**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. 04/2019**

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<th>S. No</th>
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<th>Qualifications/Experience for the Posts</th>
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<th>Topics of Syllabi</th>
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</thead>
</table>
| 1.    | 78/2019       | **Officer IT Expert-III (BS-17), Ministry of Defence.** | Second Class or Grade ‘C’ Master’s degree in Computer Science / Information Technology or equivalent qualification from a University recognized by HEC.  
**OR**  
Second Class or Grade ‘C’ Bachelor’s degree (4 years duration) in Computer Science/ Software Engineering/ Information Technology or equivalent qualification from a University recognized by HEC. | **Objective Type Test (MCQ)**  
**Part-I**  
English = 20 marks  
**Part-II**  
Professional Test=80 marks | **Part-I**  
Vocabulary, Grammar Usage, Sentence Structuring.  
**Part-II**  
- Open Source Interconnect (OSI) Model and Network Security  
- Advanced Analysis of malware using static and dynamic techniques  
- Types of malware.  
- Server side web applications attacks.  
- Cross-site scripting,  
- SQL Injection,  
- Cross-site request forgery,  
- Network protocols and service models.  
- Transport layer security, Network layer security,  
- Wireless security,  
- Embedded System Software  
- Cryptographic algorithms and design principles, including conventional and symmetric encryption  
- Data Acquisition Techniques from Smartphones or likewise devices.  
- Best practices of client side technologies like HTML, CSS, JavaScript & JQuery etc.  
- Cloud Networks and Iot Vulnerabilities & Security |
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</thead>
</table>
| 2.    | 79/2019  | **Assistant Director Legal** (BS-17), Directorate of Legal Affairs of Pakistan Railway (Railway Board), Ministry of Railways | i. LL.M. degree or Barrister-at-Law from a University/Institute recognized by HEC.  
ii. Computer Literate in Microsoft Word, Excel and Spreadsheet.  
**OR**  
i. Second Class or Grade ‘C’ LL.B. degree from a University/Institute recognized by HEC.  
ii. Two (2) years post qualification experience in legal matters.  
iii. Computer Literate in Microsoft Word, Excel and Spreadsheet. | Objective Type Test (MCQ)  
**Part-I**  
English = 20 marks  
**Part-II**  
Professional Test=80 marks | Part-I  
Vocabulary, Grammar Usage, Sentence Structuring.  
**Part-II**  
- Core courses of LL.B. Programme  
- Steps involved in Processing of Legal Cases  
- Basic Knowledge of Microsoft Office |
| 3.    | 85/2019  | **Data Processing Assistant** (BS-16), Federal Public Service Commission. | Second Class or Grade ‘C’ Bachelor’s degree in Computer Science/IT or equivalent.  
**OR**  
Second Class or Grade ‘C’ Bachelor’s degree with Mathematics/Statistics/Physics/Economics and one year diploma in Computer from the recognized Institution.  
**Note:** A competency test in IT/Computer shall be conducted as prescribed by the Commission. | Objective Type Test (MCQ)  
**Part-I**  
English = 20 marks  
**Part-II**  
Professional Test=80 marks | Part-I  
Grammar Usage, Sentence Structuring  
**Part-II**  
- Arithmetic Logical Unit, Memory (RAM, ROM) Types of RAM, Ports, etc.  
- Input and Output Devices,  
- Use of Microsoft Office  
- Application and System Software,  
- Electronic Data Processing  
- Management Information System  
- Storage and Multimedia,  
- Network & Security Issues,
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| 4.    | 86/2019  | **Assistant Executive Engineer (Civil)** (BS-17), Pak. PWD, Ministry of Housing & Works. | Bachelor’s Degree in Civil Engineering from a recognized University. | Objective Type Test (MCQ)  
Part-I  
English = 20 marks  
Part-II  
Professional Test=80 marks |  
**Part-I**  
Vocabulary, Grammar Usage, Sentence Structuring  
**Part-II**  
- Building material & Building Construction,  
- Surveying & Levelling,  
- Hydraulic & Hydrology,  
- Soil Mechanics & Foundation,  
- Concrete Technology & R.C.C Structure Design,  
- Steel Structure & Highway,  
- Construction Management,  
- Structural Design Applications,  
- Sewerage and Sewage Treatment,  
- Engineering Materials,  
- Reinforced Concrete,  
- Ground improvement,  
- Earth and Rock Structure |
| 5.    | 87/2019  | **Assistant Executive Engineer (E/M)** (BS-17), PAK. PWD, Ministry of Housing and Works. | Bachelor’s Degree in Engineering in Electrical/Mechanical from a recognized University. | Objective Type Test (MCQ)  
Part-I  
English = 20 marks  
Part-II  
Professional Test=80 marks |  
**Part-I**  
Vocabulary, Grammar Usage, Sentence Structuring,  
**Part-II**  
For candidates with **Electrical Engineering** degree  
- Electric Circuits,  
- Semiconductor Devices,  
- Electrical Instrumentation,  
- Power Transmission,  
- Power System Operation and Control,  
- Power System Protection,  
- High Voltage Engineering,  
- Electrostatics,  
- Electronic System Design,  
For candidates with **Mechanical Engineering** degree  
- Heat Transfer,  
- Thermodynamics,  
- Industrial Materials,  
- Machine Design and Drawing,  
- Mechanics of Machines,  
- Production Management & Quality control,  
- Workshop Technology,  
- Hydraulic Machines. |
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<td>6.</td>
<td>88/2019</td>
<td>Research Officer (BS-17), Manpower Section, Planning and Development Division.</td>
<td>Second Class or Grade ‘C’ Master’s Degree or equivalent qualifications in Economics/ Sociology/ Social work/ Business Administration or Public Administration.</td>
<td>Objective Type Test (MCQ) &lt;br&gt; <strong>Part-I</strong>&lt;br&gt; English = 20 marks &lt;br&gt; <strong>Part-II</strong>&lt;br&gt; Professional Test=80 marks</td>
<td>Part-I &lt;br&gt; Vocabulary, Grammar Usage, Sentence Structuring &lt;br&gt; Part-II &lt;br&gt; - Research Methodology, &lt;br&gt; - Project Management, &lt;br&gt; - Project Evaluation, &lt;br&gt; - Economic Development of Pakistan, &lt;br&gt; - Organization of Economic Research, &lt;br&gt; - Collection and Compilation of Data, &lt;br&gt; - Methods of Data Analysis, &lt;br&gt; - Report Writing and Presentation Skill.</td>
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<td>7.</td>
<td>97/2019</td>
<td>Assistant Private Secretary (BS-16), National Industrial Relations Commission (NIRC), Ministry of Overseas Pakistanis &amp; Human Resource Development</td>
<td>i. Second Class or Grade ‘C’ Bachelor’s degree from a University recognized by HEC. &lt;br&gt; ii. Minimum shorthand speed: 100 w.p.m. and typing speed: 50 w.p.m. &lt;br&gt; iii. Must be computer literate. <strong>Note:</strong> Computer literacy means proficiency in M.S Office (M.S Word, Power Point &amp; Excel).</td>
