

**FEDERAL PUBLIC SERVICE COMMISSION**  
**(Curriculum & Research Wing)**

**Schemes and Syllabi for Screening/Professional Tests as well as Descriptive Examination**  
**Relating to Posts Advertised under Consolidated Advertisement No. 01/2019**

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications for Posts	Test Specification	Topics of Syllabi
1.	01/2019	<b>Assistant Computer Officer</b> (BS-16), Armed Forces Institute of Pathology, (GHQ Medical Directorate), Ministry of Defence	2 <sup>nd</sup> Class or Grade "C" Master Degree in Computer Science/Information Technology or equivalent qualification from a University recognized by the Higher Education Commission. OR i) 2 <sup>nd</sup> Class or Grade "C" Bachelor's Degree in Computer Science/ Information Technology or equivalent qualification from a University recognized by the Higher Education Commission ii) Two (02) years post qualification experience in Computer/IT related field	Objective Type Test (MCQ) <b>Part-I</b> English =20 marks <b>Part-II</b> Professional Test =80 marks	<b>Part-I</b> Grammar Usage, Sentence Structuring <b>Part-II</b> <ul style="list-style-type: none"> <li>• Computer Hardware/Software,</li> <li>• Data Communication &amp; Networking,</li> <li>• C/C++ Language,</li> <li>• Visual Basic,</li> <li>• Operating System Unix/Linux</li> <li>• Windows 7, 8, 8.1,</li> <li>• Oracle/PLSQL,</li> <li>• System Analysis &amp; Design.</li> <li>• Web Programming,</li> </ul>
2.	03/2019	<b>Senior Scientific Assistant</b> (BS-16), Naval Headquarters, Ministry of Defence.	i. Second Class or Grade 'C' Bachelor's Degree in Science with Chemistry/ Chemical Technology. ii. Three (3) years post qualification experience in the field of prescribed qualification.	Objective Type Test (MCQ) <b>Part-I</b> English =20 marks <b>Part-II</b> Professional Test =80 marks	<b>Part-I</b> Grammar Usage, Sentence Structuring <b>Part-II</b> <ul style="list-style-type: none"> <li>• Thermodynamics,</li> <li>• Nature, Properties and States of Matter,</li> <li>• Gases, Liquids &amp; Solids,</li> <li>• Organic Chemistry</li> <li>• In-Organic Chemistry</li> </ul>

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications for Posts	Test Specification	Topics of Syllabi
3.	04/2019	<b>Assistant Scientific officer</b> (BS-17), Armed Forces Institute of Pathology, (GHQ Medical Directorate), Ministry of Defence	<p>i. Second Class or Grade "C" M.Sc. Degree in Chemistry/ Biochemistry/Microbiology or equivalent qualification from a University recognized by the Higher Education Commission.</p> <p>ii. Two (2) years post qualification experience of Research/ Analysis/ Laboratory work in the relevant subject.</p>	<p>Objective Type Test (MCQ) <b>Part-I</b> English =20 marks</p> <p><b>Part-II</b> Professional Test =80 marks</p>	<p><b>Part-I</b> Vocabulary, Grammar Usage, Sentence Structuring</p> <p><b>Part-II</b></p> <ul style="list-style-type: none"> <li>• Nature, Properties and States of Matter,</li> <li>• Gases, Liquids &amp; Solids,</li> <li>• Organic Chemistry</li> <li>• In-Organic Chemistry</li> <li>• General Immunology</li> <li>• Cell Biology</li> <li>• Clinical Bacteriology</li> <li>• General Virology</li> <li>• Research Methodology</li> </ul>
4.	05/2019	<b>Electrical Engineer</b> (BS-16), Armed Forces Institute of Pathology, (GHQ Medical Directorate), Ministry of Defence	<p>i. Second Class or Grade "C" B.E. (Electrical/Electronics) or equivalent qualification in Electro Medical Engineering from a University recognized by the Higher Education Commission</p> <p>ii. Registration with P.E.C.</p> <p style="text-align: center;"><b>OR</b></p> <p>i. Three (3) years post Matric diploma in Electro Medical/ Electrical/Electronics.</p> <p>ii. Two (2) years post qualification experience in Electro Medical field.</p>	<p>Objective Type Test (MCQ) <b>Part-I</b> English =20 marks</p> <p><b>Part-II</b> Professional Test =80 marks</p>	<p><b>Part-I</b> Vocabulary, Grammar Usage, Sentence Structuring</p> <p><b>Part-II</b></p> <ul style="list-style-type: none"> <li>• Power Electronics.</li> <li>• Digital Electronics.</li> <li>• Operational Amplifiers.</li> <li>• Electronic Instrumentations.</li> <li>• Electrostatics</li> <li>• Magnetic Circuits</li> <li>• Electrical Engineering Materials</li> <li>• Instruments and Measurements</li> <li>• Rectifiers and Convectors.</li> </ul>
5.	06/2019	<b>Joint Estate Officer</b> (Accounts) (BS-17), Estate Office Management, Ministry of Housing & Works	<p>2<sup>nd</sup> Class or Grade "C" Master Degree in Commerce / Business Administration (Finance/ Accounts) or equivalent from a recognized University.</p> <p style="text-align: center;"><b>OR</b></p> <p>SAS qualified with 03 years post qualification experience in Accounts Matters</p>	<p>Objective Type Test (MCQ) <b>Part-I</b> English = 20 marks</p> <p><b>Part-II</b> Professional Test = 80 marks</p>	<p><b>Part-I</b> Vocabulary, Grammar Usage, Sentence Structuring.</p> <p><b>Part-II</b></p> <ul style="list-style-type: none"> <li>• General Knowledge</li> <li>• Basic Arithmetic</li> <li>• Basic Knowledge of IT</li> <li>• Procedure for maintenance of Accounts of a Department</li> <li>• Handling of Audit matters</li> <li>• Functions of Ministry of Housing &amp; Works and Estate Office</li> </ul>

