# 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. 10/2019

| S. No | Case No. F.4- | Particulars of Post(s) | Qualifications/Experience for the Posts | Test Specification | Topics of Syllabi |
|---|---|---|---|---|---|
| 1. | 40/2019 | **Medical Officer** (BS-17), Federal Government Polyclinic, Ministry of National Health Services, Regulations and Coordination. | i) MBBS or equivalent qualification recognized by PM&DC.<br>ii) One (1) year House Job. | Objective Type Test (MCQ)<br><br>**Part-I**<br><br>English = 20 marks<br><br>**Part-II**<br><br>Professional Test=80 marks | **Part-I**<br>Vocabulary, Grammar Usage, Sentence Structuring.<br><br>**Part-II**<br>• Core courses of **MBBS** Degree Program.<br>• Health Policies of the Government of Pakistan.<br>• Care vs Cure for Health Management.<br>• Major Challenges being faced by the Health Sector. |
| 2. | 153/2019 | **Assistant Director** (BS-17) Department of Libraries, National History & Literary Heritage Division. | i) Second Class or Grade 'C' Master's Degree in Library Science or equivalent qualification from a University recognized by HEC.<br>ii) Two (2) years post qualification experience in the relevant field. | Objective Type Test (MCQ)<br><br>**Part-I**<br><br>English = 20 marks<br><br>**Part-II**<br><br>Professional Test = 80 marks | **Part-I**<br>Vocabulary, Grammar Usage, Sentence Structuring.<br>**Part-II**<br>• Introduction to Library & Information Science<br>• Classification: Theory and Practice<br>• Cataloguing: Theory and Practice<br>• Management of Libraries & Information Centres<br>• Library Automation/Information Storage & Retrieval<br>• Public Records, Rare Material & their Conservation<br>• Management of Serials Publications<br>• Rules & Procedure of Write off the Library Losses |
| 3. | 195/2019 | **Assistant Executive Engineer (Civil)** (BS-17 Plus 25% Special Pay), Water & Power Department, Gilgit Baltistan, Ministry of Kashmir Affairs and Gilgit Baltistan. | i) Second Class or Grade 'C' B.E in Civil or equivalent qualification recognized by PEC.<br>ii) Registration from PEC. | Objective Type Test (MCQ)<br><br>**Part-I**<br><br>English = 20 marks<br><br>**Part-II**<br><br>Professional Test = 80 marks | **Part-I**<br>Vocabulary, Grammar Usage, Sentence Structuring.<br>**Part-II**<br>• Soil Mechanics & Foundation Engineering<br>• Surveying & Levelling<br>• Costing and Estimation<br>• Construction Management<br>• Building Material & Building Construction<br>• Structural Design Applications<br>• Concrete Technology & R.C.C Structure Design<br>• Preparation of PC-1 for Infrastructure Projects<br>• Project Management & Supervision.<br>• Basic IT/Computer Knowledge |

| S. No | Case No. F.4- | Particulars of Post(s) | Qualifications/Experience for the Posts | Test Specification | Topics of Syllabi |
|---|---|---|---|---|---|
| 4. | 210/2019 | **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** <br>• Accounting Principles & Procedures, <br>• Journal, Ledger & Cash Book, <br>• Preparation of Annual Budget, <br>• Heads of Accounts, Re-appropriation of Funds <br>• Preparation of Pension Documents. <br>• Financial Accounting <br>• Financial Management <br>• Cost Accounting <br>• Business taxation <br>• Public Procurement Rules, 2004 <br>• Basic IT/Computer Knowledge |
| 5. | 213/2019 | **Assistant Mechanical Engineer** (BS-17), Mechanical Engineering Department of Pakistan Railways, (Railway Board), Ministry of Railways. | i) Bachelor's degree in Mechanical Engineering OR equivalent qualification. <br>ii) Registration with PEC required. | Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test = 80 marks | **Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** <br>• Heat Transfer <br>• Thermodynamics <br>• Industrial Materials <br>• Machine Design and Drawing <br>• Mechanics of Machines <br>• Production Management & Quality Control <br>• Workshop Technology <br>• Hydraulic Machines <br>• Project Management <br>• Basic IT/Computer Knowledge |
| 6. | 214/2019 | **Assistant Executive Engineer** (BS-17), Civil Engineering Department of Pakistan Railways, (Railway Board), Ministry of Railways. | i) Bachelor's degree in Civil Engineering OR equivalent qualification. <br>ii) Registration with PEC required. | Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test = 80 marks | **Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** <br>• Soil Mechanics & Foundation Engineering <br>• Surveying & Levelling <br>• Costing and Estimation <br>• Construction Management <br>• Building Material & Building Construction <br>• Structural Design Applications <br>• Concrete Technology & R.C.C Structure Design <br>• Preparation of PC-1 for Infrastructure Projects <br>• Project Management & Supervision. <br>• Basic IT/Computer Knowledge |

