special pay), Drug Control Administration, Health Department, Gilgit Baltistan, Ministry of Kashmir Affairs and Gilgit Baltistan. | i. Second Class or Grade 'C' Master's Degree in Pharmacy recognized by Pharmacy Council of Pakistan. ii. Two (2) years post qualification experience in Pharmaceutical field. OR i. Second Class or Grade 'C' basic degree in Pharmacy recognized by Pharmacy Council of Pakistan. ii. Four (4) years post qualification experience in Pharmaceutical field. | Objective Type Test (MCQ) <u>Part-I</u> English = 20 marks <u>Part-II</u> Professional Test=80 marks | <u>Part-I</u> Vocabulary, Grammar Usage, Sentence Structuring <u>Part-II</u> <ul style="list-style-type: none"> • Physical Pharmacy, • Hospital Pharmacy, • Pharmaceutical Chemistry, • Pharmaceutical Quality Control & Management, • Physiology & Histology, • Application of Computer in Pharmacy. |
| 5. | 223/2018 | Deputy Assistant Solicitor (BS-17), Ministry of Law and Justice. | i. Bachelors Degree in Law or equivalent. ii. Two (2) years post qualification experience of work in Judicial or Legal appointment or practice as an Advocate in a court of law after enrolment as practicing lawyer excluding attachment period. | Objective Type Test (MCQ) <u>Part-I</u> English = 20 marks <u>Part-II</u> Professional Test=80 marks | <u>Part-I</u> Vocabulary, Grammar Usage, Sentence Structuring <u>Part-II</u> <ul style="list-style-type: none"> • Code of Civil Procedure, • Code of Criminal Procedure, • Pakistan Penal Code, • Specific Relief Act. |
| 6. | 224/2018 | Inspector (BS-16), Bureau of Emigration & Overseas Employment, Ministry of Overseas Pakistanis & Human Resource Development. | i. Second Class or Grade 'C' Bachelor's degree from a University recognized by HEC. ii. Three (3) years post qualification experience in Labour/ Manpower and Overseas Employment Service/ Technical or Vocational Training/ Planning/ Economic Development. | Objective Type Test (MCQ) <u>Part-I</u> English = 20 marks <u>Part-II</u> Professional Test=80 marks | <u>Part-I</u> Grammar Usage, Sentence Structuring <u>Part-II</u> <ul style="list-style-type: none"> • International Migration Convention 2003 • Role of remittances and Impact of Immigrants in Pakistani Economy • Emigration Ordinance and Rules, 1979 • Issues of Pakistani Migrant Workers |

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|-------|---------------|---|--|---|---|
| 7. | 225/2018 | Sub Divisional Forest Officer (BS-17 Plus 25% Special Pay), Forest, Parks & Wildlife Department, Gilgit Baltistan, Ministry of Kashmir Affairs and Gilgit Baltistan. | i. M.Sc. Degree in Forestry. ii. Two (2) years post qualification experience in the relevant field. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Vocabulary, Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • Forest Management • Range Management • Watershed Management • The Gilgit Forest Rules 1932 • Forest Types: Pakistan and Gilgit-Baltistan • Forest Biometrics |
| 8. | 228/2018 | Prosthetics & Orthotist (BS-17), Armed Forces Institute of Rehabilitation Medicine, Ministry of Defence. | i. B.Sc. in Orthopedic Technology from a University recognized by HEC. ii. Three (3) years post qualification experience as Prosthetics and Orthotist in a Government Organization. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Vocabulary, Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • CAD/CAM Prosthetics & Orthotics • Mayo Electric Upper Limbs • Internal Sockets Pressure Measurements • High Tech Prosthetic Designing • High Tech Orthotics • Hydraulic and Microprocessor Knees • Reciprocating Gait Orthosis • CAD/CAM Insole Designing • Assistive Aids |
| 9. | 229/2018 | Trained Graduate Teacher (Female) (BS-16 Plus 25% Special Pay), Education Department, Gilgit Baltistan, Ministry of Kashmir Affairs and Gilgit Baltistan. | Second Class or Grade 'C' Bachelor's Degree with B.Ed. or equivalent qualification from a university recognized by the HEC. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II General Intelligence Test = 40 marks Part-III Professional Test = 40 marks | Part-I Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • Basic Arithmetic. • Current Affairs. • Pakistan Affairs & Islamic Studies • Everyday/General Science Part-III <ul style="list-style-type: none"> • Education System in Pakistan, • Class Room Management and Discipline, • Instructional Planning and Teaching Strategies, • Students Evaluation and Examination System, |

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|-------|---------------|--|---|--|---|
| 10. | 233/2018 | Electronic Engineer (BS-17), Pakistan Meteorological Department, Cabinet Secretariat (Aviation Division). | B.E./B.Sc. Engineering in Mechanical/ Electrical/ Electronics/ Instruments from a University recognized by HEC. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Vocabulary, Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • Power Electronics. • Digital Electronics. • Operational Amplifiers. • Electronic Instrumentations. • Logic Design & Switching Theory. • Circuit Theory, Electric Current and Ohm's law • Batteries • Electrostatics • Magnetic Circuits • Electrical Engineering Materials • Instruments and Measurements • DC Generators. • Transformers. • Transmission and Distribution Cables. • High Voltage Engineering • Rectifiers and Convertors. |
| 11. | 234/2018 | Administrative Officer (BS-17), Pakistan Meteorological Department, Cabinet Secretariat (Aviation Division). | i. Second Class or Grade 'C' Master's Degree from a University recognized by the HEC. ii. Two (2) years post qualification experience in Admin./ Establishment/ Recruitment of Personnel/ Budget & Accounts. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Vocabulary, Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • Human Resource Management • Civil Servants Act, 1973 and Rules made thereunder • Rules of Business, 1973 • New System of Financial Control and Budgeting • Public Procurement Rules, 2004 • Basic Arithmetic, • Basic knowledge of Computer/IT. |
| 12. | 236/2018 | Assistant Meteorologist (BS-16), Pakistan Meteorological Department, Cabinet Secretariat (Aviation Division). | Second Class or Grade 'C' B.Sc. Degree in Physics/Mathematics/ Space Science/Geology/ Meteorology/ Environment from a University recognized by the HEC. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • Meteorology • Climatology • Basics of Physics • Environmental Studies • Basic Mathematics • Basic Geology |

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|-------|---------------|--|--|---|--|
| 13. | 240/2018 | Assistant Naval Store Officer (BS-16), Naval Headquarters, Ministry of Defence. | i. Second Class or Grade 'C' Bachelor's Degree. ii. Three (3) years post qualification experience in Store Management. OR i. Ex-Chief Petty Officers (CPOs)/ Petty Officers (POs). ii. Matriculation or Higher Education Test (HET). iii. Five (5) years post qualification experience in Store Management. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II General Intelligence/ Professional Test=80 marks | Part-I Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • General Science • Basic knowledge of I.T • Procedures of Receipt and Issue of Stores • Stores procedures with relation to following topics:- <ol style="list-style-type: none"> a. Stock Taking b. Care and preservation of Equipments and Stores c. Ware House Management • Public Procurement Rules, 2004 |
| 14. | 241/2018 | Administrative Officer (BS-16), Naval Headquarters, Ministry of Defence. | i. Second Class or Grade 'C' Bachelor's Degree with Business Administration ii. Three (3) years post qualification experience in Establishment/ Budget and Accounts/ Estate matters. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • Human Resource Management • Civil Servants Act, 1973 and Rules made thereunder • Rules of Business, 1973 • System of Financial Control and Budgeting • Public Procurement Rules, 2004 • Basic Arithmetic, • Basic knowledge of Computer/IT. |
| 15. | 242/2018 | Experimental Officer (BS-16), Naval Headquarters, Ministry of Defence. | i. Second Class or Grade 'C' Bachelor's Degree in Science with Chemistry or Chemical Technology. ii. Three (3) years post qualification experience in the field of prescribed qualification. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • Kinetic Theory of Gases. • Nature, properties and states of matter. • Chemical Kinetics. • Thermodynamics. • Thermo-chemistry. • Radioactivity • Electrochemistry including Fuel Cells; Chemical Equilibria and Catalysis. |