<td>- Typing Test with minimum Speed of 50 W.P.M &lt;br&gt; - Shorthand Test with minimum Speed of 100 W.P.M &lt;br&gt; - Computer Literacy Test: &lt;br&gt;   i. Microsoft Word (Typing, Formatting) &lt;br&gt;   ii. Microsoft Excel (Typing, Graph, Calculations) &lt;br&gt;   iii. Microsoft Power Point (Typing, Formatting, Inserting Objects)</td>
<td>- 35 Marks &lt;br&gt; - 35 Marks &lt;br&gt; - 10 Marks &lt;br&gt; - 10 Marks &lt;br&gt; - 10 Marks</td>
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<td>8.</td>
<td>98/2019</td>
<td>Hospital Dietitian (BS-17 Plus 25% Special Pay), Health Department, Gilgit Baltistan, Ministry of Kashmir Affairs and Gilgit Baltistan.</td>
<td>i. Second Class or Grade ‘C’ M.Sc. in Human Nutrition or equivalent from a University recognized by the HEC. &lt;br&gt; ii. Two (2) years post qualification experience in the relevant field.</td>
<td>Objective Type Test (MCQ) &lt;br&gt; <strong>Part-I</strong>&lt;br&gt; English = 20 marks &lt;br&gt; <strong>Part-II</strong>&lt;br&gt; Professional Test=80 marks</td>
<td>Part-I &lt;br&gt; Vocabulary, Grammar Usage, Sentence Structuring. &lt;br&gt; Part-II &lt;br&gt; - Fundamentals of Food &amp; Nutrition &lt;br&gt; - Principles of Diet Therapy. &lt;br&gt; - Planning &amp; Preparation of Balanced Diet. &lt;br&gt; - Physiological aspect of Nutrition &lt;br&gt; - Food Microbiology &lt;br&gt; - Energy Value of Foods &lt;br&gt; - Sanitation and Hygiene &lt;br&gt; - Regulation of food intake, &lt;br&gt; - Nutritional requirements &lt;br&gt; - Nutrition Health &amp; Prevention</td>
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| 9.    | 101/2019 | **Assistant Director** (BS-17), Prime Minister’s Inspection Commission, Prime Minister’s Office. | i. Second Class or Grade ‘C’ Master’s Degree in Business Administration/ Public Administration/ Economics/ H.R/ Commerce from a University recognized by the Higher Education Commission.  
ii. Two years post qualification experience in the field of Administration/ Accounts. | Objective Type Test (MCQ)  
**Part-I**  
English =20 marks  
**Part-II**  
Professional Test=80 marks | Part-I  
Vocabulary, Grammar Usage, Sentence Structuring.  
Part-II  
- Public Administration,  
- Administrative Responsibility,  
- Accountability & Reforms,  
- Annual Budget Statement,  
- Decision Making in Public Organizations,  
- Performance Management in Public Organization in Pakistan,  
- Structure of Federal and Provincial Governments in Pakistan,  
- Salient features of economy of Pakistan, |
| 10.   | 102/2019 | **Database Manager/ IT Professional** (BS-17), S.E.C. Division, Ministry of Foreign Affairs | Second Class or Grade ‘C’ Bachelor’s degree (4 years duration) in Computer Engineering/Computer Science/ Software Engineering/ Information Technology or equivalent qualification from a University recognized by HEC. | Objective Type Test (MCQ)  
**Part-I**  
English =20 marks  
**Part-II**  
Professional Test=80 marks | Part-I  
Vocabulary, Grammar Usage, Sentence Structuring.  
Part-II  
- Electronic Data Processing  
- Management Information System  
- Networking Fundamentals  
- Data Communication  
- Database Management Techniques  
- Operating System  
- Introductory Hardware & Software Concepts  
- Introductory Programming Concepts |
| 11.   | 103/2019 | **Law Officer** (BS-16), (Railway Board), Ministry of Railways | i. Second Class or Grade ‘C’ LL.B. degree from a University/ Institute recognized by HEC.  
ii. Computer Literate in Microsoft Word, Excel and Spreadsheet. | Objective Type Test (MCQ)  
**Part-I**  
English =20 marks  
**Part-II**  
Professional Test=80 marks | Part-I  
Grammar Usage, Sentence Structuring.  
Part-II  
- Core courses of LL.B. Programme  
- Steps involved in Processing of Legal Cases  
- Basic Knowledge of Microsoft Office. |
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<td>12.</td>
<td>104/2019</td>
<td>General Staff Officer-III (IT Expert) (BS-17), Ministry of Defence.</td>
<td>Second Class or Grade ‘C’ Master’s degree in Computer Science/ Information Technology or equivalent qualification from a University recognized by HEC. OR Second Class or Grade ‘C’ Bachelor’s degree (4 years duration) in Computer Science/ Software Engineering/ Information Technology or equivalent qualification from a University recognized by HEC.</td>
<td>Objective Type Test (MCQ) <strong>Part-I</strong> English = 20 marks <strong>Part-II</strong> Professional Test=80 marks</td>
<td>Part-I Vocabulary, Grammar Usage, Sentence Structuring. Part-II • Open Source Interconnect (OSI) Model and Network Security • Advanced Analysis of malware using static and dynamic techniques • Types of malware. • Server side web applications attacks. • Cross-site scripting, • SQL Injection, • Cross-site request forgery, • Network protocols and service models. • Transport layer security, Network layer security, • Wireless security, • Embedded System Software • Cryptographic algorithms and design principles, including conventional and symmetric encryption • Data Acquisition Techniques from Smartphones or likewise devices. • Best practices of client side technologies like HTML, CSS, JavaScript &amp; JQuery etc. • Cloud Networks and lot Vulnerabilities &amp; Security</td>
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<td>13.</td>
<td>105/2019</td>
<td>Librarian (Female) (BS-16), Federal Government Educational Institutions (Cantts/Garrisons) Directorate, Ministry of Defence</td>
<td>Second Class or Grade ‘C’ Bachelor’s Degree with Diploma in Library Science. OR Bachelor of Library Science.</td>
<td>Objective Type Test (MCQ) <strong>Part-I</strong> English =20 marks <strong>Part-II</strong> Professional Test=80 marks</td>
<td>Part-I Grammar usage, Sentence Structure. Part-II • Introduction to Library &amp; Information Science • Information Sources and Services • Classification: Theory and Practice • Cataloguing: Theory and Practice • Management of libraries &amp; Information Centres • Research Methods &amp; Techniques for Librarians • Public Records, Rare Material &amp; their Conservation • Management of Serials Publications • Rules &amp; Procedure of Write off the Library Losses</td>
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<td>14.</td>
<td>106/2019</td>
<td><strong>Assistant Anesthetist (BS-17), Federal General Hospital, Chak Shahzad Islamabad, Ministry of National Health Services, Regulations &amp; Coordination</strong>&lt;br&gt;<strong>Test Specification</strong>&lt;br&gt;Objective Type Test (MCQ)&lt;br&gt;Part-I&lt;br&gt;English = 20 marks&lt;br&gt;Part-II&lt;br&gt;Professional Test = 80 marks</td>
<td>MBBS or equivalent qualification recognized by PMDC.</td>