| S. No | Case No. F.4- | Particulars of Post(s) | Qualifications/Experience for the Posts | Test Specification | Topics of Syllabi |
|---|---|---|---|---|---|
| 7. | 216/2019 | **Labour Welfare and Safety Officer** (BS-16), Naval Headquarters, Ministry of Defence. | i) Second Class or Grade 'C' Bachelor's Degree with sociology/ social Work.<br>ii) Three (3) years post qualification experience in Labour Welfare. | Objective Type Test (MCQ)<br>**Part-I**<br>English = 20 marks<br>**Part-II**<br>Professional Test = 80 marks | **Part-I**<br>Vocabulary, Grammar Usage, Sentence Structuring.<br>**Part-II**<br>• Community Organization and Development,<br>• Social Research & Statistics,<br>• Organizational Behaviour and Human Resources,<br>• Social Welfare Policy and Administration,<br>• Criminology and its Remedial Measures,<br>• Methods of Counselling & Guidance Services<br>• Environmental Sociology<br>• Labour Policy, 2010 |
| 8. | 217/2019 | **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.<br>ii) Three (3) years post qualification experience in the field of prescribed qualification. | Objective Type Test (MCQ)<br>**Part-I**<br>English =20 marks<br>**Part-II**<br>Professional Test =80 marks | **Part-I**<br>Grammar Usage, Sentence Structuring<br>**Part-II**<br>• Kinetic Theory of Gases.<br>• Nature, properties and states of matter.<br>• Chemical Kinetics.<br>• Thermodynamics.<br>• Thermo-chemistry.<br>• Radioactivity<br>• Electrochemistry including Fuel Cells; Chemical Equilibria and Catalysis. |
| 9. | 218/2019 | **Junior Civilian Security Officer** (BS-16), OS Directorate, GHQ, Ministry of Defence. | Retd. JCO or equivalent of the Armed Forces.<br>**OR**<br>i) Second Class or Grade 'C' Bachelor's Degree or equivalent qualification from a University recognized by the HEC.<br>ii) Two (2) years post qualification experience as Security Supervisor. | Objective Type Test (MCQ)<br>**Part-I**<br>English = 20 marks<br>**Part-II**<br>General Intelligence/ Professional Test = 80 marks | **Part-I**<br>Vocabulary, Grammar Usage, Sentence Structuring.<br>**Part-II**<br>▪ Basic Arithmetic<br>− Algebra<br>− Ratios<br>− Percentages<br>− Arithmetic Means<br>▪ Current Affairs.<br>− Developments at National and International Levels in the last 2 years<br>▪ Pakistan Affairs & Islamic Studies<br>− Basic Level knowledge<br>▪ Security Measures to Maintain Law & Order<br>Note **: (Equal weightage for each topic at Part-II)** |