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| 16. | 247/2018 | Research Officer (BS-17), Devolution & Area Development (Rural Development and Local Planning Section), Ministry of Planning, Development and Reform. | Second Class or Grade 'C' Master's Degree or equivalent qualifications in Agricultural Economics/ Economics/ Social Work/ Sociology/ Rural Development. OR Bachelor's Degree or equivalent qualifications in Civil Engineering or Agricultural Engineering. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Vocabulary, Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • Meaning of Development and its Philosophy. • Determinants of Rural Development. • Approaches to rural development. • Socio-cultural obstacles to rural development. • Rural development program and policies in Pakistan. • Research and Analysis • Report Writing |
| 17. | 248/2018 | Research Officer (BS-17), Mass Media & Culture Sports Tourism and Youth Section (CSTY), Ministry of Planning, Development and Reform. | Second Class or Grade 'C' Master's Degree or equivalent qualifications in any of the following subjects: Literature, Humanities, Journalism, Business Administration, Public Administration, Library Science. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Vocabulary, Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • Definition of Mass Communication & Mass Media • Mass Media in Pakistan • Basics about Advertising & Public Relations • Fundamentals of News Reporting • Research Methodology, |
| 18. | 251/2018 | Assistant Private Secretary (BS-16), Ministry of Statistics, Statistics Division. | 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. Note: Computer literacy means proficiency in M.S Office (M.S Word, Power Point & Excel). | <ul style="list-style-type: none"> • Typing Test with minimum Speed of 50 W.P.M • Shorthand Test with minimum Speed of 100 W.P.M • Computer Literacy Test: <ul style="list-style-type: none"> i Microsoft Word (Typing, Formatting) ii Microsoft Excel (Typing, Graph, Calculations) iii Microsoft Power Point (Typing, Formatting, Inserting Objects) | 35 Marks 35 Marks 10 Marks 10 Marks 10 Marks |

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| 19. | 252/2018 | Assistant Manager IT (BS-17), Intelligence Bureau. | <p>i. Second Class or Grade 'C' Master's degree or equivalent in Computer Science. OR Second Class or Grade 'C' Bachelor's degree in Software Engineering or System Engineering/ Computer Engineering.</p> <p>ii. Certification in MTA (Microsoft Technology Associate) OR CCNA (CISCO Certified Network Associate) OR RHCSA (Red Hat Certified System Administrator) OR The officer will be required to qualify certification in either of the above during probation period.</p> <p>Note: (i) To short list the candidates at first stage MCQs Screening Test shall be held. Thereafter subjective type IT Proficiency test of 100 marks will be conducted for shortlisted candidates at the ratio of 1:8 (eight candidates per post) with qualifying standard of 50% marks. (ii) Candidates finally qualified in proficiency test, will be called for Psychological Assessment & Interview.</p> | <p>Objective Type Test (MCQ)</p> <p>Part-I</p> <p>English = 20 marks</p> <p>Part-II</p> <p>Professional Test = 80 marks</p> <p>For Preselected Candidates</p> <p>Syllabus of Subjective Type IT Proficiency Test of 100 marks is available at Page 9-10.</p> | <p>Part-I</p> <p>Vocabulary, Grammar Usage, Sentence Structuring.</p> <p>Part-II</p> <ul style="list-style-type: none"> • Computer Hardware & Software, , • Data Communication & Networking, • C/C++ Language, • Visual Basic, • Relational Database Management System (RDBMS), • Operating System Unix/Linux • Oracle/PLSQL, |
| 20. | 253/2018 | Assistant Director (BS-17), Geological Survey of Pakistan, Petroleum Division, Ministry of Energy. | Second Class or Grade 'C' M.Sc. degree in Geology or equivalent qualification from a University recognized by the HEC. | <p>Objective Type Test (MCQ)</p> <p>Part-I</p> <p>English = 20 marks</p> <p>Part-II</p> <p>Professional Test=80 marks</p> | <p>Part-I</p> <p>Vocabulary, Grammar Usage, Sentence Structuring.</p> <p>Part-II</p> <ul style="list-style-type: none"> • Introduction to Physical Geology • Stratigraphy • Structural Geology • Plate Tectonics • Palaeontology (Invertebrate & Vertebrate) • Geological Mapping • Engineering and Environmental Geology |

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|-------|---------------|---|--|---|--|
| 21. | 254/2018 | Inspector (BS-16), Anti Narcotics Force, (Narcotics Control Division) Ministry of Narcotics Control. | i. Second Class or Grade 'C' Bachelor's Degree or equivalent qualification recognized by HEC. ii. Two (2) years post qualification experience in Law Enforcement Agency/ Security Agency. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Grammar Usage, Sentence Structuring Part-II <ul style="list-style-type: none"> • Basic knowledge of Narcotics Substances Act,1997 • International Conventions and Agreements on Drug Control. • Role of United Nations Organization for Drug Control (UNODC) • Role of Pakistan's Anti Narcotics Control Setup in Drug Control • Sources of Terrorist Financing |
| 22. | 259/2018 | Inspector (Investigation) (BS-16), Federal Investigation Agency, Ministry of Interior. | Second Class or Grade 'C' Bachelor's degree from a University recognized by the HEC. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II General Intelligence Test = 80 marks | Part-I Grammar Usage, Sentence Structuring. Part-II <ul style="list-style-type: none"> • Basic Arithmetic. • Current Affairs. • Pakistan Affairs & Islamic Studies • Everyday/General Science Note : (Equal weightage for each topic at Part-II) |
| 23. | 260/2018 | Assistant Director (Legal) (BS-17), Federal Investigation Agency, Ministry of Interior. | i. Second Class or Grade 'C' LLB degree from a University recognized by HEC. ii. Two (2) years post qualification experience of legal practice/ prosecution working in legal field. | Objective Type Test (MCQ) Part-I English = 20 marks Part-II Professional Test=80 marks | Part-I Vocabulary, Grammar Usage, Sentence Structuring. Part-II <ul style="list-style-type: none"> • Basic knowledge of Criminal Procedure Code, • Basic knowledge of "Qanun-e-Shahadat Order", 1984 • Basic knowledge of Pakistan Penal Code, • FIA Act, 1974 |
| 24. | 261/2018 | Assistant Director (Investigation) (BS-17), Federal Investigation Agency, Ministry of Interior. | Second Class or Grade 'C' Master's degree from a University recognized by the HEC. | 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 <ul style="list-style-type: none"> • Basic Arithmetic. • Current Affairs. • Pakistan Affairs & Islamic Studies • Everyday/General Science • FIA Act, 1974 Note : (Equal weightage for each topic at Part-II) |