<td>Part-I&lt;br&gt;Vocabulary, Grammar Usage, Sentence Structuring&lt;br&gt;Part-II&lt;br&gt;Core courses of <strong>MBBS</strong> Degree Program.&lt;br&gt;Health Policies of the Government of Pakistan.&lt;br&gt;Care vs Cure for Health Management.&lt;br&gt;Major Challenges being faced by the Health Sector.</td>
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<td>15.</td>
<td>107/2019</td>
<td><strong>Assistant Private Secretary (BS-16), Naval Headquarters, Ministry of Defence</strong>&lt;br&gt;i. Second Class or Grade ‘C’ Bachelor’s degree from a University recognized by HEC.&lt;br&gt;ii. Minimum shorthand speed: 100 w.p.m. and typing speed: 50 w.p.m.&lt;br&gt;iii. Must be computer literate.&lt;br&gt;Note: Computer literacy means proficiency in M.S Office (M.S Word, Power Point &amp; Excel).</td>
<td>• Typing Test with minimum Speed of 50 W.P.M 35 Marks&lt;br&gt;• Shorthand Test with minimum Speed of 100 W.P.M 35 Marks&lt;br&gt;• Computer Literacy Test: i. Microsoft Word (Typing, Formatting) 10 Marks&lt;br&gt;ii. Microsoft Excel (Typing, Graph, Calculations) 10 Marks&lt;br&gt;iii. Microsoft Power Point (Typing, Formatting, Inserting Objects) 10 Marks</td>
<td>• Core courses of <strong>MBBS</strong> Degree Program.&lt;br&gt;• Health Policies of the Government of Pakistan.&lt;br&gt;• Care vs Cure for Health Management.&lt;br&gt;• Major Challenges being faced by the Health Sector.</td>
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<td>16.</td>
<td>108/2019</td>
<td><strong>General Staff Officer-III (Tech Expert) (BS-17), Ministry of Defence.</strong>&lt;br&gt;Second Class or Grade ‘C’ Master’s degree in Computer Science/ Information Technology or equivalent qualification from a University recognized by HEC.&lt;br&gt;<strong>OR</strong>&lt;br&gt;Second Class or Grade ‘C’ Bachelor’s degree (4 years duration) in Computer Science/ Software Engineering/ Information Technology or equivalent qualification from a University recognized by HEC.</td>
<td>Objective Type Test (MCQ)&lt;br&gt;Part-I&lt;br&gt;English = 20 marks&lt;br&gt;Part-II&lt;br&gt;Professional Test = 80 marks</td>
<td>Part-I&lt;br&gt;Vocabulary, Grammar Usage, Sentence Structuring.&lt;br&gt;Part-II&lt;br&gt;• Open Source Interconnect (OSI) Model and Network Security&lt;br&gt;• Advanced Analysis of malware using static and dynamic techniques&lt;br&gt;• Types of malware.&lt;br&gt;• Server side web applications attacks.&lt;br&gt;• Cross-site scripting,&lt;br&gt;• SQL Injection,&lt;br&gt;• Cross-site request forgery,&lt;br&gt;• Network protocols and service models.&lt;br&gt;• Transport layer security, Network layer security,&lt;br&gt;• Wireless security,&lt;br&gt;• Embedded System Software&lt;br&gt;• Cryptographic algorithms and design principles, including conventional and symmetric encryption&lt;br&gt;• Data Acquisition Techniques from Smartphones or likewise devices.&lt;br&gt;• Best practices of client side technologies like HTML, CSS, JavaScript &amp; jQuery etc.&lt;br&gt;• Cloud Networks and IoT Vulnerabilities &amp; Security</td>
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<td>17.</td>
<td>116/2019</td>
<td>Assistant Architect (BS-17), PAK, PWD, Ministry of Housing and Works</td>
<td>Bachelor's Degree in Architecture or equivalent OR Associate of the Royal Institute of British Architects OR Member of a recognized Institute of Architects</td>
<td>Objective Type Test (MCQ) <strong>Part-I</strong> English = 20 marks <strong>Part-II</strong> Professional Test=80 marks</td>
<td><strong>Part-I</strong> Vocabulary, Grammar Usage, Sentence Structuring <strong>Part-II</strong> - Theory of Architecture - Architectural Design - Materials &amp; Construction - Structure for Architects - Urban Design and Planning - Landscape Architecture - Computer Applications in Architecture</td>
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<td>18.</td>
<td>119/2019</td>
<td>Assistant Private Secretary (BS-16), Directorate of Federal Government Educational Institutions (Cantts/Garrisons), Ministry of Defence</td>
<td>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. <strong>Note:</strong> Computer literacy means proficiency in M.S Office (M.S Word, Power Point &amp; Excel).</td>
<td><strong>Part-I</strong> Typing Test with minimum Speed of 50 W.P.M 35 Marks <strong>Part-II</strong> Shorthand Test with minimum Speed of 100 W.P.M 35 Marks <strong>Computer Literacy Test:</strong> i. Microsoft Word (Typing, Formatting) 10 Marks ii. Microsoft Excel (Typing, Graph, Calculations) 10 Marks iii. Microsoft Power Point (Typing, Formatting, Inserting Objects) 10 Marks</td>
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<td>19.</td>
<td>121/2019</td>
<td>Technical Expert (BS-17), Ministry of Defence. <strong>Category-A:</strong> For Technical Expert (BS-17) (Electrical/Mechanical/Electronics) <strong>Category-B:</strong> For Technical Expert (BS-17) (Computer Science/Information Technology)</td>
<td>Category-A: Bachelor’s of Engineering in the relevant subject or equivalent qualification from a University recognized by HEC. <strong>Category-B:</strong> Second Class or Grade ‘C’ Master’s degree in Computer Science/Information Technology or equivalent qualification from a University recognized by HEC. OR Second Class or Grade ‘C’ Bachelor’s Degree (4 years duration) in Computer Science/Software Engineering/Information Technology or equivalent qualification from a University recognized by HEC.</td>
<td>Objective Type Test (MCQ) <strong>Part-I</strong> English = 20 marks <strong>Part-II</strong> Professional Test=80 marks <strong>For Cat-A</strong> <strong>Part-I</strong> Vocabulary, Grammar Usage, Sentence Structuring. <strong>Part-II</strong> <strong>For Electrical Engineer</strong> - Electric Circuits - Semiconductor Devices - Electrical Instrumentation - Power Transmission - Power System Operation and Control - Power System Protection - High Voltage Engineering - Electrostatics &amp; Electronic System Design - DC Motors &amp; Generators - Transmission Lines &amp; Antennas - Basic IT/Computer Knowledge - DC Generators and Batteries - Power Factor and Power Factor Improvement</td>
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<td>AC Fundamentals</td>
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<td>AC Motors and AC Generators</td>
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<td>Power System Analysis</td>
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<td>Heating Ventilation and AC Equipment</td>
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<td>Project Management</td>
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<td>Alternative Energy Sources</td>
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**For Electronics Engineer**