| S. No | Case No. F.4- | Particulars of Post(s) | Qualifications/Experience for the Posts | Test Specification | Topics of Syllabi |
|---|---|---|---|---|---|
| 10. | 222/2019 | **Protocol Officer** (BS-17), Ministry of Housing and Works. | i) Second Class or Grade 'C' Master's Degree, from a University recognized by HEC.<br>ii) Two years post qualification experience in the field of Protocol Duties.<br>**OR**<br>i) Second Class or Grade 'C' Bachelor's degree from a university recognized by HEC.<br>ii) Five (5) years post qualification experience in the field of Protocol Duties. | Objective Type Test (MCQ)<br>**Part-I**<br>English = 20 marks<br>**Part-II**<br>General Intelligence/ Professional Test = 80 marks | **Part-I**<br>Vocabulary, Grammar Usage, Sentence Structuring.<br>**Part-II**<br>▪ Basic Arithmetic<br>  − Algebra<br>  − Ratios<br>  − Percentages<br>  − Arithmetic Means<br>▪ Current Affairs.<br>  − Developments at National and International Levels in the last 2 years<br>▪ Pakistan Affairs & Islamic Studies<br>  − Basic Level knowledge<br>▪ Basic Protocol duties<br>Note **: (Equal weightage for each topic at Part-II)** |
| 11. | 226/2019 | **Inspector** (BS-16), Airports Security Force, Cabinet Secretariat, (Aviation Division). | Bachelor's Degree. | Objective Type Test (MCQ)<br>**Part-I**<br>English = 20 marks<br>**Part-II**<br>General Intelligence/ Professional Test = 80 marks | **Part-I**<br>Vocabulary, Grammar Usage, Sentence Structuring.<br>**Part-II**<br>▪ Basic Arithmetic<br>  − Algebra<br>  − Ratios<br>  − Percentages<br>  − Arithmetic Means<br>▪ Current Affairs.<br>  − Developments at National and International Levels in the last 2 years<br>▪ Pakistan Affairs & Islamic Studies<br>  − Basic Level knowledge<br>▪ Basic Knowledge of ASF Act – 1975<br>Note **: (Equal weightage for each topic at Part-II)** |

| S. No | Case No. F.4- | Particulars of Post(s) | Qualifications/Experience for the Posts | Test Specification | Topics of Syllabi |
|---|---|---|---|---|---|
| 12. | 227/2019 | **Assistant Executive Engineer (E & M)** (BS-17 Plus 25% Special Pay), Water & Power Department Gilgit Baltistan, Ministry of Kashmir Affairs and Gilgit Baltistan. | i) Second Class or Grade 'C' B.E in Electrical/ Mechanical/ Electronics or equivalent qualification recognized by PEC.<br>ii) Registration from PEC. | Objective Type Test (MCQ)<br>**Part-I**<br>English = 20 marks<br>**Part-II**<br>Professional Test = 80 marks | **Part-I**<br>Vocabulary, Grammar Usage, Sentence Structuring.<br>**Part-II**<br>• Power Generation,<br>• Power Distribution,<br>• Power Transmission,<br>• Power System Control,<br>• Power & Digital Electronics,<br>• Electronic Devices and Structure,<br>• Electric Circuits,<br>• Electronic/ Electrical Instrumentation,<br>• Thermodynamics<br>• Mechanics of Machines<br>• Production Management & Quality Control<br>• Workshop Technology<br>• Hydraulic Machines<br>• Principles of Planning,<br>• Public Procurement Regulatory Authority (PPRA) Rules, 2004 |
| 13. | 228/2019 | **Scientific Officer** (BS-17), National Veterinary Laboratory, Ministry of National Food Security and Research | Second Class or Grade C Master's Degree in Pharmacology/ Parasitology/ Bacteriology/ Microbiology/ Biochemistry/ Epidemiology.<br>**OR**<br>Second Class or Grade C Bachelor's Degree in Animal Husbandry/ Veterinary Sciences/ DVM.<br>**OR**<br>B. Pharmacy. | Objective Type Test (MCQ)<br>**Part-I**<br>English =20 marks<br>**Part-II**<br>Professional Test =80 marks | **Part-I**<br>Vocabulary, Grammar Usage, Sentence Structuring<br>**Part-II**<br>• Animal Breeding Plans & Policies in Pakistan<br>• Animal Feed Resources<br>• Histology & Embryology<br>• Pharmacology & Toxicology<br>• Livestock Economics & Business Management<br>• Principles of Animals Nutrition<br>• Systematic Virology, Histology & Pathology<br>• Veterinary Entomology, Epidemiology & Public Health |