SUBJECTIVE TYPE IT PROFICIENCY TEST

Max Marks: 100

Qualifying Standard 50%

Time Allowed: 3 Hours

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| Case No. | F.4-252/2018-R |
| Particulars of post | Assistant Manager IT (BS-17) in a Federal Government Organization. |
| Minimum Qualification & Experience: | i. Second Class or Grade 'C' Master's degree or equivalent in Computer Science. OR Second Class or Grade 'C' Bachelor's degree in Software Engineering or System Engineering/ Computer Engineering. ii. Certification in MTA (Microsoft Technology Associate) OR CCNA (CISCO Certified Network Associate) OR RHCSA (Red Hat Certified System Administrator) OR The officer will be required to qualify certification in either of the above during probation period. |

I. Introduction to Computing

Introduction to Information Technology and Computers, Computer System Components and Communication System, Input & Output devices and their types, Storage Media and their types, Types of Computer Hardware, Information Security/Privacy, Computer Crimes and Ethical Challenges, Trees (Binary Trees, Binary Search trees, AVL Trees, Encryption Algorithms (DES, RSA), Design Concepts, Architectural Design, Machine Instruction Characteristics, Instruction Processing, Processor Structure & Function, Control Unit Operation, Micro-programmed Control, Instruction-Level Parallelism And Superscalar Processors, Parallel Processing, Multi-Processor and Multi-core Systems.

II. Computer Communications & Networks

Basic Concepts and Classification of Networks, Circuit switching, Packet switching, Multiplexing (TDM, FDM), Layering: OSI and TCP/IP, Application Layer (Network application architectures, HTTP, FTP, Email, DNS, P2P applications), Transport Layer (Multiplexing in UDP and TCP, Connectionless Transport: UDP, Reliable data transfer and TCP, Congestion avoidance and control), Network Layer (The Internet Protocol, IPv4 Datagram, Internet Address Classes, Special IP Addresses ARP, IPv6, ICMP, Network Address Translation (NAT), Internet Routing Protocols and Algorithms, X.25, Frame relay and ATM, MPLS), Physical & Link Layer Functionalities (Error Detection & Control, ARQ, Link layer addressing, LAN Technologies, Bridges and Hubs, Multiple Access), Special topics (Security, Overlay networks, naming, Content distribution networks, Peer to peer systems, DHTs, Network Attacks).

III. Database Systems

Introduction to Database Systems, Relational Data Model & Relational Database Constraints, Relational Data Model, SQL, Relational Algebra & Calculus, ER Model, ER to Relational Mapping, PL/SQL Stored Procedures & Triggers, Functional Dependencies and Normalization, Storage & Indexing, Indexing Structure, XML documents & Web Services, Query Processing & Evaluation, Query Optimization, Transaction processing, Object-Oriented Databases, Distributed Databases, Database Security & Access Control

IV. Operating Systems & Web

Roles of an Operating System, Operating-System Evolution, Memory Management, File Systems (UNIX and Windows Systems), Web applications Issues (Accessibility, testing, performance, operation, maintenance, security).

SUGGESTED READINGS

| S. No. | Title | Author |
|--------|---|---|
| 1. | Computer System Architecture | M. Morris Mano |
| 2. | Software Engineering | Ian Sommerville |
| 3. | Computer Networking: A Top Down approach featuring the Internet | James F. Kurose and Keith W. Ross |
| 4. | Data and Computer Communications | William Stallings |
| 5. | Database Systems Concepts | Silberchatz, Abraham & Korth, Sudarshan |
| 6. | Computer Networks | Andrew Tanenbaum |
| 7. | Web Services: Principles and Technology | Michael Papazoglu |

Schemes and Syllabi for Written Examination (Descriptive) for All Posts in BS-18 & BS-19 included in Consolidated Advertisement No. 11/2018

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 (Cambridge University Press) |
| 2. | Practical English Usage | M. Swan (Oxford University Press) |
| 3. | The Little, Brown Handbook | H. Ramsey Flower & Jane Aaron (The Little, Brown & Co; Harper Collins) |
| 4. | A University English Grammar | R. Quirk & S. Greenbaum (ELBS; Longmans) |
| 5. | Write Better, Speak Better | Readers Digest Association |
| 6. | Modern English in Action | Henry Christ (D.C. Heath & Co.) |
| 7. | Exploring the World of English | Syed Saadat Ali Shah |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

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| Case No. | F.4-165/2018-R |
| Particulars of post | District Health Officer (BS-18 Plus 25% Special Pay), Health Department, Gilgit Baltistan, Ministry of Kashmir Affairs and Gilgit Baltistan. |
| Minimum Qualification & Experience: | <p>i. MBBS/BDS or equivalent qualification recognized by Pakistan Medical and Dental Council.</p> <p>ii. Postgraduate higher Diploma in Public Health/ Health Services Administration/ Hospital Administration recognized by Pakistan Medical and Dental Council with one (1) year post qualification experience in any of the above fields.</p> <p style="text-align: center;">OR</p> <p>Postgraduate Lower Diploma in Public Health/ Health Services Administration/ Hospital Administration recognized by Pakistan Medical and Dental Council with three (3) years post qualification experience in any of the above fields.</p> |

Part-I: (Qualification Based)**50 Marks**Core courses of **MBBS/BDS Degree****Part-II: (Professional)****50 Marks**Core courses of Post Graduate Lower Diploma in **Public Health/ Health Services Administration/ Hospital Administration.**

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

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| Case No. | F.4-190/2018-R |
| Particulars of post | Senior Veterinary Officer (BS-18), Remount Veterinary and Farms Corps, GHQ, Ministry of Defence. |
| Minimum Qualification & Experience: | i. M.Sc. (Hons)/ M.Phil (Veterinary Science) with basic degree of D.V.M. from a university recognized by HEC. ii. Registration with PVMC. iii. Three (3) years post qualification experience in the relevant field. OR Retired Lt. Col/ Maj. of RV&FC. |

Veterinary Medicine: 100 Marks**I. Veterinary Protozoology**

Protozoology: definition, history and differences from other unicellular organisms, Anatomy and physiology of protozoa, Classification, Morphology, Life cycle, Pathogenesis, Diagnosis and Control of the species of the following genera of Protozoa, Trypanosoma / Leishmania, Trichomonas and Histomonas, Entamoeba, Giardia and Balantidium, Eimeria and Isospora, Toxoplasma and Sarcocystis, Toxoplasmosis and Sarcocystosis and Plasmodium, Plasmodium, Haemoproteus, Leucocytozoan and Hepatozoan, Babesia, Theileria, Anaplasma & Cryptosporidium, Ehrlichia & Eperythrozoon, Protozoan zoonosis.

II. Systemic Veterinary Pathology

Digestive system, Skin and Appendages, Dermatophytes (Ring Worms), Mange: Psoroptic, chorioptic mange, neoplasia, Urinary system, Cardiovascular system, Nervous system, Respiratory system, Musculo-skeleton system, Rickets, Osteomalacia, Osteodystrophy, Osteoporosis, Osteopetrosis, Exostoses, neoplasia, Reproductive System, Postparturient Haemoglobinuria,

III. Small Ruminant Production

Scope and role of small ruminants, Sheep and goat as milch, meat and wool/hair producer. Grazing management systems and supplementary feeding, Management during drought, Record keeping of sheep and goat, Fencing on ranges, Shearing and handling wool/hair,

IV. Ruminant Nutrition

Nutrients, their classification and requirements, Concept of forage, concentrate and non-conventional feed resources in feeding of ruminants, Feeding standards, their usefulness and limitations for large ruminants. Feeding standards, their usefulness and limitations for small ruminants. Nutrient requirements of cattle for maintenance, production and reproduction. Nutrient requirements of buffaloes for maintenance, production and reproduction. Nutrient requirements of sheep for maintenance, production and reproduction, Nutrient requirements of beef animals for maintenance and fattening. Concept of digestibility and nitrogen balance. Feeding management of dairy animals at different physiological stages, Feeding practices of small ruminants, Nutritional management of grazing livestock, Feeding of calves from birth to puberty.