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications for Posts	Test Specification	Topics of Syllabi
6.	07/2019	<b>Joint Estate Officer</b> (General) (BS-17), Estate Office Management, Ministry of Housing & Works	i) 2 <sup>nd</sup> Class or Grade "C" Master's Degree in Economics/ Mathematics/ Statistics/ Business Administration/ Commerce/ Public Administration or equivalent from a University recognized by HEC. ii) 03 years post qualification experience in a Government/ Autonomous Organization in Estate Matters.	Objective Type Test (MCQ) <b>Part-I</b> English = 20 marks <b>Part-II</b> Professional Test = 80 marks	<b>Part-I</b> Vocabulary, Grammar Usage, Sentence Structuring. <b>Part-II</b> <ul style="list-style-type: none"> <li>• General Knowledge</li> <li>• Basic Arithmetic</li> <li>• Basic Knowledge of IT</li> <li>• Accommodation Allocation Rules</li> <li>• Land and Building (recovery of possession) Rules</li> <li>• Functions of Ministry of Housing &amp; Works and Estate Office</li> </ul>
7.	09/2019	<b>Preventive Officer</b> (BS-16) Revenue Division, Federal Board Of Revenue.	i. Second Class or Grade 'C' Bachelor's degree from a recognized University with Economics, Commerce, Statistics, Accounting, Computer Science, Law, Pharmacy, Chemistry or Physics as one of the subjects or B.Sc. Engineering in any speciality. ii. Computer literacy up to the level of MS Word, MS Power Point and MS Excel.	Objective Type Test (MCQ) <b>Part-I</b> English = 20 marks <b>Part-II</b> General Intelligence Test = 80 marks	<b>Part-I</b> Grammar Usage, Sentence Structuring <b>Part-II</b> <ul style="list-style-type: none"> <li>• Basic Arithmetic.</li> <li>• Current Affairs.</li> <li>• Pakistan Affairs &amp; Islamic Studies</li> <li>• Everyday/General Science</li> </ul> <b>Note : (Equal weightage for each topic at Part-II)</b>
8.	10/2019	<b>Assistant Private Secretary</b> (BS-16), National Highways & Motorway Police, Ministry of Communications	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. <b>Note:</b> Computer literacy means proficiency in M.S Office (M.S Word, Power Point & Excel).	<ul style="list-style-type: none"> <li>• Typing Test with minimum Speed of 50 W.P.M</li> <li>• Shorthand Test with minimum Speed of 100 W.P.M</li> <li>• Computer Literacy Test:               <ul style="list-style-type: none"> <li>i Microsoft Word (Typing, Formatting)</li> <li>ii Microsoft Excel (Typing, Graph, Calculations)</li> <li>iii Microsoft Power Point (Typing, Formatting, Inserting Objects)</li> </ul> </li> </ul>	<b>35 Marks</b> <b>35 Marks</b> <b>10 Marks</b> <b>10 Marks</b> <b>10 Marks</b>