# Schemes and Syllabi for Written Examination (Descriptive) for All Posts in BS-18 & BS-19 included in Consolidated Advertisement No. 10/2019

## 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

| Case No. | F.4-201/2019-R |
|---|---|
| Particulars of post | **Director** (BS-19), Geological Survey of Pakistan, Ministry of Energy (Petroleum Division). |
| Minimum Qualification & Experience: | i. Second Class or Grade 'C' M.Sc. degree in Geology or equivalent qualification from a University recognized by the HEC.<br>ii. Post qualification Research experience of twelve (12) years in the field of Geology including three (3) years experience to plan, organize, conduct and supervise geological field programme for geological surveys.<br>iii. Must have published five (5) research papers in the fields of Geology. |

## Part-I: (Geology)     : 75 Marks (Descriptive)

### I. Stratigraphy and Palaeontology

Principles of stratigraphy; laws of superposition and faunal succession. Geological time scale with divisions. Classification and nomenclature of stratigraphic units: lithostragraphic units, biostratigraphic units and chronostratgraphic units.

Introduction to fossils and their significance; modes of fossilization, Study of morphology, range and broad classification of major invertebrate phyla; Introduction to micro fossils; Introduction to Paleobotany; Introduction and classification of major vertebrates; Introduction to micropaleontology

### II. Structural Geology and Tectonics

Stress-strain concepts; factors which control the mechanical behavior of materials; Folds, Faults, Joints, Foliation: terminology, classification and relationship with bedding; Lineation, Unconformity.

Plate tectonics theory; Geological evidences for continental drift; Sea-floor spreading; Oceanic ridges; Continental rifts; Intra-oceanic islands; Hot spot and Mantle plumes; Wilson Cycle; Tectonic framework of Pakistan.

### III. Mineral and Energy Resources

Introduction of geological exploration/prospecting. Brief description of hydrocarbons, coal, gemstones, copper, lead, zinc, iron, gold, chromite, manganese, salt, gypsum, bauxite, sulphur, barite, fluorite, clays, phosphorite, building and dimension stones, industrial rocks and m i n e r a l s , radioactive minerals and rocks with special reference to economic mineral deposits in Pakistan.

Origin, occurrence, and depositional environments of coal; coal Constitution and kinds of coals.Coal rank, grade and calorific value. Coal deposits of Pakistan with reference to Thar Coal. Geothermal energy resources of Pakistan.

### IV. Engineering and Environmental Geology

Rock and soil mechanics and its application in civil engineering; Rock mass characteristics; Geotechnical studies of rocks and soils; Geological factors and strength of rocks; Study of geological factors in relation to the construction of buildings and foundations, roads, highways, tunnels, dams and bridges;

Application of geophysical methods for site investigation; Construction materials; Mass movement, their causes and prevention.

V. **Economic and Applied Geology**

Metallic and Non-metallic mineral resources of Pakistan. Mineral-based industries. Overview of Recodec Copper. Radioactive minerals and their occurrences in Pakistan. Gemstones of Pakistan

Geology of Reservoirs, Dams .Highways and Tunnels. Major natural hazards and their Impact on the environment with special reference to Pakistan.

# Part-III: 25 Marks (MCQ)

▪ 25 MCQ Questions on Part-I.