V. Beef Production

Scope and importance of meat production in Pakistan, Present situation of meat industry and Problems of meat industry in Pakistan, Feeding of beef Animals, Breeding of beef Animals, Management of Beef Animals, Feed additives, hormones and Probiotics, Vitamins etc for enhanced growth Antibiotics, Factors affecting carcass and meat quality, Meat Hygiene, Storage and Preservation of Meat, Marketing of beef animals and beef, Modern Slaughter Houses, Slaughtering Methods.

SUGGESTED READINGS

| S. No. | Title | Author |
|--------|---|---|
| 1. | General Parasitology and Protozoology. | Akhtar, M., M. A. Hafeez and C. S. Hayat 2003. |
| 2. | Techniques in Parasitology. Higher Education Commission, Pakistan | Iqbal, Z., M.S. Sajid, A. Jabbar, Z.A. Rao and M.N. Khan, 2006. |
| 3. | Introduction to Veterinary Pathology. | Cheville, N. F., 2006. |
| 4. | Pathologic Basis of Veterinary Disease | McGavin, D. M. and J. F. Zachary, 2006. |
| 5. | Sheep and Goat Production, Univ. of Agriculture, Faisalabad. | Khan, B.B., A. Iqbal and M.I. Mustafa. 2003. |
| 6. | Goats. McMillan Education Ltd.. | Steel, M., 1996 |
| 7. | Recent Advances in Ruminant Nutrition. | Garnsworthy and J. Wiseman. 2002. |
| 8. | Feeding the Dairy Cow. | Chamberlain, A.T. and J.M. Wilkinson. 2002. |
| 9. | Commercial Poultry Nutrition, | Lesson, S. and J.D. Summers. 2001. |
| 10. | Feed Manufacturing Technology | McEllihiney, R.R. 1994. |
| 11. | Dictionary of Animal Nutrition and Feed Technology,. | Singhal, K.K. 1992. |
| 12. | Meat Production and Technology in Pakistan, PARC, Islamabad. | Alvi, A.S. 1991. |
| 13. | Meat Hygiene and Inspection. | Anwar, A.H. 1996. |
| 14. | Meat Hygiene. Bailliere Tindall, UK. | Gracey, J. F. and Collins D.S. 1992 |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

| | |
|-------------------------------------|---|
| Case No. | F.4-191/2018-R |
| Particulars of post | Executive Veterinary Officer (BS-19), Remount Veterinary and Farms Corps, GHQ, Ministry of Defence. |
| Minimum Qualification & Experience: | (i) Ph.D (Veterinary Science) with basic degree of D.V.M. from a university recognized by HEC. (ii) Registration with PVMC. (iii) Eight (8) years post qualification experience in the relevant field. OR Retired Brig/ Col. Of RV&FC. |

Veterinary Medicine: 100 Marks**I. Veterinary Protozoology**

Protozoology: definition, history and differences from other unicellular organisms, Anatomy and physiology of protozoa, Classification, Morphology, Life cycle, Pathogenesis, Diagnosis and Control of the species of the following genera of Protozoa, Trypanosoma / Leshmania, Trichomonias and Histomonas, Entamoeba, Giardia and Balantidium, Eimeria and Isospora, Toxoplasma and Sarcocystis, Toxoplasmosis and Sarcocystosis and Plasmodium, Plasmodium, Haemoproteus, Leucocytozoan and Hepatozoan, Babesia, Theileria, Anaplasma & Cryptosporidium, Ehrlichia & Eperythrozoon, Protozoan zoonosis.

II. Systemic Veterinary Pathology

Digestive system, Skin and Appendages, Dermatophytes (Ring Worms), Mange: Psoroptic, chorioptic mange, neoplasia, Urinary system, Cardiovascular system, Nervous system, Respiratory system, Musculo-skeleton system, Rickets, Osteomalacia, Osteodystrophy, Osteoporosis, Osteopetrosis, Exostoses, neoplasia, Reproductive System, Postparturient Haemoglobinuria,

III. Small Ruminant Production

Scope and role of small ruminants, Sheep and goat as milch, meat and wool/hair producer. Grazing management systems and supplementary feeding, Management during drought, Record keeping of sheep and goat, Fencing on ranges, Shearing and handling wool/hair,

IV. Ruminant Nutrition

Nutrients, their classification and requirements, Concept of forage, concentrate and non-conventional feed resources in feeding of ruminants, Feeding standards, their usefulness and limitations for large ruminants. Feeding standards, their usefulness and limitations for small ruminants. Nutrient requirements of cattle for maintenance, production and reproduction. Nutrient requirements of buffaloes for maintenance, production and reproduction. Nutrient requirements of sheep for maintenance, production and reproduction, Nutrient requirements of beef animals for maintenance and fattening. Concept of digestibility and nitrogen balance. Feeding management of dairy animals at different physiological stages, Feeding practices of small ruminants, Nutritional management of grazing livestock, Feeding of calves from birth to puberty.

V. Beef Production

Scope and importance of meat production in Pakistan, Present situation of meat industry and Problems of meat industry in Pakistan, Feeding of beef Animals, Breeding of beef Animals, Management of Beef Animals, Feed additives, hormones and Probiotics, Vitamins etc for enhanced growth Antibiotics, Factors affecting carcass and meat quality, Meat Hygiene, Storage and Preservation of Meat, Marketing of beef animals and beef, Modern Slaughter Houses, Slaughtering Methods.

SUGGESTED READINGS

| S. No. | Title | Author |
|--------|---|---|
| 1. | General Parasitology and Protozoology. | Akhtar, M., M. A. Hafeez and C. S. Hayat 2003. |
| 2. | Techniques in Parasitology. Higher Education Commission, Pakistan | Iqbal, Z., M.S. Sajid, A. Jabbar, Z.A. Rao and M.N. Khan, 2006. |
| 3. | Introduction to Veterinary Pathology. | Cheville, N. F., 2006. |
| 4. | Pathologic Basis of Veterinary Disease | McGavin, D. M. and J. F. Zachary, 2006. |
| 5. | Sheep and Goat Production, Univ. of Agriculture, Faisalabad. | Khan, B.B., A. Iqbal and M.I. Mustafa. 2003. |
| 6. | Goats. McMillan Education Ltd.. | Steel, M., 1996 |
| 7. | Recent Advances in Ruminant Nutrition. | Garnsworthy and J. Wiseman. 2002. |
| 8. | Feeding the Dairy Cow. | Chamberlain, A.T. and J.M. Wilkinson. 2002. |
| 9. | Commercial Poultry Nutrition, | Lesson, S. and J.D. Summers. 2001. |
| 10. | Feed Manufacturing Technology | McEllihiney, R.R. 1994. |
| 11. | Dictionary of Animal Nutrition and Feed Technology,. | Singhal, K.K. 1992. |
| 12. | Meat Production and Technology in Pakistan, PARC, Islamabad. | Alvi, A.S. 1991. |
| 13. | Meat Hygiene and Inspection. | Anwar, A.H. 1996. |
| 14. | Meat Hygiene. Bailliere Tindall, UK. | Gracey, J. F. and Collins D.S. 1992 |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

| | |
|-------------------------------------|---|
| Case No. | F.4-212/2018-R |
| Particulars of post | Rehabilitation Specialist (BS-18), Armed Forces Institute of Rehabilitation Medicine, Ministry of Defence. |
| Minimum Qualification & Experience: | i. MBBS with FCPS in Rehabilitation Medicine from CPSP. ii. Five (5) years post FCPS experience as Specialist in a Govt. Organization. |