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications for Posts	Test Specification	Topics of Syllabi
9.	11/2019	<b>Computer Operator</b> (BS-16), National Highways & Motorway Police, Ministry of Communications.	Second Class or Grade 'C' Bachelor's Degree in Computer Science.	Objective Type Test (MCQ) <b>Part-I</b> English = 20 marks <b>Part-II</b> Professional Test=80 marks	<b>Part-I</b> Grammar Usage, Sentence Structuring <b>Part-II</b> <ul style="list-style-type: none"> <li>• Program logic,</li> <li>• Visual Basic, C++, Java, Unix/Red Hat Linux Operating System,</li> <li>• Computer Networks and Internet,</li> <li>• Computer Graphics and Algorithms</li> <li>• Development of Basic Algorithms,</li> </ul>
10.	12/2019	<b>Accountant</b> (BS-16), National Highways & Motorway Police, Ministry of Communications.	Second Class or Grade 'C' Bachelor's Degree in Commerce. OR Qualified as SAS/ AAT (PIPFA); OR Professional Examination of Institute of Cost and Management Accountants of Pakistan (ICMAP)/ Foundation Examination of Institute of Chartered Accountants of Pakistan.	Objective Type Test (MCQ) <b>Part-I</b> English =20 marks <b>Part-II</b> Professional Test =80 marks	<b>Part-I</b> Grammar Usage, Sentence Structuring <b>Part-II</b> <ul style="list-style-type: none"> <li>• Accounting Principles &amp; Procedures,</li> <li>• Scrutiny of Records for Audit Purposes</li> <li>• Journal, Ledger &amp; Cash Book,</li> <li>• Preparation of Annual Budget,</li> <li>• Financial Planning and Cost Accounting</li> <li>• Heads of Accounts, Re-appropriation of Funds and Supplementary Grants</li> <li>• Settlement of Audit Objections.</li> <li>• Public Procurement Rules, 2004</li> <li>• Basic IT Knowledge</li> </ul>
11.	13/2019	<b>Computer Programmer</b> (BS-17), National Highways & Motorway Police, Ministry of Communications. .	Second Class or Grade 'C' Master's Degree in Computer Sciences. OR Second Class or Grade 'C' Bachelor's degree in Computer Engineering	Objective Type Test (MCQ) <b>Part-I</b> English = 20 marks <b>Part-II</b> Professional Test = 80 marks	<b>Part-I</b> Vocabulary, Grammar usage, Sentence Structuring. <b>Part-II</b> <ul style="list-style-type: none"> <li>• Programming in PHP, Ajax and Java Script</li> <li>• Designing, Analyzing &amp; Maintenance of Software</li> <li>• Coding, Debugging, Testing and Documenting of Application Programme</li> <li>• Installation and Testing Software Package</li> <li>• Software Development Process,</li> <li>• Software Architecture,</li> <li>• Software Maintenance &amp; Optimization</li> </ul>