## SUGGESTED READINGS

| S. No. | Title | Author |
|---|---|---|
| 1. | Principles of Paleontology | Raup, D.M. & Stanley, S.M |
| 2. | Principles of Sedimentology and Stratigraphy | Boggs, S |
| 3. | Mineralogy | Perkins, D |
| 4. | Plate Tectonics – Geodynamics | Moores, E.M. & Twiss, R.J |
| 5. | Structural Geology | Twiss, R.J. & Moores, E.M., |
| 6. | Sequence Stratigraphy | Emery, D. & Myers, K.J., |
| 7. | Geology of Pakistan | Bender, F.K. & Raza, H.A., |
| 8. | Environmental Geology | Montgomery, C.W., |
| 9. | Economic Geology: Principles and Practice | Walter L. Pohl |
| 10. | Energy Resources | Brown and Skipsy |
| 11. | Pakistan Energy Yearbook 2012 | Ministry of Petroleum and Natural Resources Hydrocarbon Development Institute of Pakistan. Islamabad |

# PAPER-II: PROFESSIONAL

Max Marks: 100                                                  Time Allowed: 3 Hours

| Case No. | F.4-209/2019-R |
|---|---|
| Particulars of post | **Associate Professor (Mathematics)** (BS-19), Federal College of Education, Ministry of Federal Education and Professional Training. |
| 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 (Descriptive)

### 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)  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

# Part-III: 25 Marks (MCQ)

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

## 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

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

| Case No. | F.4-219/2019-R |
|---|---|
| Particulars of post | **Associate Professor (Physics) (Male)** (BS-19), F.G. Colleges, Federal Government Educational Institutions (Cantts/ Garrisons), Ministry of Defence. |
| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level.<br>**OR**<br>M.Phil Degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level.<br>**OR**<br>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: (Physics)     50 Marks (Descriptive)

### 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; 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.     Waves and Oscillation

- Free oscillation with one and two degrees of freedom; forced and damped oscillations and phenomenon of resonance.
- Reflection, Refraction, Interference, Diffraction and Polarization of waves; interfero-meter and Newton's rings.

### III.     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; Maxwellian distribution of molecular velocities; Brownian motion; Transport phenomena. Classical Maxwell-Boltzmann Statistics and its application.

### IV.     Electricity and Magnetism

- Gauss' law Electric potential and Poisson and Laplace's equation Dielectric medium and Polarization; Ampere's law; Vector potential; Magnetic properties of matter; Faraday's law of electromagnetic induction; Maxwell's equations;

Poynting theorem and Poynting Vector. Maxwell's equations in integral and differential form.

### V. Modern and Quantum Physics

- Operators and quantum states, time dependent and independent Schrodinger equation, angular momentum, wave mechanics, 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. Lande's g factor and Zeeman effect. Raman effect; Waves and particles and De Broglie's Hypothesis.

### VI. Nuclear Physics

- Structure of Nuclei; Radioactivity, Methods of detection, Phenomenon of fission; reactor and nuclear power, nuclear fusion and its application.

# Part-II: (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

# Part-III: 25 Marks (MCQ)
- 25 MCQ Questions on Part-I & Part-II.

## 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. | 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.4-220/2019-R |
|---|---|
| Particulars of post | **Director (Technical Services)** (BS-19), Department of Libraries, National History & Literary Heritage Division. |
| Minimum Qualification & Experience: | i) Second Class or Grade 'C' Master's Degree in Library Science or equivalent qualification from a University recognized by HEC.<br>ii) Twelve (12) years post qualification experience in the relevant field. |

## Part-I: (Library/Information Science) 50 Marks (Descriptive)

### 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

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.

## Part-II: 25 Marks (Descriptive)
(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, Principles of Organization, 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; Elements of Financial Administration, 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, Characteristics of Computer and related material; 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;

# Part-III: 25 Marks (MCQ)

▪ 25 MCQ Questions on Part-I & Part-II.