Part-I: (Qualification Based)**50 Marks**Core courses of **MBBS Degree****Part-II: (Professional)****50 Marks**Core courses of FCPS in **Rehabilitation Medicine.**

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

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|-------------------------------------|---|
| Case No. | F.4-216/2018-R |
| Particulars of post | Deputy Director (Urdu Stenography) (BS-18), Secretariat Training Institute, Islamabad, Establishment Division. |
| Minimum Qualification & Experience: | <ul style="list-style-type: none"> i. Second Class or Grade 'C' Bachelor's degree with Urdu as one of the subject from University recognized by HEC. ii. Minimum shorthand speed: 100 w.p.m. and typing speed: 40 w.p.m. with 90% accuracy iii. Certificate in Urdu Stenography from a recognized Institution. iv. Ten (10) years post qualification functional/ instructional experience of Urdu Stenography |

Professional Test : 100 Marks

| S. No. | Detail of Topics | Marks |
|--------|---|-----------|
| 1. | Urdu Typing Test on Inpage with minimum speed of 40 w.p.m with 90% Accuracy | 35 |
| 2. | Urdu Shorthand Test with minimum speed of 100 w.p.m | 35 |
| 3. | Computer Literacy Test: (30 Marks) | |
| | i. In-page (Typing, Formatting) | 10 |
| | ii. Microsoft Excel (Typing, Calculation and Graphic) | 10 |
| | iii. Microsoft Power Point (Typing, Formatting, Inserting Objects) | 10 |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

| | |
|-------------------------------------|--|
| Case No. | F.4-218/2018-R |
| Particulars of post | Deputy Chief (Fuel) (BS-19), Energy Appraisal & Plan Formulation Section, Energy Wing, Ministry of Planning, Development and Reform. |
| Minimum Qualification & Experience: | <p>i. Second Class or Grade 'C' Master's Degree or equivalent qualification in Petroleum Geology or Geology with specialization in Coal Resources.</p> <p style="text-align: center;">OR</p> <p>Bachelor's Degree of Engineering or equivalent qualifications in Petroleum, Gas Reservoir, Chemical, Energy, or Mining Engineering with specialization in Coal mining/technology.</p> <p>ii. Ten (10) years post qualification experience in exploration of fuel and energy resources and/or production planning and designing in this field.</p> |

Part-I: (Research and Planning)**50 Marks****i. Communication Skills, Technical Writing and Presentation Skills**

Paragraph writing, Essay writing, Translation skills, Study skills, Academic skills, Academic writing, Technical Report writing, Progress report writing, Presentation skills

ii. Planning and Management**a) Project Management**

Project Management, Processes Integration Management, Project Plan Development, Project Plan Execution and Overall Change Control.

b) Scope Management

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

c) Time Management

Activity Definition, Activity Sequencing, Activity Duration Estimation, Schedule Development and Schedule Control.

d) Communications Management

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

e) Statistical Techniques

All statistical techniques related to Planning & Research

Part-II: (Exploration of Fuel and Energy)**50 Marks****i. Petroleum Geology & Exploration**

Geological history of Petroleum. The origin, migration and accumulation of petroleum, Reservoirs with abnormal pressure and temperature. Geological distribution of petroleum in the world. Geological basins of Pakistan. Geology of existing oil and gas fields in Pakistan. Surface geological methods for petroleum exploration. Use of topography and surface features for oil prospecting. Geophysical exploration methods with emphasis on seismic methods.

ii. Coal Geology

Definition, composition, classification and origin of coal. Lithotypes and coal macerals. Chemical and petrographical analysis. Application of coal petrography. Depositional environments of coal and coal bearing strata, coalification process, types of coal basins and their tectonic setting, concepts of cyclic deposition in coal basin, origin of splits and partings in coal seams. Structural problems relevant to exploration & mining. Coal utilization and resource evaluation. Coal bearing sequences of Pakistan. Methods of coal exploration: geological, geophysical and drilling. Coal mining and its environmental issues.

SUGGESTED READINGS

| S. No. | Title | Author |
|---------------|--|--|
| 1. | Practical English Grammar | A.J. Thomson and A.V. Martinet. |
| 2. | Writing. Intermediate | Marie-Christine Boutin, Suzanne Brinand and Francoise Grellet. |
| 3. | Writing. Upper-Intermediate | Rob Nolasco. |
| 4. | Reading. Advanced | Brian Tomlinson and Rod Ellis. |
| 5. | Study Skills | Riachard Yorky |
| 6. | Writing. Advanced | Ron White. |
| 7. | College Writing Skills | John Langan. |
| 8. | Patterns of College Writing | Laurie G. Kirszner and Stephen R. Mandell. |
| 9. | The Mercury Reader. A Custom Publication. | Janice Neulib; Kathleen Shine Cain; Stephen Ruffus and Maurice Scharton. |
| 10. | Project Management Body of Knowledge, | Project Management Institute (PMI) standards committee |
| 11. | Software Project Management | S.A. Kelkar, A Concise Study, Prentice Hall of India. |
| 12. | Geology of Petroleum | A. I. Levorsen. |
| 13. | Basic Petroleum Geology | Peter K. Link. |
| 14. | Petroleum Geology of Pakistan | Iqbal B. Kadri. |
| 15. | Geophysical Prospecting | Milton, B. Dobrin. |
| 16. | Basic Exploration Geophysics | Robinson |
| 17. | Significance of Coal Resources of Pakistan | Kazmi |
| 18. | Sedimentology of Coal and Coal Bearing Sequences | Rehmani & Flores |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

| | |
|-------------------------------------|---|
| Case No. | F.4-220/2018-R |
| Particulars of post | Assistant Professor (Mathematics) (Male) (BS-18), Islamabad Model Colleges for Boys, Federal Directorate of Education, Capital Administration & Development Division. |
| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level. OR M. Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level. OR Second Class or Grade 'C' Master's Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level. |

Part-I: (Mathematics)**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-II: (Professional)

50 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. Educational Administration and Supervision

- The Concept of Administration
- Educational Supervision

V. Research Methods in Education

- Scientific Method and its Application in Education
- Sampling Techniques:
- 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. | 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**Max Marks: 100****Time Allowed: 3 Hours**

| | |
|-------------------------------------|---|
| Case No. | F.4-227/2018-R |
| Particulars of post | Assistant Professor (Chemistry) (BS-18), Military College Jhelum, Ministry of Defence. |
| Minimum Qualification & Experience: | Ph. D Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level. OR M. Phil Degree in the relevant subject with three (3) year post qualification teaching experience at College/ University level OR Second Class or Grade 'C' Master's Degree in the relevant subject from a University recognized by HEC with five (5) year post qualification teaching experience at College/ University level |