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications for Posts	Test Specification	Topics of Syllabi
12.	14/2019	<b>Accounts Officer</b> (BS-17), National Highways & Motorway Police, Ministry of Communications.	i. Second Class or Grade 'C' Bachelor's degree. ii. Qualified as SAS/ AAT (PIPFA)/ Professional Examination of Institute of Cost and Management Accountants of Pakistan (ICMAP)/ Foundation Examination of Institute of Chartered Accountants of Pakistan. <b>OR</b> Second Class or Grade 'C' Master's degree in Commerce/ Business Administration with Accounting as one of the subjects.	Objective Type Test (MCQ) <b>Part-I</b> English =20 marks <b>Part-II</b> Professional Test =80 marks	<b>Part-I</b> Vocabulary, Grammar Usage, Sentence Structuring <b>Part-II</b> <ul style="list-style-type: none"> <li>• Accounting Principles &amp; Procedures,</li> <li>• Scrutiny of Records for Audit Purposes</li> <li>• Journal, Ledger &amp; Cash Book,</li> <li>• Preparation of Annual Budget,</li> <li>• Financial Planning and Cost Accounting</li> <li>• Heads of Accounts, Re-appropriation of Funds and Supplementary Grants</li> <li>• Settlement of Audit Objections.</li> <li>• Public Procurement Rules, 2004</li> <li>• Basic IT Knowledge</li> </ul>
13.	15/2019	<b>Inspector Customs/ Intelligence Officer</b> (BS-16), Revenue Division, Federal Board of Revenue.	i. Second Class or Grade 'C' Bachelor's Degree from a recognized university with Economics, Commerce, Statistics, Accounting, Computer Science, Law, Pharmacy, Chemistry or Physics as one of the subjects or B.Sc Engineering in any specialty. ii. Computer literacy up to the level of MS Word, MS Power Point and MS Excel.	Objective Type Test (MCQ) <b>Part-I</b> English = 20 marks <b>Part-II</b> General Intelligence=80 marks	<b>Part-I</b> Grammar Usage, Sentence Structuring <b>Part-II</b> <ul style="list-style-type: none"> <li>• Basic Arithmetic.</li> <li>• Current Affairs.</li> <li>• Pakistan Affairs &amp; Islamic Studies</li> <li>• Everyday/General Science</li> <li>• Basic Computer Operation in MS Office</li> </ul> <b>Note : (Equal weightage for each topic at Part-II)</b>
14.	16/2019	<b>Appraising/ Valuation Officer</b> (BS-16), Revenue Division, Federal Board of Revenue.	i. Second Class or Grade 'C' Master's Degree in Social Work/ Sociology/ Anthropology. ii. Two (2) years post qualification experience in Social/Welfare Works.	Objective Type Test (MCQ) <b>Part-I</b> English = 20 marks <b>Part-II</b> Professional Test=80 marks	<b>Part-I</b> Vocabulary, Grammar Usage, Sentence Structuring. <b>Part-II</b> <ul style="list-style-type: none"> <li>• Community Organization and Development,</li> <li>• Social Research &amp; Statistics,</li> <li>• Organizational Behaviour and Human Resources,</li> <li>• Social Welfare Policy and Administration,</li> <li>• Criminology and its Remedial Measures,</li> <li>• Methods of Counselling &amp; Guidance Services</li> <li>• Environmental Sociology</li> <li>• Health Policy of the Government</li> </ul>

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications for Posts	Test Specification	Topics of Syllabi
16.	19/2019	<b>Lecturer/ Instructor (Computer Science)</b> (BS-17), Military College Jhelum, Ministry of Defence	Second Class or Grade 'C' Master's degree in the relevant subject from a university recognized by HEC.	Objective Type Test (MCQ) <b>Part-I</b> English = 20 marks <b>Part-II</b> Subject Test = 50 marks <b>Part-III</b> Professional Test = 30 marks	<b>Part-I</b> Vocabulary, Grammar Usage, Sentence Structuring <b>Part-II (Masters Level)</b> <ul style="list-style-type: none"> <li>• Computer Hardware/Software,</li> <li>• Data Communication &amp; Networking,</li> <li>• C/C++ Language,</li> <li>• Visual Basic,</li> <li>• Operating System Unix/Linux</li> <li>• Windows 7, 8, 8.1,</li> <li>• Oracle/PLSQL,</li> <li>• System Analysis &amp; Design.</li> <li>• Web Programming,</li> </ul> <b>Part-III</b> <ul style="list-style-type: none"> <li>• Teaching Techniques and Methodology,</li> <li>• Classroom Management and Discipline,</li> <li>• Testing and Evaluation,</li> <li>• Development of Education in Pakistan</li> </ul>
17.	21/2019	<b>Agriculture Officer</b> (BS-17 Plus 25% Special Pay), Agriculture Department, Gilgit Baltistan, Ministry of Kashmir Affairs and Gilgit Baltistan.	Second Class or Grade 'C', M.Sc. Agriculture OR Second Class or Grade 'C', B.Sc (Hons) Agriculture (4 years Course after F.Sc).	Objective Type Test (MCQ) <b>Part-I</b> English =20 marks <b>Part-II</b> Professional Test=80 marks	<b>Part-I</b> Vocabulary, Grammar Usage, Sentence Structuring <b>Part-II</b> <ul style="list-style-type: none"> <li>• Introduction to Agriculture</li> <li>• Agricultural Survey</li> <li>• Plant Pathology</li> <li>• Agricultural Planning</li> <li>• Agriculture Machinery</li> <li>• Agricultural Policy &amp; Development</li> <li>• Agricultural Statistics about Pakistan</li> <li>• Issues and Challenges confronting Pakistan in the Agricultural Field</li> <li>• Techniques and Process of Research in Agriculture</li> </ul>
18.	22/2019	<b>Assistant Private Secretary</b> (BS-16), Ministry of National Health Services, Regulations & Coordination	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. <b>Note:</b> Computer literacy means proficiency in M.S Office (M.S Word, Power Point & Excel).	<ul style="list-style-type: none"> <li>• Typing Test with minimum Speed of 50 W.P.M</li> <li>• Shorthand Test with minimum Speed of 100 W.P.M</li> <li>• Computer Literacy Test: <ul style="list-style-type: none"> <li>i Microsoft Word (Typing, Formatting)</li> <li>ii Microsoft Excel (Typing, Graph, Calculations)</li> <li>iii Microsoft Power Point (Typing, Formatting, Inserting Objects)</li> </ul> </li> </ul>	<b>35 Marks</b> <b>35 Marks</b> <b>10 Marks</b> <b>10 Marks</b> <b>10 Marks</b>