## 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. | 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

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

| Case No. | F.4-221/2019-R |
|---|---|
| Particulars of post | **Deputy Chief** (BS-19), Water Resources Section, Ministry of Planning, Development and Reform. |
| Minimum Qualification & Experience: | i)  Second Class or Grade 'C' Bachelor's Degree or equivalent qualifications in Civil Engineering or Agricultural Engineering. <br> ii) Ten (10) years post qualification experience of operation, maintenance, drainage or research or planning relating to irrigation, drainage or flood control works or similar matters. |

## Part-I: (Research and Planning)          25 Marks

**i.  Communication Skills, Technical Writing and Presentation Skills**

Paragraph writing, Essay writing, CV and job application, Translation skills, Study skills, Academic skills, Essay writing, Academic writing, Technical Report writing, Progress report writing, Presentation skills

**ii.  Planning and Management**

a) <u>Project Management</u>
    Project Management, Processes Integration Management, Project Plan Development, Project Plan Execution and Overall Change Control, PERT, Gantt Chart, CPM

b) <u>Scope Management</u>
    Initiation, Scope Planning, Scope Definition, Scope Verification and Scope Change Control.

c) <u>Communications Management</u>
    Communications Planning, Information Distribution, Performance Reporting and Administrative Closure.

d) <u>Risk Management</u>
    Risk Identification, Risk Quantification, Risk Response Development and Risk Response Control.

e) <u>Statistical Techniques</u>
    All statistical techniques related to Planning & Research

## Part-II: (Professional)          50 Marks

**I.   Civil Engineering Fundamentals:**

Structures; stress, strain, shearing force and bending moment concepts, beams, columns, footing. Simply supported and Cantilever beams, Pulleys and gears. Estimation, Quantity Surveying, Composite Schedule of Rates, Surveying and Levelling, Plain Tabling, Theodolite Survey;

**II.  Fundamental of Irrigation**

Definition of irrigation, need for irrigation, sources of irrigation water, (surface water, groundwater and rainfall), utilization of water for agricultural purposes.

**III. Indus Basin Irrigation System:**

Components, operation and maintenance of Indus basin irrigation system, conveyance and distribution of irrigation water.

**IV. Irrigation Structures:**

Dams, barrages, Headworks, diversion structures, types and functions of outlets, desirable features/characteristics of outlets, design and construction of outlets, water measurement structures, energy dissipater, transition and erosion protection.

**V. Canal Design and Maintenance:**

Layout of canals, design of canals, Kennedy's and Lacy's theories, silt factor and friction factors, canal lining and its advantages, maintenance of canals.

**VI. Water Losses:**

Water losses in canals and watercourses, measurement of water losses and methods to alleviate water losses.

**VII. Flood Protection:**

Importance of floods in irrigation system operation, types of floods, damages caused by floods, methods of flood control and cost of flood protection.

# Part-III: 25 Marks (MCQ)
- 25 MCQ Questions on Part-I & Part-II.

## SUGGESTED READINGS

| S. No. | Title | Author |
|--------|-------|--------|
| 1. | Practical English Grammar | A.J. Thomson and A.V. Martinet. |
| 2. | Reading. Advanced | Brian Tomlinson and Rod Ellis. |
| 3. | Study Skills | Riachard Yorky |
| 4. | Writing. Advanced | Ron White. |
| 5. | College Writing Skills | John Langan. |
| 6. | Patterns of College Writing | Laurie G. Kirszner and Stephen R. Mandell. |
| 7. | Project Management Body of Knowledge, | Project Management Institute (PMI) standards committee |
| 8. | Strength of material | Andrew Pytel and Singer. |
| 9. | Surveying and Levelling | T.P Kanetaker. |
| 10. | Irrigation and Drainage Engineering | Siddiqui, I. H. |
| 11. | Irrigation Design and Practice | Withers, Bruce & Vipond, S |
| 12. | Irrigated Agriculture of Pakistan | Ahmad, N. and Chaudhry, G.R. |
| 13. | Water Resources of Pakistan | Ahmad, N. |
| 14. | Irrigation and Water Power Engineering | Arora, R.K. |

## PAPER-II: PROFESSIONAL

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

| Case No. | F.4-229**A**/2019-R |
|---|---|
| Particulars of post | **Associate Professor (Female) (Physics)** (BS-19), F.G. Colleges, Directorate of Federal Government Educational Institutions (FGEI) (Cantts/ Garrisons),  Ministry of Defence. |
| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. <br> **OR** <br> M. Phil Degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. <br> **OR** <br> 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: (Physics)                    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;  Gravitation; planetary motion and satellites; Kepler's laws; centripetal forces
- Special theory of relativity. Michelson—Morley experiment and Einstein's postulates; Lorentz transformation; time dilation and length contraction; equivalence of mass and energy.