Part-I: (Chemistry)**50 Marks**

- 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; Debye-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-II: (Professional)**50 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. Educational Administration and Supervision**
- The Concept of Administration
 - Educational Supervision
- V. Research Methods in Education**
- Scientific Method and its Application in Education
 - Sampling Techniques:
 - Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
 - Research Proposal and Report Writing

SUGGESTED READINGS

| S. No. | Title | Author |
|---------------|--|---------------------------------------|
| 1. | Advanced Inorganic Chemistry 3 rd Ed. | Cotton. F.A. and Wilkinson Groffrey |
| 2. | Inorganic Chemistry, 3 rd Ed. 1983 | Hukeavy, James E. |
| 3. | Physical Chemistry 5 th Ed. | Moore, Walter J. |
| 4. | Mechanism & Structure in Organic Chemistry | Gould, Edwards |
| 5. | Organic Chemistry 2 nd 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.4-232-A/2018-R |
| Particulars of post | Assistant Professor (Female) (Islamic Studies) (BS-18) , Federal Government Colleges for Girls, Federal Directorate of Education Islamabad, Capital Administration & Development Division. |
| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level OR M.Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level OR Second Class or Grade 'C' Master's Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level. |

Part-I: (Islamic Studies)**50 Marks****I. Islam: the Code of Life**

- Salient features of Islamic;
 - Social System
 - Political System
 - Economic System
 - Judicial System
 - Administrative System
- Responsibilities of Civil Servants

II. Study of Seerah

Need and importance of the study of Seerah Prophet Mohammad (PBAH) as:

- The Role Model
- Merciful for the universe.
- Preacher
- Diplomat
- Teacher and Educationist
- Revolutionary Leader

III. Islamic Civilization and Culture:

- Meanings and the vital elements of Islamic Civilization and Culture
- Role of civilisation in the development of the human personality and communities
- Distinctions of Islamic Civilization;
 - Tauheed
 - Risalat
 - Spiritualism
 - Dignity of Man
 - Equality
 - Social Justice
 - Moral values
 - Tolerance
 - Rule of Law

IV. Islam and World

- Impact of Islamic Civilization on the West and vice-versa.
- Muslim World and the Contemporary Challenges
- Interaction between East and West.
- Role of Islam in the modern world.

I. اسلامی ضابطہ حیات

⇨ اسلامی نظام کی نمایاں خصوصیات:

- سماجی نظام
- سیاسی نظام
- اقتصادی نظام
- عدالتی نظام
- انتظامی نظام

⇨ سرکاری ملازمین کی ذمہ داریاں

II. سیرت النبی کا مطالعہ

⇨ سیرت النبی کے مطالعہ کی اہمیت اور ضرورت بطور:

- نمونہ عمل
- ہتھیبر امن
- مسلخ
- سفارت کار
- معلم انسانیت
- انقلابی رہنما

III. اسلامی تہذیب و ثقافت

⇨ اسلامی تہذیب و ثقافت کے معانی اور اہم اجزا

⇨ سماج اور انسانی شخصیت کی تعمیر میں تہذیب کا کردار

⇨ اسلامی تہذیب کے نمایاں اوصاف:

- توحید
- رسالت

- تزکیہ نفس
- انسانی عزت و وقار
- مساوات
- سماجی انصاف
- اخلاقی اقدار
- صبر و برداشت
- قانون کی حکمرانی

.IV اسلام اور دنیا:

- ↔ اسلامی تہذیب کے مغرب اور مغرب کے اسلامی تہذیب پر اثرات
- ↔ اسلام اور عصر حاضر کے چیلنجز
- ↔ مشرق اور مغرب کے درمیان بات چیت
- ↔ جدید دنیا میں اسلام کا مقام

Part-II: (Professional)

50 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. Educational Administration and Supervision

- The Concept of Administration
- Educational Supervision

V. Research Methods in Education

- Scientific Method and its Application in Education
- Sampling Techniques:
- Research Instruments: Questionnaire; Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing

SUGGESTED READINGS

| S. No. | Title | Author |
|---------------|--|------------------------|
| 1. | Islam: its meaning and Message | Khurshid Ahmad |
| 2. | Islam: The Misunderstood Religion | Muhammad Qutub |
| 3. | Towards Understanding Islam | Abul Aala Moudoodi |
| 4. | Ideals and Realities of Islam | Hussain Nasr, |
| 5. | A brief Survey of Muslim Science and Culture | Muhammad Abdur –Rahman |
| 6. | Quranic Sciences | Afzalur Rahman |
| 7. | Research in Education | JW Best |
| 8. | Integrating Education Technology into Teaching | Roblyer |
| 9. | Curriculum Development | S.M. Shahid |
| 10. | Educational Measurement and Evaluation | S.M. Shahid |
| 11. | Educational Administration | S.M. Shahid |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

| | |
|-------------------------------------|--|
| Case No. | F.4-232-B/2018-R |
| Particulars of post | Assistant Professor (Female) (Pakistan Studies) (BS-18) , Federal Government Colleges for Girls, Federal Directorate of Education Islamabad, Capital Administration & Development Division |
| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level OR M.Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level OR Second Class or Grade 'C' Master's Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level. |

Part-I: (Pakistan Studies)**50 Marks**

- I. Ideology of Pakistan-----definition and elucidation, historical aspects: Muslim rule in the Sub-Continent, its downfall and efforts for Renaissance. Movements for reforms-- Shaikh Ahmad Sarhindi, Shah Waliullah, Sayyid Ahmad Shaheed, Aligarh, Deoband, Nadwah, and other educational institutions-----Sindh Madrassah and Islamia College Peshawar. Ideology of Pakistan in the light of Speeches and statements of Allama Iqbal and Quaid- i Azam Muhammad Ali Jinnah.
- II. Changing Security Dynamics for Pakistan: Challenges to National Security of Pakistan
- III. Pakistan War on Terror
- IV. Foreign Policy of Pakistan Post 9/11
- V. Evolution of Democratic System in Pakistan
- VI. Hydro Politics ; Water Issues in Domestic and Regional Context
- VII. Pakistan's National Interest
- VIII. Pakistan's Energy Problems and their Effects
- IX. Pakistan's Relations with Neighbours
- X. Pakistan and India Relations Since 1947
- XI. Kashmir Issue
- XII. The war in Afghanistan since 1979 and its impact on, and challenges to Pakistan, in the Post 2014 era.
- XIII. Latest Constitutional Amendments and Important Legislations,
- XIV. The Prevailing Social Problems of Pakistan and the Strategies to Deal with Them, Poverty, Education, Health and Sanitation.