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications for Posts	Test Specification	Topics of Syllabi
19.	24/2019	<b>Assistant Secretary</b> (BS-16), Military Finance Wing, Finance Division	<p>i. Second Class or Grade 'C' Bachelor's degree from a University recognized by HEC.</p> <p>ii. Minimum shorthand speed: 100 w.p.m. and typing speed: 50 w.p.m.</p> <p>iii. Must be computer literate.</p> <p><b>Note:</b> Computer literacy means proficiency in M.S Office (M.S Word, Power Point &amp; Excel).</p>	<ul style="list-style-type: none"> <li>• Typing Test with minimum Speed of 50 W.P.M</li> <li>• Shorthand Test with minimum Speed of 100 W.P.M</li> <li>• Computer Literacy Test: <ul style="list-style-type: none"> <li>i Microsoft Word (Typing, Formatting)</li> <li>ii Microsoft Excel (Typing, Graph, Calculations)</li> <li>iii Microsoft Power Point (Typing, Formatting, Inserting Objects)</li> </ul> </li> </ul>	<p><b>35 Marks</b></p> <p><b>35 Marks</b></p> <p><b>10 Marks</b></p> <p><b>10 Marks</b></p> <p><b>10 Marks</b></p>
20.	25/2019	<b>Patrol Officer</b> (BS-14), National Highways & Motorway Police, Ministry of Communications.	<p>i Second Class or Grade 'C' Bachelor's Degree</p> <p>ii <u>Minimum Height:</u>  a) <u>For Male</u> 5'-8"  b) <u>For Female</u> 5'-4"  (For candidates of Balochistan height is relaxable by 2" for male and by 1" for female)</p> <p>iii <u>Minimum Chest Measurement:</u> 33"-35"  (Relaxable by 1")</p> <p>iv Car and Motorcycle driving proficiency required.</p>	Objective Type Test(MCQ )  <b>Part-I</b>  English =20 Marks  <b>Part-II :</b>  General Intelligence Test = 80 Marks	<b>Part-I</b> Grammar Usage, Sentence Structuring <b>Part-II</b>  <ul style="list-style-type: none"> <li>• Basic Arithmetic.</li> <li>• Current Affairs.</li> <li>• Pakistan Affairs &amp; Islamic Studies</li> <li>• Everyday/General Science</li> </ul> <b>Note : (Equal weightage for each topic at Part-II)</b>
21.	26/2019	<b>Patrol Officer</b> (BS-14) (For departmental employees of NH & MP), National Highways & Motorway Police, Ministry of Communications.	<p>ii <u>Minimum Chest Measurement:</u> 33"-35"  (Relaxable by 1")</p> <p>iv Car and Motorcycle driving proficiency required.</p>		
22.	31/2019	<b>Research Officer</b> (BS-17), Policy Wing, Ministry of Petroleum and Natural Resources.	Second Class or Grade 'C' Master's degree in Economics/ Commerce/ Statistics/ Business Administration/ Public Administration.	Objective Type Test (MCQ)  <b>Part-I</b>  English =20 marks  <b>Part-II</b>  Professional Test=80 marks	<b>Part-I</b> Vocabulary, Grammar Usage, Sentence Structuring <b>Part-II</b> <ul style="list-style-type: none"> <li>• Accounting Principles &amp; Procedures,</li> <li>• Management, Planning, Goal Setting &amp; decision Making,</li> <li>• Role of HRM in Organizational Performance,</li> <li>• Issue &amp; Challenges of Public Administration in Pakistan</li> </ul>

**Scheme and Syllabus for Written Examination (Descriptive)  
for all Posts in BS-20 & BS-21 advertised under Consolidated  
Advertisement No. 01/2019**

Case No.	F.4-23/2019-R
Particulars of post	<b>Inspector General (Forests) (BS-21), Ministry of Climate Change</b>
Minimum Qualification & Experience:	i) Second Class or Grade 'C' B.Sc. (Hons) Forestry/M.Sc. Forestry ii) Twenty-two years post qualification experience in the field of Forestry and Wildlife.