- Power Electronics.
- Digital Electronics.
- Operational Amplifiers.
- Electronic Instrumentations.
- Logic Design & Switching Theory.
- Circuit Theory, Electric Current and Ohm’s law
- Batteries
- Electrostatics
- Magnetic Circuits
- Electrical Engineering Materials
- Instruments and Measurements
- DC Generators.
- Transformers.
- Transmission and Distribution Cables.
- High Voltage Engineering
- Rectifiers and Converters.

**For Mechanical Engineer**

- Heat Transfer
- Thermodynamics
- Industrial Materials
- Machine Design and Drawing
- Mechanics of Machines
- Production Management & Quality Control
- Workshop Technology
- Hydraulic Machines
- Basic IT/Computer Knowledge
- Heating Ventilation and AC Equipment (in depth knowledge)
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<td>20.</td>
<td>122/2019</td>
<td>Preventive Officer (BS-16), Federal Board of Revenue, Revenue Division.</td>
<td>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.</td>
<td>Objective Type Test (MCQ) <strong>Part-I</strong> English = 20 marks  <strong>Part-II</strong> General Intelligence Test = 80 marks</td>
<td><strong>For Cat-B</strong> <strong>Part-I</strong> Vocabulary, Grammar Usage, Sentence Structuring.  <strong>Part-II</strong> • Information security terminology • Open Source Interconnect (OSI) Model and Network Security • Advanced Analysis of malware using static and dynamic techniques • Server side web applications attacks. • Cross-site scripting, • SQL Injection, • Cross-site request forgery, • Network protocols and service models. • Transport layer security, Network layer security, • Wireless security, • Embedded System Software • Cryptographic algorithms and design principles, including conventional and symmetric encryption • Data Acquisition Techniques from Smartphones or likewise devices.</td>
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| 21.   | 123/2019 | **Assistant Secretary** (BS-16), Ministry of States & Frontier Regions | 1. Second Class or Grade ‘C’ Bachelor’s degree from a University recognized by HEC.  
2. Minimum shorthand speed: 100 w.p.m. and typing speed: 50 w.p.m.  
3. Must be computer literate.  
**Note:** Computer literacy means proficiency in M.S Office (M.S Word, Power Point & Excel). | - Typing Test with minimum Speed of 50 W.P.M  
- Shorthand Test with minimum Speed of 100 W.P.M  
- Computer Literacy Test:  
  i. Microsoft Word (Typing, Formatting)  
  ii. Microsoft Excel (Typing, Graph, Calculations)  
  iii. Microsoft Power Point (Typing, Formatting, Inserting Objects) | 35 Marks  
35 Marks  
10 Marks  
10 Marks |
| 22.   | 125/2019 | **Medical Officer** (BS-17), Ministry of Defence. | 1. MBBS Degree or equivalent qualification from a University recognized by PM&DC.  
2. Registered Medical practitioner with PM&DC.  
OR  
Retired Medical Officer of Pakistan Armed Forces. | Objective Type Test (MCQ)  
**Part-I**  
English = 20 marks  
**Part-II**  
Professional Test=80 marks | **Part-I**  
Vocabulary, Grammar Usage, Sentence Structuring.  
**Part-II**  
- Core courses of MBBS Degree Program.  
- Care vs Cure for Health Management.  
- Major Challenges being faced by the Health Sector. |
Scheme and Syllabus for Written Examination (Descriptive)
for all Posts in BS-20 advertised under Consolidated
Advertisement No. 04/2019

<table>
<thead>
<tr>
<th>Case No.</th>
<th>F.4-81/2019-R</th>
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<tbody>
<tr>
<td>Particulars of post</td>
<td>Chief (IT) (BS-20), Federal Public Service Commission.</td>
</tr>
</tbody>
</table>

Minimum Qualification & Experience:

i. Second Class or Grade C Master Degree in Computer Science/ BCS (4 years)/ IT/ Electronics or equivalent. OR B.Sc. in Computer Engineering (software). OR Second Class or Grade C Master Degree in Mathematics/ Statistics/ Physics/ Economics and one year diploma in Computer from the recognized Institution.

ii. Seventeen years experience in the field of Electronic Data Processing/ IT/ System Analysis/ Computer Programming/ Management and Administration of Database System dealing with Recruitment/ Administration/ Accounts/ Examination Development/ LAN/ Management of Website/ IT Training.

**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 related to the advertised post. 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. 04/2019

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**

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<tr>
<td>1.</td>
<td>English Grammar in Use</td>
<td>Raymond Murphy (Cambridge University Press)</td>
</tr>
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<td>2.</td>
<td>Practical English Usage</td>
<td>M. Swan (Oxford University Press)</td>
</tr>
<tr>
<td>4.</td>
<td>A University English Grammar</td>
<td>R. Quirk &amp; S. Greenbaum (ELBS; Longmans)</td>
</tr>
<tr>
<td>5.</td>
<td>Write Better, Speak Better</td>
<td>Readers Digest Association</td>
</tr>
</tbody>
</table>
Part-I: (Mathematics) 50 Marks

I. Vector Calculus

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

II. Statics

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

III. Dynamics

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

IV. Ordinary differential equations

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

V. Fourier series and partial differential equations

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

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

Part-II: (Professional) 50 Marks

I. Development of Curriculum and Instructional Material

- Elements of Curriculum.

II. Process of Teaching and Teaching Strategies

- Process of Classroom Communication
- Factors affecting Classroom Communication
- Barriers to Classroom Communications
- Use of Instructional Materials and Media

III. Educational Assessment and Evaluation

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

IV. Educational Administration and Supervision

- The Concept of Administration
- Educational Supervision

V. Research Methods in Education

- Scientific Method and its Application in Education
- Sampling Techniques:
- Research Instruments: Questionnaire; Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing
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<td>An Introduction to Vector Analysis</td>
<td>Khalid Latif,</td>
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<td>2.</td>
<td>Introduction to Mechanics</td>
<td>Q.K. Ghori</td>
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<td>3.</td>
<td>An Intermediate Course in Theoretical Mechanics</td>
<td>Khalid Latif,</td>
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<tr>
<td>4.</td>
<td>Differential Equations with Boundary Value Problems</td>
<td>D. G. Zill and M. R. Cullen</td>
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<td>5.</td>
<td>Elementary Differential Equations</td>
<td>E.D. Rainville, P.E. Bedient and R.E. Bedient</td>
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<td>6.</td>
<td>Elements of Numerical Analysis</td>
<td>F. Ahmad and M.A Rana</td>
</tr>
<tr>
<td>7.</td>
<td>Mathematical Methods</td>
<td>S. M. Yousaf, Abdul Majeed and Muhammad Amin</td>
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<td>Research in Education</td>
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Particulars of post

**Assistant Professor (Male) (Physics)** (BS-18), Federal Government Educational Institutions (FGEI) (Cantts/ Garrisons), Ministry of Defence.

Minimum Qualification & Experience:

- Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level.
  
  OR

- M. Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level.
  
  OR

- Second Class or Grade ‘C’ Master’s Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level.