Part-II: (Professional)**50 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
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- 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. Educational Administration and Supervision

- The Concept of Administration
- Educational Supervision

V. Research Methods in Education

- Scientific Method and its Application in Education
- Sampling Techniques:
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing

SUGGESTED READINGS

| S. No. | Title | Author |
|---------------|--|---|
| 1. | Federalism and Ethnic Conflict Regulation in India and Pakistan. | Adeney, Katharine. , New York: Palgrave Macmillan, 2007. |
| 2. | Labor, Democratization and Development in India and Pakistan. | Candland, Christopher, New York: Routledge, 2007. |
| 3. | Frontline Pakistan: The Struggle with Militant Islam. | Hussian, Zahid. New York: I.B.Tauris, 2007. |
| 4. | Modern South Asia: History, Culture, Political Economy. | Jalal, Aisha and Bose, Sugata., New York: Routledge, 1998. |
| 5. | Back to Pakistan: A Fifty Year Journey. | Mass, Leslie Noyes. Plymouth: Rowman & Littlefield Publishers, 2011. |
| 6. | Pakistan: Manifest Destiny. | Qureshi, Atiff. London: Epic Press, 2009. |
| 7. | Pakistan, America, and the Future of Global Jihad. | Riedel, Bruce. Deadly Embrace: Washington: Brookings Institute Press, 2011. |
| 8. | Kashmir in Conflict: India, Pakistan and the Unending War. | Schofield, Victoria. New York: I.B.Tauria, 2003. |

| S. No. | Title | Author |
|--------|--|---|
| 9. | A Brief History of Pakistan. | Wynbrandt, James. New York: Infobase Publishing, 2009. |
| 10. | Pakistan's Energy Sector: From Crisis to Crisis-Breaking the Chain | Zaid Alahdad |
| 11. | Research in Education | JW Best |
| 12. | Integrating Education Technology into Teaching | Roblyer |
| 13. | Curriculum Development | S. M. Shahid |
| 14. | Educational Measurement and Evaluation | S. M. Shahid |
| 15. | Educational Administration | S. M. Shahid |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

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|-------------------------------------|--|
| Case No. | F.4-232-C/2017-R |
| Particulars of post | Assistant Professor (Female) (Statistics) (BS-18), Federal Government Colleges for Girls, Federal Directorate of Education Islamabad, Capital Administration & Development Division. |
| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level OR M.Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level OR Second Class or Grade 'C' Master's Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level. |

Part-I (Statistics): 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).

Part-II: (Professional)

50 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. Educational Administration and Supervision

- The Concept of Administration
- Educational Supervision

V. Research Methods in Education

- Scientific Method and its Application in Education
- Sampling Techniques:
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing

SUGGESTED READINGS

| S. No. | Title | Author |
|---------------|---|------------------------------|
| 1. | Principles and Procedures of Statistics | Steel, R and Torrie, J.H. |
| 2. | Introduction to Statistical Theory, Part-I & II | Chaudhry, S.M. and Kamal, S. |
| 3. | Fundamentals of Modern Statistical Methods | Wilcox, R. |
| 4. | Statistical Methods | Aggarwal, Y.P. |
| 5. | Research in Education | JW Best |
| 6. | Integrating Education Technology into Teaching | Roblyer |
| 7. | Curriculum Development | S. M. Shahid |
| 8. | Educational Measurement and Evaluation | S. M. Shahid |
| 9. | Educational Administration | S. M. Shahid |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

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|-------------------------------------|---|
| Case No. | F.4-237/2018-R |
| Particulars of post | Vice Principal/ Headmaster (Male) (BS-18), Federal Govt. Schools, Federal Directorate of Education, Islamabad, Capital Administration and Development Division. |
| Minimum Qualification & Experience: | i. Second Class or Grade 'C' Master's degree with B.Ed./ M.Ed. ii. Five (5) years post qualification teaching and professional/ administrative experience in a recognized Educational Institution. |

Part-I: 50 Marks(Human Resource, Financial Management,
Quality 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. 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;

III. 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

Part-II: (Professional)**50 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. Educational Administration and Supervision

- The Concept of Administration
- Educational Supervision

V. Research Methods in Education

- Scientific Method and its Application in Education
- Sampling Techniques:
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing

SUGGESTED READINGS

| S. No. | Title | Author |
|---------------|--|---|
| 1. | Human Resource Management | H.T.Graham & Roger Bennett |
| 2. | Management | James A.F.Stoner, R.Eward Freeman, Daniel R.Gilbert Jr. |
| 3. | Understanding Computer: Today and Tomorrow | Deborah Morley, Charles Parker |
| 4. | MS Office 365 Handbook: 2013 Edition | Kevin Wilson |
| 5. | Research in Education | JW Best |
| 6. | Integrating Education Technology into Teaching | Roblyer |
| 7. | Curriculum Development | S. M. Shahid |
| 8. | Educational Measurement and Evaluation | S. M. Shahid |
| 9. | Educational Administration | S. M. Shahid |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

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|-------------------------------------|--|
| Case No. | F.4-238/2018-R |
| Particulars of post | Assistant Inspector General of Forest (BS-18), Ministry of Climate Change. |
| Minimum Qualification & Experience: | <ul style="list-style-type: none"> i. Second Class or Grade 'C' B.Sc. (Hons) Forestry/ M.SC. (Forestry). ii. Five (5) years post qualification experience in the field of Forestry and wildlife. |

Forestry: 100 Marks**I. Definition of Forestry**

- National Definition of Forestry (Pakistan)
- National Definition of Deforestation (Pakistan)
- Definition of Forestry by UNFCCC, Convention of Bio Diversity, FAO
- Definition of Deforestation by UNFCCC, Convention of Bio Diversity, FAO

II. Introduction to Forestry

- Forest resources of Pakistan and their distribution of forests in different ecological zones with species composition.
- Economic, social and environmental importance of forests.
- Main issues in protections and development of forest resources in Pakistan.
- Measures taken for protection and development of forest resources (legal, technical, social and financial).

III. Forest Policies and Laws

- **Forest Laws/Regulations/Acts/Ordinances:**
 - The Forest Act 1927
 - Pakistan National Forest Policy 2015
 - Constitutional Provisions relating to Forest under Constitution of Pakistan 1973.
- **Provincial Acts/Ordinances:**
 - Khyber Pakhtunkhwa Forest Ordinance 2002
 - Punjab The Forest Act, 1927 amended 2016.
 - Baluchistan Forest Regulation. 1890
 - Sindh Forest Act 2012
 - Gilgit Forest Rules 1932
 - AJK Forest Regulations
- **Multi-lateral Environment Agreements:**
 - United Nations Framework Convention on Climate Change
 - United Nations Forum on Forest Strategic Plan
 - Convention on Biological Diversity 1993

IV. Forest Management

- Definition and scope of forest management in Pakistan.
- Objectives of forest management.
- Forest fires and their control
- Protected area Management
- Silviculture efforts at National/Provincial level on forest & Wildlife

V. Forestry and Wildlife Statistics of Pakistan

SUGGESTED READINGS

| S. No. | Title | Author |
|--------|---|--|
| 1. | Forest Types of Pakistan, Pakistan Forest Institute, Peshawar.1965 | Champion, H.G., Seth, S.K. and Khattak, G.M. |
| 2. | Forest Law and Sustainable Development: Addressing Contemporary Challenges Through Legal Reform | Lawrence C. Christy. 2007. |
| 3. | Explanatory Notes on Forest Law with up-to-date amendments by Asif Jah. 2009. | Compiled for the use of Forestry students at Pakistan Forest Institute Peshawar. |
| 4. | West Pakistan Forest Manual Vol.I | Govt. of Pakistan. 1975. |
| 5. | Forest Policy Directives | Ministry of Food and Agri. Government of Pakistan. |
| 6. | Forest Act, 1927 | Ideal Publisher, Karachi |
| 7. | NWFP (KP) Forest Ordinance 2002. | |
| 8. | Global Environmental Forest Policies: An International Comparison | McDermott, C., B. Cashore and P. Kanowski. 2009. |
| 9. | Forest Management and Planning | Pete Bettinger, Kevin Boston, Jacek P. Siry and Donald L. Grebner (2008) |
| 10. | Forest Management and the Water Cycle: An Ecosystem-Based Approach | Michael Bredemeie (2010) |
| 11. | Legal and Institutional Dynamics of Forest Management in Pakistan | Yusuf, M. (2009) |
| 12. | Global Forest Resources Association 2010 | FAO Forestry Paper 163 Food and Agriculture Organization |
| 13. | National Forest Policy of Pakistan 2015 | |
| 14. | http://unfccc.int/resourc/focs | |
| 15. | www.cbt.int/ (Convention on Biological Diversity) | |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