**PAPER: ENGLISH (100 MARKS)**

**English Essay:** Candidates will be required to write an Essay in English from three topics comprising approximately **2000 words**. Candidates are expected to reflect comprehensive and research based knowledge on a selected topic. Candidate's articulation, expression and technical treatment of the style of English Essay writing will be examined.

**OR**

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



## Schemes and Syllabi for Written Examination (Descriptive) for All Posts in BS-18 & BS-19 included in Consolidated Advertisement No. 01/2019

### 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.4-17/2019-R
Particulars of post	<b>Deputy Armament Supply Officer (BS-18)</b> , Pakistan Navy, Ministry of Defence.
Minimum Qualification & Experience:	i. Second Class or Grade 'C' Master's Degree in Chemistry/ Physics. ii. Five (5) years post qualification experience in Explosives/ Dangerous Cargoes/ Petroleum/ Oils/ Lubricants

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

- I. Atomic structure.—Quantum theory, Schrodinger equation, Particle in box, hydrogen atom. Hydrogen moleculeion, hydrogen molecule. Theories of hydrogen and metallic bonding.
- II. Electrochemistry.—Ionic equilibria, theory of strong electrolytes; ebye-Huckel theory of activity coefficients, galvanic cells, membrane equilibria and fuel cells. Theories of Acids and Bases, glass electrode, measurement of pH. Electrolysis, overvoltage and corrosion.
- III. Thermodynamics.—First law of thermodynamics, internal energy, enthalpy functions. Thermochemistry, Entropy and second law of Thermodynamics, Free energy and chemical equilibrium.
- IV. Chemistry of Following Elements.—Oxygen, Carbon, Chlorine, Silicon, Nitrogen, Phosphorus.
- V. Inorganic Chemical Industries.—Sulphuric Acid, Fixation of Nitrogen, Chemical Fertilizers, Semi-conductivity devices. Cement, Glass and Ceramics.
- VI. Industrial Organic Chemistry.—Organic Polymers. Fermentation processes including preparation of Anti-Biotics. Petro-Chemical Industry.

**Part-II: (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; Dynamics of rigid body; spin and precession; gyroscope; 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. **Fluid Mechanics**
  - Surface tension; Viscosity; Elasticity; fluid motion and Bernoulli's theorem.
- III. **Heat and Thermodynamics**
  - Perfect gas and Vander Waals equation; Three Laws of Thermodynamics, internal energy, temperature, entropy. Thermal properties of Simple system production and measurement of low temperatures; kinetic theory of gases; Maxwellian distribution of molecular velocities; Brownian motion;

Transport phenomena. Classical Maxwell-Boltzmann Statistics and its application; Quantum Bose—Einstein and Fermi—Dirac Statistics.

#### IV. Electricity and Magnetism

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

#### V. 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.

#### VI. Nuclear Physics

- Structure of Nuclei; Radioactivity,  $\alpha$ ,  $\beta$  and  $\gamma$  decay. Methods of detection, Mass Spectrometer. Accelerators. Phenomenon of fission; reactor and nuclear power, nuclear fusion and its application, Elementary particles and their properties.

### SUGGESTED READINGS

S. No.	Title	Author
1.	Advanced Inorganic Chemistry 3 <sup>rd</sup> Ed.	Cotton. F.A. and Wilkinson Groffrey
2.	Inorganic Chemistry, 3 <sup>rd</sup> Ed. 1983	Hukeavy, James E.
3.	Physical Chemistry 5 <sup>th</sup> Ed.	Moore, Walter J.
4.	Mechanism & Structure in Organic Chemistry	Gould, Edwards
5.	Organic Chemistry 2 <sup>nd</sup> Ed.	Morrison, Robert Thornton & Boyd R.N.
6.	Perspectives of Modern Physics.	A. Beiser.
7.	Fundamentals of Physics.	Halliday & Resnick
8.	Introduction to Electromagnetic Fields and Waves.	D. Corson & P. Lorrain.
9.	Heat and Thermodynamics.	D. Zemansky
10.	Introduction to Quantum Mechanics	D. Griffiths
11.	Modern Physics	Serway, Moses, Moyer.
12.	Solid State Physics	C. Kittel