---

**Part-I: (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 Schrödinger equation, angular momentum, wave mechanics, Heisenberg’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) 50 Marks

I. Development of Curriculum and Instructional Material
- Elements of Curriculum.

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

III. Educational Assessment and Evaluation
- Concept of Classroom Assessment and Evaluation
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- Approaches to Evaluation: Formative Evaluation; Summative Evaluation
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IV. Educational Administration and Supervision
- The Concept of Administration
- Educational Supervision

V. Research Methods in Education
- Scientific Method and its Application in Education
- Sampling Techniques:
- Research Instruments: Questionnaire: Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing
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<td>1.</td>
<td>Perspectives of Modern Physics.</td>
<td>A. Beiser.</td>
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<td>2.</td>
<td>Fundamentals of Physics.</td>
<td>Halliday &amp; Resnick</td>
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<td>3.</td>
<td>Introduction to Electromagnetic Fields and Waves</td>
<td>D. Corson &amp; P. Lorrain</td>
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<td>Introduction to Quantum Mechanics</td>
<td>D. Griffiths</td>
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<td>Solid State Physics</td>
<td>C. Kittel</td>
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PAPER-II: PROFESSIONAL

Max Marks: 100

Time Allowed: 3 Hours

Case No. F.4-57-C/2019-R

Particulars of post
Assistant Professor (Male) (Chemistry) (BS-18), Federal Government Educational Institutions (FGEI) (Cantts/ Garrisons), Ministry of Defence.

Minimum Qualification & Experience:
Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level.

OR

M. Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level.

OR

Second Class or Grade ‘C’ Master’s Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level.

Part-I: (Chemistry) 50 Marks


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.


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

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


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


Part-II: (Professional) 50 Marks

I. Development of Curriculum and Instructional Material
   - Elements of Curriculum.

II. Process of Teaching and Teaching Strategies
   - Process of Classroom Communication
   - Factors affecting Classroom Communication
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<tr>
<td>2.</td>
<td>Inorganic Chemistry, 3rd Ed. 1983</td>
<td>Hukeavy, James E.</td>
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**PAPER-II: PROFESSIONAL**

Max Marks: 100  
Time Allowed: 3 Hours

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<td><strong>Assistant Professor (Male) (Statistics) (BS-18), Federal Government Educational Institutions (FGEI) (Cantts/ Garrisons), Ministry of Defence.</strong></td>
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| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level.  
**OR**  
M. Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level.  
**OR**  
Second Class or Grade ‘C’ Master’s Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level. |

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

**I. Probability Distributions**


**II. Regression Analysis & Correlation Analysis**

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

**III. Sampling & Sampling Distributions**


Sampling with and without replacement, Application of Central Limit Theorem in Sampling, Sampling Distribution of Mean, difference between two Means, Proportion, difference between two Proportion and Variance.

**IV. Statistical Inferences**


Inferences for Two Populations Proportions using Independent Samples, Estimation of sample size

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

Part-II: (Professional) 50 Marks

I. Development of Curriculum and Instructional Material
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<td>1.</td>
<td>Principles and Procedures of Statistics</td>
<td>Steel, R and Torrie, J.H.</td>
</tr>
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<td>2.</td>
<td>Introduction to Statistical Theory, Part-I &amp; II</td>
<td>Chaudhry, S.M. and Kamal, S.</td>
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<tr>
<td>3.</td>
<td>Fundamentals of Modern Statistical Methods</td>
<td>Wilcox, R.</td>
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<td>4.</td>
<td>Statistical Methods</td>
<td>Aggarwal, Y.P.</td>
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Time Allowed: 3 Hours

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OR  
M. Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level.  
OR  
Second Class or Grade ‘C’ Master’s Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level. |

Part-I: (Economics) 50 Marks

I. Micro Economics

Consumer behaviour, Determination of market demand and supply i.e. concept of elasticity of Demand & Supply, Static, Comparative Static Analysis, Distinction between partial and general equilibrium analysis (basic level) theory of the Firm, Producer’s equilibrium, Pricing factors of production

II. Macro Economics

Basic Economic Concepts, National Income Accounting, Consumption Function, Multiplier, Accelerator, Component of Aggregate Demand, Labour Demand and Supply, Un-Employment, Determination of equilibrium level of income and output (at least with reference to two or three school of thought), Inflation.

III. Public Financing


IV. Role of Foreign Trade and Aid in Economic Development

Trends in Pakistan’s Balance of Payments, Terms of Trade, Changes in direction of trade, Trends in Pakistan’s major exports and imports, Causes of significant changes in the trends, the role of migration and remittances in Pakistan’s economy, costs and benefits of Foreign Aid, Role of Foreign Investment.

V. Major Issues in Pakistan Economy

Energy crisis, Corruption, Bad governance, External debt accumulation and dependency, Unemployment, Income inequality, Inflation, Fiscal and trade deficits, Balance of payment issues, Shortage of irrigation water.
Part-II: (Professional) 50 Marks

I. Development of Curriculum and Instructional Material
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<td>2.</td>
<td>Government Finance—An Economic Analysis</td>
<td>Due John, F.</td>
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<td>4.</td>
<td>Macroeconomics</td>
<td>Rudigar Dorubush and Stanley Fisher Blanchard</td>
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<td>5.</td>
<td>Foreign Aid Theory and Practice in Southern Asia</td>
<td>Wolf, Jr. DC</td>
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<td>6.</td>
<td>History of International Trade</td>
<td>Findlay, R and O’ Rourke, K</td>
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Part-I: (Biology) 50 Marks

I. Anatomy and Embryology
   - Micro and mega sporogenesis, pollination mechanism, fertilization, development of Embryo and Endosperm, Seed dispersal.

II. Plant Physiology
   - Photosynthesis: Plant pigments, Light reaction, CO2 fixation, Mechanism of photophosphorylation.
   - Respiration: Glycolysis, Kreb cycle, Mechanism of oxidative phosphorylation.

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

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

V. Animal Form and Function
   - Protection, Support and Movement: Integumentary system of invertebrates and vertebrates; Animal muscles: the muscular system of invertebrates and vertebrates.
   - Digestion and Nutrition: Feeding mechanism, Digestion, Organization and regional function of alimentary canal, Regulation of food intake, Nutritional requirements.
   - Internal Fluids and Respiration: Internal fluid environment, Composition of blood, Circulation and respiration mechanisms.
- Nervous Coordination: Nervous system and Senses: Functional units of nervous system, Synapses junctions between nerves.
- Chemical Coordination: Endocrine System; Vertebrate endocrine glands and types of hormones, Mechanism of hormones action,

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

I. Development of Curriculum and Instructional Material
- Elements of Curriculum.

II. Process of Teaching and Teaching Strategies
- Process of Classroom Communication
- Factors affecting Classroom Communication
- Barriers to Classroom Communications
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- The Concept of Administration
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<td>5.</td>
<td>Growth and Differentiation in Plants</td>
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PAPER-II: PROFESSIONAL

Max Marks: 100 Time Allowed: 3 Hours

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<tr>
<td>Particulars of post</td>
<td>Assistant Professor (Male) (Health &amp; Physical Education) (BS-18), Federal Government Educational Institutions (FGEI) (Cantts/Garrisons), Ministry of Defence.</td>
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<tr>
<td>Minimum Qualification &amp; Experience:</td>
<td>Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level. OR M. Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level. OR Second Class or Grade ‘C’ Master’s Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level.</td>
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</table>

Part-I: (Health and Physical Education) 50 Marks

I. Philosophical Basis of Physical Education
Philosophy and Physical Education, Physical Education as Discipline, Scientific Foundation of Physical Education, Physical Education and Recreation, Leadership in Physical Education

II. Scientific Sports Coaching
Sports Planning, Periodisation of Training, Systemization of Training, Data Collection, Coach and Professional Ethics

III. Evaluation in Physical Education and Sports
Evaluation and Administration of Tests, Basic Statistics, Measurement of Physical Fitness, General Motor Ability, Cardiovascular Fitness, Rating Scales in Physical Education.