### II.    Waves and Oscillation

- Free oscillation with one and two degrees of freedom; forced and damped oscillations and phenomenon of resonance.
- Reflection, Refraction, Interference, Diffraction and Polarization of waves; interfero-meter and Newton's rings.

### III.    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; Maxwellian distribution of molecular velocities; Brownian motion; Transport phenomena.  Classical Maxwell-Boltzmann Statistics and its application.

### IV.    Electricity and Magnetism

- Gauss' law Electric potential and Poisson and  Laplace's equation Dielectric medium and Polarization; Ampere's law; Vector potential; Magnetic properties of matter; Faraday's law of  electromagnetic  induction;  Maxwell's equations;

Poynting theorem and Poynting Vector. Maxwell's equations in integral and differential form.

## V. Modern and Quantum Physics

- Operators and quantum states, time dependent and independent Schrodinger equation, angular momentum, wave mechanics, 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. Lande's g factor and Zeeman effect. Raman effect; Waves and particles and De Broglie's Hypothesis.

## VI. 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.

## VII. Nuclear Physics

- Structure of Nuclei; Radioactivity, $\alpha$, $\beta$ and $\gamma$ decay. Methods of detection, Phenomenon of fission; reactor and nuclear power, nuclear fusion and its application.

# Part-II: (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

# Part-III: 25 Marks (MCQ)
- 25 MCQ Questions on Part-I & Part-II.

**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. | 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.4-229**B**/2019-R |
|---|---|
| Particulars of post | **Associate Professor (Female) (Mathematics)** (BS-19), F.G. Colleges, Directorate of Federal Government Educational Institutions (FGEI) (Cantts/ Garrisons), Ministry of Defence. |
| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. <div align="center">**OR**</div> M. Phil Degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. <div align="center">**OR**</div> 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: (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. Modern Algebra

- Group, subgroups, Lagranges theorem, Cyclic groups, Normal subgroups, Quotient groups. Fundamental theorem of homomorphism. Isomorphism theorems of groups, Inner automorphisms. Conjugate elements, conjugate subgroups. Commutator subgroups.
- Ring, Subrings, Integral domains, Quotient fields, Isomorphism theorems, Field extension and finite fields.
- Vector spaces, Linear independence, Bases, Dimension of a finitely generated space. Linear transformations, Matrices and their algebra. Reduction of matrices to their echelon form. Rank and nullity of a linear transformation.
- Solution of a system of homogeneous and non-homogeneous linear equations. Properties of determinants.

# Part-II: (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

# Part-III: 25 Marks (MCQ)
- 25 MCQ Questions on Part-I & Part-II.

**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. | Mathematical Methods | S. M. Yousaf, Abdul Majeed and Muhammad Amin |
| 7. | Topics in Algebra | Herstein, I.N. |
| 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.4-229**C**/2019-R |
|---|---|
| Particulars of post | **Associate Professor (Female) (Pak Studies)** (BS-19), F.G. Colleges, Directorate of Federal Government Educational Institutions (FGEI) (Cantts/ Garrisons),  Ministry of Defence. |
| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. <br> **OR** <br> M. Phil Degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. <br> **OR** <br> 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: (Pakistan Studies)      50 Marks (Descriptive)

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 Energy Problems and their Effects