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|-------------------------------------|--|
| Case No. | F.4-239/2018-R |
| Particulars of post | Assistant Professor (Male) (Mathematics) (BS-18) , F. G. Colleges, Directorate Of Federal Government Educational Institutions (Cantts/ Garrisons), Ministry Of Defence. |
| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject and one (1) year post qualification teaching experience at College/ University level. OR M.Phil in the relevant subject with three (3) years post qualification teaching experience at College/ University level. OR Second Class or Grade 'C' Master's Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level. |

Part-I: (Mathematics)**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-II: (Professional)**50 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. Educational Administration and Supervision

- The Concept of Administration
- Educational Supervision

V. Research Methods in Education

- Scientific Method and its Application in Education
- Sampling Techniques:
- 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. | 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: PROFESSIONALMax Marks: 100Time Allowed: 3 Hours

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|-------------------------------------|--|
| Case No. | F.4-245/2018-R |
| Particulars of post | Physician (General Medicine) (BS-19), Federal General Hospital, Chak Shahzad, Islamabad, Cabinet Division. |
| Minimum Qualification & Experience: | i. MBBS degree recognized by PM&DC. ii. Postgraduate higher diploma in the relevant field recognized by PM&DC with seven (7) years post graduate experience. OR Post graduate lower diploma in the relevant field recognized by PM&DC with ten (10) years post graduate experience. |

Part-I: (Qualification Based)**50 Marks**Core courses of **MBBS Degree****Part-II: (Professional)****50 Marks**Core courses of Post Graduate Lower Diploma in **General Medicine**.

PAPER-II: PROFESSIONAL

Max Marks: 100

Time Allowed: 3 Hours

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|-------------------------------------|--|
| Case No. | F.4-246/2018-R |
| Particulars of post | Chief Documentation Officer (BS-19), Academy of Educational Planning and Management (AEPAM), Ministry of Federal Education and Professional Training |
| Minimum Qualification & Experience: | Ph. D in Library Sciences with 08 years post qualification experience in the relevant field. OR M. Phil in Library Sciences with 10 years post qualification experience in the relevant field. OR Second Class or Grade 'C' Master's degree in Library Science with 12 years post qualification experience in the relevant field |

Part-I: 50 Marks(Human Resource, Financial Management,
Quality 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. 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;

III. 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

Part-II: (Library/Information Science) 50 Marks**I. Use of Emerging Technologies in Library**

Information and other Library Technologies. Hardware. Software. Operating System. Telecommunications and Networks. Internet and the www, Barcode Technology, Wireless Technology and Virtual Private Network (VPN). Social Networking. Email. Word Processing. Spreadsheets. Presentation Software. Desktop Publishing. Databases. Library Security Systems. Tele-lifts. Digitization Hardware and Software. Reprographic Technology.

ii. Organization of Information

Systems for Organization of Information: Environments, Storage and Retrieval Tools, Encoding Standards, Cataloguing Codes, Current Systems. The Information Organization Process: Surrogate/ Metadata Records: Description, Access; Authority Control. Subject Access: Analysis, Verbal Subject Approaches, Classification. Organization and Administration: Arrangement, Management Issues. Problems of Information Organization in Pakistan.

iii. Basic Reference Sources

Definition. Evaluation Criteria. Bibliographies-- General Bibliographies, Basic Guides To Reference Materials, Library Catalogues; Serials Guides; Indexes and Abstracts; HEC NDL; Dictionaries and Thesauri; Almanacs And Fact Books; Encyclopaedias; Directories; Biographical Sources; Geographical Sources-- Maps, Atlases & Gazetteers; Reference Websites.

iv. Management of Library and Information Services

Basic Theories and Principles of Administration for Effective Management of Public, Academic, and Special Libraries and Information Centres with emphasis on Planning, Organizing, Staffing, Directing, Coordinating, Reporting, and Budgeting. Administrative Aspects of Public and Technical Services, Facilities, Rules and Regulations, Evaluation, Public Relations, Inter-Agency Cooperation, and Change Management. Library Space Management.

SUGGESTED READINGS

| S. No. | Title | Author |
|--------|--|--|
| 1. | Human Resource Management | H.T. Graham & Roger Bennett |
| 2. | Management | James A.F. Stoner, R. Edward Freeman, Daniel R. Gilbert Jr. |
| 3. | Understanding Computer: Today and Tomorrow | Deborah Morley, Charles Parker |
| 4. | MS Office 365 Handbook: 2013 Edition | Kevin Wilson |
| 5. | Governance | Anne Mette Kjær |
| 6. | The Electronic Library. | Rowley, J. (2001). |
| 7. | Role of ICTs in Library and Information Science | A. Kaliammal & G. Thamaraiselvi |
| 8. | Discovering computers 2007: A gateway to information. | Shelly, G. B., Cashman, T. J., & Vermaat, M. (2007). |
| 9. | Guide to selecting and cataloging quality WWW resources for the small library. | Coleman, A. (2004). |
| 10. | Jadid Catalogue Sazi | Khurshid, Anis (1993) |
| 11. | Reference and information services: An introduction. | Bopp, R. E., & Smith, L. C. (2001). |
| 12. | Introduction to reference work: Vol. 1, | Katz, W. A. (2002). |
| 13. | Management basics for information professionals. | Evans, G. E., Layzell Ward, P., Rugaas, B., & Evans, G. E. (2007). |
| 14. | The practical library manager. | Massis, B. E. (2003). |

PAPER-II: PROFESSIONAL**Max Marks: 100****Time Allowed: 3 Hours**

| | |
|-------------------------------------|--|
| Case No. | F.4-257/2018-R |
| Particulars of post | Associate Professor (Mathematics) (BS-19), Federal College of Education, Capital Administration and Development Division. |
| Minimum Qualification & Experience: | Second Class or Grade 'C' Master's Degree in Mathematics with Twelve (12) years post qualification teaching/ administrative experience at College/ University level. |

Part-I: (Mathematics)**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-II: (Professional)

50 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. Educational Administration and Supervision

- The Concept of Administration
- Educational Supervision

V. Research Methods in Education

- Scientific Method and its Application in Education
- Sampling Techniques:
- 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. | 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**Max Marks: 100****Time Allowed: 3 Hours**

| | |
|-------------------------------------|---|
| Case No. | F.4-263/2018-R |
| Particulars of post | Associate Anaesthetist (BS-18), Federal General Hospital, Chak Shahzad Islamabad, Capital Administration and Development Division. |
| Minimum Qualification & Experience: | i. MBBS degree recognized by PM&DC. ii. Postgraduate higher diploma in the relevant field recognized by PM&DC with 3 years post graduate experience. OR Postgraduate lower diploma in the relevant field recognized by PM&DC with 5 years post graduate experience. |

Part-I: (Qualification Based)**50 Marks**Core courses of **MBBS Degree****Part-II: (Professional)****50 Marks**Core courses of Post Graduate Lower Diploma in **Anaesthesia**.