IV. Exercise Physiology
Muscular System and Exercise, Cardiovascular System and Exercise, Environment and Exercise, Nervous System and Exercise, Glandular System and Exercise, Gender Differences, Obesity

Part-II: (Professional) 50 Marks

I. Development of Curriculum and Instructional Material
- Elements of Curriculum.

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<tbody>
<tr>
<td>1.</td>
<td>Health &amp; Physical Education.</td>
<td>Dr. A. Waheed Mughal</td>
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<td>2.</td>
<td>Education in Physical Education.</td>
<td>Shamshad Ahmed</td>
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<td>4.</td>
<td>Modern Measurement.</td>
<td>Osterlind J. Steven</td>
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<td>5.</td>
<td>Introduction to Measurement in PE and Exercise Science</td>
<td>Margaret J. Safrit PhD, Terry M. Wood PhD</td>
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<td>6.</td>
<td>Physiology of Sports</td>
<td>Reilly T and Williams</td>
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<td>7.</td>
<td>Essentials of Exercise Physiology.</td>
<td>Shaver</td>
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**PAPER-II: PROFESSIONAL**  
Max Marks: 100  
Time Allowed: 3 Hours

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<td>Assistant Professor (Male) (English) (BS-18), Federal Government Educational Institutions (FGEI) (Cantts/ Garrisons), Ministry of Defence.</td>
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| Minimum Qualification & Experience: | Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level.  
**OR**  
M. Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level.  
**OR**  
Second Class or Grade ‘C’ Master’s Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level. |

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<th>Part-I: (English)</th>
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<tbody>
<tr>
<td>I. Essays:</td>
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<tr>
<td>Bertrand Russell (The Conquest of Happiness)</td>
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<td>George Orwell (Politics and the English Language; The Prevention of Literature)</td>
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<td>Ralph Waldo Emerson (The Transcendentalist; Self-reliance)</td>
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<td>II. Short Stories:</td>
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</tr>
<tr>
<td>Somerset Maugham (The Lotus-eater)</td>
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<tr>
<td>G.K.Chesterton (A Somewhat Improbable Story)</td>
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<td>O’Henry (The Gift of the Magi)</td>
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<td>III. Poetry:</td>
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<td>William Wordsworth (Resolution Independence; Tintern Abbey)</td>
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<td>John Keats (Ode to a Nightingale; Ode to Autumn)</td>
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<td>Lord Alfred Tennyson (Ulysses; The Lady of Shalott)</td>
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<tr>
<td>Yeats (A Dialogue of Self and Soul; The Second Coming)</td>
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<tr>
<td>Eliot (The Wasteland; Love Song of J. Alfred Prufrock)</td>
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<tr>
<td>Philip Larkin (Maturity; Continuing to Live; The Trees)</td>
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| Wallace Stevens (A postcard from the volcano; Continual conversation with a silent man; Dry loaf)  
**OR** Walt Whitman (As I ponder’d in silence; Are you the new person drawn toward me?; This moment yearning and thoughtful) | |
| IV. Drama:       |           |
| Shakespeare (Hamlet; King Lear, As you like it and Twelfth Night) | |
| William Congreve (The Way of the World) | |
| Shaw (Pygmalion; Heartbreak House) | |
| Harold Pinter (The Caretaker) | |
| Samuel Beckett (Waiting for Godot) | |
• Eugene O’Neill (Long Day’s Journey into Night)

V. Novels:
• Thomas Hardy (Far from the Madding Crowd)
• D.H. Lawrence (Sons and Lovers)
• George Orwell (Nineteen Eighty-four)
• James Joyce (A Portrait of the Artist as a Young Man)
• Iris Murdoch (Under the Net)
• Nathaniel Hawthorne (The Scarlet Letter) or William Faulkner (The Sound and the Fury)

VI. Literacy Theory & Criticism
• Structuralism
• Marxism
• Deconstructionism
• Psychoanalytic criticism
• Feminist criticism
• Postcolonial Criticism

Part-II: (Professional) 50 Marks

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

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

III. Educational Assessment and Evaluation
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  • Scientific Method and its Application in Education
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  • Research Instruments: Questionnaire; Interview; Test; Observation; Rating Scale
  • Research Proposal and Report Writing
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<tr>
<td>7.</td>
<td>Modern Critical Views &amp; Interpretations, ed: 80’s and 90’s editions.</td>
<td>Harold Bloom</td>
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# PAPER-II: PROFESSIONAL

Max Marks: 100  
Time Allowed: 3 Hours

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## Part-I: (Urdu)  

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<td>5</td>
<td>Question 5 Content</td>
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Part-II: (Professional) 50 Marks

I. Development of Curriculum and Instructional Material
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### PAPER-II: PROFESSIONAL

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


II. Changing Security Dynamics for Pakistan: Challenges to National Security of Pakistan

III. Pakistan War on Terror

IV. Foreign Policy of Pakistan Post 9/11

V. Evolution of Democratic System in Pakistan

VI. Hydro Politics; Water Issues in Domestic and Regional Context

VII. Pakistan’s National Interest

VIII. Pakistan’s Energy Problems and their Effects

IX. Pakistan’s Relations with Neighbours

X. Pakistan and India Relations Since 1947

XI. Kashmir Issue

XII. The war in Afghanistan since 1979 and its impact on, and challenges to Pakistan, in the Post 2014 era.

XIII. Latest Constitutional Amendments and Important Legislations,

Part-II: (Professional) 50 Marks

I. Development of Curriculum and Instructional Material
   ▪ Elements of Curriculum.

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   ▪ Barriers to Classroom Communications
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<td>10.</td>
<td>Pakistan’s Energy Sector: From Crisis to Crisis-Breaking the Chain</td>
<td>Zaid Alahdad</td>
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Part-I: (Zoology) 50 Marks

I. Animal Diversity-Chordata
   - **Fishes**: Structural and functional adaptations of fishes.
   - **Amphibian**: Movement onto land and early evolution of terrestrial vertebrates.
   - **Reptiles**: Characteristics of reptiles, adaptations in reptilians.
   - **Birds**: Migration and navigation, adaptations.
   - **Mammals**: Structural and functional adaptations of mammals.

II. Principles of Animal Life
   - **Protozoa**: Reproduction pattern in protozoan, Parasitism in protozoan
   - **Tissues Types**: epithelial, connective, muscle and nervous tissue; organs and organ systems.