VIII.   Pakistan's Relations with Neighbours

IX.     Pakistan and India Relations Since 1947

X.      Kashmir Issue

## Part-II: (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

# Part-III: 25 Marks (MCQ)
- 25 MCQ Questions on Part-I & Part-II.

## 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. |
| 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

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

| Case No. | F.4-229**D**/2019-R |
|---|---|
| Particulars of post | **Associate Professor (Female) (Islamiyat)** (BS-19), F.G. Colleges, Directorate of Federal Government Educational Institutions (FGEI) (Cantts/ Garrisons), Ministry of Defence. |
| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. <br> **OR** <br> M. Phil Degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. <br> **OR** <br> 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: (Islamiyat)     50 Marks (Descriptive)

**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 Mohummad (PBAH) as;
- The Role Model
- Merciful for the universe.
- Preacher
- Diplomat
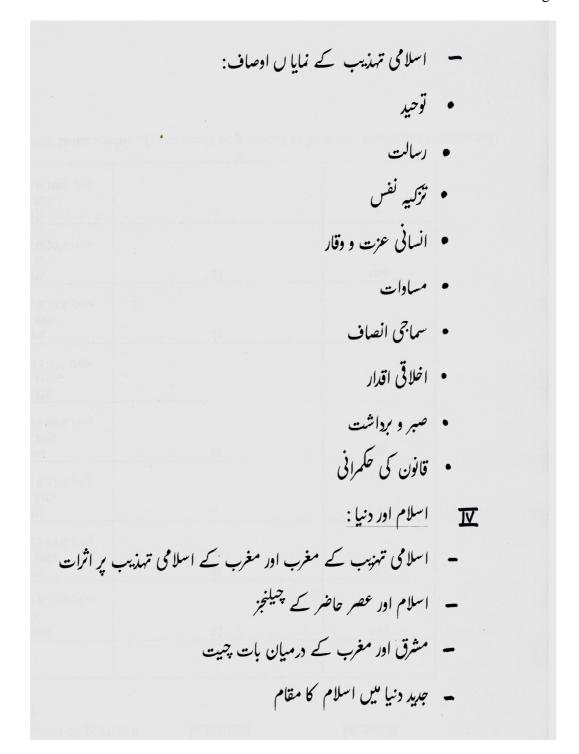- Teacher and Educationalist
- Revolutionary Leader

**III. Islamic Civilization and Culture:**
- Meanings and the vital  elements
- The role of civilisation in the development of the human personality and communities
- Distinctions of Islamic Civilization;
  - Tauheed
  - 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

• پیغمبر امن

• مبلغ

• 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

<div dir="rtl">

— 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** <u>اسلام اور دنیا:</u>

— اسلامی تہذیب کے مغرب اور مغرب کے اسلامی تہذیب پر اثرات

— اسلام اور عصر حاضر کے چیلینجز

— مشرق اور مغرب کے درمیان بات چیت

— جدید دنیا میں اسلام کا مقام

</div>

## Part-II: (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

# Part-III: 25 Marks (MCQ)

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

## 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

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

| Case No. | F.4-230/2019-R |
|---|---|
| Particulars of post | **Pathologist** (BS-18), Armed Forces Institute of Rehabilitation Medicine, Ministry of Defence. |
| Minimum Qualification & Experience: | i.   MBBS with FCPS from CPSP. <br> ii.  Five (5) years post FCPS experience in Government Organization as Pathologist. |

## Part-I: (Qualification Based)   50 Marks (Descriptive)

Core courses of **MBBS Degree**

## Part-II: (Professional)   25 Marks  (Descriptive)

Core courses of FCPS with reference to **Pathology.**

## Part-III: 25 Marks (MCQ)
- 25 MCQ Questions on Part-I & Part-II.

# PAPER-II: PROFESSIONAL

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

| Case No. | F.4-231/2019-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. <br> OR <br> M.Phil in the relevant subject with three (3) years post qualification teaching experience at College/ University level. <br> OR <br> 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 (Descriptive)

### 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) 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

# Part-III: 25 Marks (MCQ)
- 25 MCQ Questions on Part-I & Part-II.

**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 |