III. Animal Form and Function
   - **Protection, Support and Movement**: Integumentary system of invertebrates and vertebrates; Animal muscles: the muscular system of invertebrates and vertebrates.
   - **Digestion and Nutrition**: Feeding mechanism, Digestion, Organization and regional function of alimentary canals, Regulation of food intake, Nutritional requirements
   - **Internal Fluids and Respiration**: Internal fluid environment, Composition of blood, Circulation and respiration mechanisms
   - **Nervous Coordination**: Nervous system and Sense: Functional units of nervous systems, Synapses junctions between nerves.
   - **Chemical Coordination**: Endocrine System; Vertebrate endocrine glands and types of hormones, Mechanism of hormones action,
   - **Animal Behavior**: Learning, Habituation, Insight learning, latent learning, classical learning: Control of Behavior; social behavior
Part-II: (Professional) 50 Marks

I. Development of Curriculum and Instructional Material
    Elements of Curriculum.

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

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    Educational Supervision

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

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<tr>
<td>1</td>
<td>Integrated Principles of Zoology.</td>
<td>Hickman, Jr. C.P., Keen, S. L, Larson, and Eisenhower, D.J.</td>
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<td>Miller, S. A. and Harley, J. B.</td>
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<td>Douglas Futuyma</td>
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PAPER-II: PROFESSIONAL

Max Marks: 100

Case No. F.4-57-L/2019-R

Particulars of post

**Assistant Professor (Male) (Computer Science) (BS-18), Federal Government Educational Institutions (FGEI) (Cantts/ Garrisons), Ministry of Defence.**

Minimum Qualification & Experience:

- Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level.
- OR
- M. Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level.
- OR
- Second Class or Grade ‘C’ Master’s Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level.

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**Part-I: (Computer Science) 50 Marks**

I. **Computer Architecture**

Microprocessor Bus Structure (Address/Data/Control), Registers and Flags, Storage Hierarchy (Main/Virtual/Cache/Secondary memory), Peripheral communication, CPU, ALU, Principles of Instruction Set Design, Multiprocessors & Thread Level Parallelism.

II. **Object Oriented Programming**

Data types, control structures, functions, arrays, classes, methods, object and encapsulation; constructors and destructors, operator and function overloading, virtual functions, derived classes, inheritance and polymorphism, I/O and file processing.

III. **Data Structure and Algorithms**

Stack and Queue, Sequential Search, Binary Search, Bubble sort, Merge sort, Quick sort, Insertion sort, Selection Sort, Linked Lists, Infix to postfix conversions, Expression tree construction, Tree traversals, Graph representation and traversal, Minimum spanning tree.

IV. **Database Management Systems**

Entity Relationship modeling, Relational data model and algebra, Structured Query language, Database design, functional dependencies and normal forms, concurrency control and recovery techniques, Database security and authorization.

V. **Computer Communications and Networks**


VI. **Operating Systems**

Process and CPU management, Multithreading, Deadlocks, Memory management and virtual memory, External Fragmentation, Paging and Demand Paging, File management systems, Scheduling and dispatch, Introduction to concurrency.
Part-II: (Professional) 50 Marks

I. Development of Curriculum and Instructional Material
   - Elements of Curriculum.

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

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

IV. Educational Administration and Supervision
   - The Concept of Administration
   - Educational Supervision

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

Suggested Reading

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>1</td>
<td>Modern Operating Systems</td>
<td>Andrew S. Tanenbaum</td>
</tr>
<tr>
<td>2</td>
<td>Operating System Concepts</td>
<td>Addison-Wesley</td>
</tr>
<tr>
<td>3</td>
<td>Algorithms and Data Structures</td>
<td>N. Wirth</td>
</tr>
<tr>
<td>4</td>
<td>Data structures</td>
<td>Aaron M. Tanenbaum,</td>
</tr>
<tr>
<td>5</td>
<td>Database Systems: A Practical Approach to Design, Implementation and Management</td>
<td>R. Connolly and P. Begg</td>
</tr>
<tr>
<td>6</td>
<td>Introduction to Computer Networks</td>
<td>A. S. Tanenbaum</td>
</tr>
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<td>7</td>
<td>Computer Networks and Internets</td>
<td>Douglas E. Comer</td>
</tr>
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<td>8</td>
<td>Computer Architecture: A Quantitative Approach</td>
<td>Hennessy &amp; Patterson</td>
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<td>Integrating Education Technology into Teaching</td>
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<td>Curriculum Development</td>
<td>S.M. Shahid</td>
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<td>12</td>
<td>Educational Measurement and Evaluation</td>
<td>S.M. Shahid</td>
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<td>13</td>
<td>Educational Administration</td>
<td>S.M. Shahid</td>
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</tbody>
</table>
PAPER-II: PROFESSIONAL
Max Marks: 100
Time Allowed: 3 Hours

Case No. F.4-57-M/2019-R

<table>
<thead>
<tr>
<th>Particulars of post</th>
<th>Assistant Professor (Male) (Islamic Studies) (BS-18), Federal Government Educational Institutions (FGEI) (Cantts/ Garrisons), Ministry of Defence.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Qualification &amp; Experience:</td>
<td>Ph.D. Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level. OR M. Phil Degree in the relevant subject with three (3) years post qualification teaching experience at College/ University level. OR Second Class or Grade ‘C’ Master’s Degree in the relevant subject with five (5) years post qualification teaching experience at College/ University level.</td>
</tr>
</tbody>
</table>

Part-I: (Islamic Studies)  50 Marks

I. Islam: the Code of Life

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

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

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

III. Islamic Civilization and Culture:

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

- Impact of Islamic Civilization on the West and vice-versa.
- Muslim World and the Contemporary Challenges
- Interaction between East and West.
- Role of Islam in the modern world.
Part-II: (Professional) 50 Marks

I. Development of Curriculum and Instructional Material
   - Elements of Curriculum.

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
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- Research Instruments: Questionnaire; Interview; Test; Observation; Rating Scale
- Research Proposal and Report Writing

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<td>Islam: its meaning and Message</td>
<td>Khurshid Ahmad</td>
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<td>Islam: The Misunderstood Religion</td>
<td>Muhammad Qutub</td>
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<td>Towards Understanding Islam</td>
<td>Abul Aala Moudoodi</td>
</tr>
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<td>4.</td>
<td>Ideals and Realities of Islam</td>
<td>Hussain Nasr,</td>
</tr>
<tr>
<td>5.</td>
<td>A brief Survey of Muslim Science and Culture</td>
<td>Muhammad Abdur –Rahman</td>
</tr>
<tr>
<td>6.</td>
<td>Quranic Sciences</td>
<td>Afzalur Rahman</td>
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<td>Research in Education</td>
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# PAPER-II: PROFESSIONAL

**Max Marks: 100**

**Time Allowed: 3 Hours**

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<tr>
<th>Case No.</th>
<th>F.4-67 /2019-R</th>
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</thead>
<tbody>
<tr>
<td>Particulars of post</td>
<td>Deputy Chief/Project Management Specialist (BS-19), Ministry of Federal Education and Professional Training.</td>
</tr>
</tbody>
</table>
| Minimum Qualification & Experience: | i. Second Class or Grade ‘C’ Master’s degree in Sciences (Natural/ Social)/Development Studies/Economics/Finance/Public Administration/Business Administration or equivalent qualification from a University/ Institute recognized by HEC.  
OR  
Second Class or Grade ‘C’ Bachelor’s degree in Engineering (in any field)  
i. Twelve (12) years post qualification experience of Planning/Implementation/Monitoring in PSDP Projects.  
OR  
i. M.Phil. in Sciences (Natural/ Social)/Development Studies/Economics/Finance/Public Administration/Business Administration or equivalent qualification from a University/ Institute recognized by HEC.  
OR  
Second Class or Grade ‘C’ Master’s degree in Engineering (in any field)  
i. Ten (10) years post qualification experience of Planning/Implementation/Monitoring in PSDP Projects. |

## Part-I: 50 Marks

( Public Administration, Office Management and Planning)

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

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

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

4. **Planning and Management**
   a) **Project Management**
      Project Management, Processes Integration Management, Project Plan Development, Project Plan Execution and Overall Change Control.
   b) **Scope Management**
      Initiation, Scope Planning, Scope Definition, Scope Verification and Scope Change Control.
   c) **Time Management**
      Activity Definition, Activity Sequencing, Activity Duration Estimation, Schedule Development and Schedule Control.
   d) **Statistical Techniques**
      All statistical techniques related to Planning & Research
V. Civil Servant Act 1973 and Rules made thereunder;


**Part-II: 50 Marks**
(Human Resource, Financial Management, Quality Management and Information Technology)

I. **Human Resource and Financial Management**


II. **Basic Concept of Quality Management**

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

III. **Information Technology and MS Office**

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

**SUGGESTED READINGS**

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<td>The Bureaucracy of Pakistan</td>
<td>Charles F. Kennedy</td>
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<td>5.</td>
<td>Project Management Body of Knowledge</td>
<td>Project Management Institute (PMI) standards committee</td>
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<td>8.</td>
<td>Understanding Computer: Today and Tomorrow</td>
<td>Deborah Morley, Charles Parker</td>
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</table>
PAPER-II: PROFESSIONAL
Max Marks: 100
Time Allowed: 3 Hours

Case No. F.4-77 /2019-R

Particulars of post
Joint Director Legal Affairs (BS-19), Directorate of Legal Affairs of Pakistan Railways, (Railway Board), Ministry of Railways.

Minimum Qualification & Experience:

i. LL.M. degree or Barrister-at-Law from a University/ Institute recognized by HEC.

ii. Ten (10) years post qualification experience as an Advocate of Supreme Court/High Court.

iii. Computer Literate in Microsoft Word, Excel and Spreadsheet.

OR

i. Second Class or Grade ‘C’ LL.B. degree from a University/ Institute recognized by HEC.

ii. Twelve (12) years post qualification experience as an Advocate of Supreme Court/High Court.

iii. Computer Literate in Microsoft Word, Excel and Spreadsheet.

LAW: 100 Marks

I. Definitions of Crime

II. All Provisions of:

i. Concept of arbitration, arbitration with or without intervention of court and in civil suits.

ii. Establishment of Civil Courts with their Original & Appellate Jurisdiction.

iii. The Code of Civil Procedure, 1908

iv. Pakistan Penal Code, 1860

v. Qanun-e-Shahdat Order, 1984

vi. Criminal Procedure Code, 1898

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<tbody>
<tr>
<td>1.</td>
<td>Pakistan Penal Code, 1860</td>
<td>M. Mahmood</td>
</tr>
<tr>
<td>2.</td>
<td>Criminal Procedure Code, 1898</td>
<td>Shaukat Mahmood</td>
</tr>
<tr>
<td>3.</td>
<td>Law of Evidence</td>
<td>Justice (R) Khalid ur Rahman Khan as adapted from Principles and Digest of the Law of Evidence by M. Monir</td>
</tr>
<tr>
<td>4.</td>
<td>Qanun-e-Shahdat Order, 1984</td>
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<td>Aamir Raza A. Khan</td>
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<td>6.</td>
<td>The Arbitration Laws in Pakistan</td>
<td>M. Mahmood</td>
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<td>7.</td>
<td>Civil Courts Ordinance, 1962</td>
<td>Nisar Ahmad Nisar</td>
</tr>
</tbody>
</table>
PAPER-II: PROFESSIONAL

Max Marks: 100

Case No. | F.4-80/2019-R
Particulars of post | Deputy Chief Administrative Officer (BS-18), GHQ, Ministry of Defence
Minimum Qualification & Experience: | i. Second class or Grade “C” Master’s Degree in Business Administration Public Administration or equivalent from a university recognized by HEC.
| ii. Five (5) years post qualification experience in administration.

Part-I: 50 Marks

(Public Administration & Office Management)

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

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

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

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

V. **Planning**: Types of Plans, Planning Process; Principles of Planning, Planning Machinery in Pakistan;

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

VII. Civil Servant Act 1973 and Rules made thereunder;

VIII. Rules of Business 1973;

IX. Secretariat Instructions and Office Procedures;


Part-II: 50 Marks

(Human Resource, Financial Management, Quality Management and Information Technology)

I. **Human Resource and Financial Management**


II. Basic Concept of Quality Management

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

III. Information Technology and MS Office

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

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PAPER-II: PROFESSIONAL

Max Marks: 100  
Time Allowed: 3 Hours

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<th>F.4-82/2019-R</th>
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<tbody>
<tr>
<td>Particulars of post</td>
<td>Officer IT Expert-I (BS-19), Ministry of Defence.</td>
</tr>
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Minimum Qualification & Experience:

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<tr>
<td>i.</td>
<td>Ph.D in Computer Sciences/ Software Engineering/ Information Technology or equivalent qualification from a University recognized by HEC.</td>
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OR

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<td>i.</td>
<td>Second Class or Grade ‘C’ Master’s degree in Computer Science/ Information Technology or equivalent qualification from a University recognized by HEC.</td>
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Professional: 100 Marks

I. Data Structures and Algorithms

Abstract data types, Hardware Reverse Engineering of embedded systems, divide and conquer algorithms, Sorting algorithms (selection, insertion, merge, quick, bubble, heap, shell, radix, bucket), queue, dequeueuer, priority queues (linked and array implementations of queues), linked list & its various types, sorted linked list, searching an unsorted array, memory management and garbage collection.

II. Data Encryption and Security

Advanced Forensics Techniques for Windows/MMacOS/Linux/Andriod, Cryptographic algorithms and design principles, including conventional and symmetric encryption (DES, IDEA, Blowfish, Rijndael, RC-4, RC-5), public key or asymmetric encryption (RSA, Diffie-Hellman), key management, hash functions (MD5, SHA-1, RIPEMD-160, HMAC), digital signatures and certificates. Authentication protocols (X.509, Kerberos), electronic mail security (S/MIME, PGP), web security and protocols for secure electronic commerce (IPSec, SSL, TLS, SET). Security mechanism (ASLR, DEP, SHE, Android Permission Modelling and sandboxing)
III. Cyber Security

IV. Information Security
Information security foundations, security design principles; security mechanisms, symmetric and asymmetric cryptography, encryption, hash functions, digital signatures, key management, authentication and access control; software security, vulnerabilities and protections, malware, database security; network security, firewalls, intrusion detection; security policies, policy formation and enforcement, risk assessment, cybercrime, law and ethics in information security, privacy and anonymity of data.

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<td>Data Structures and Algorithms in C++</td>
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<td>Java Software Structures: Designing and Using Data Structures</td>
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<td>Corporate Computer Society</td>
<td>Randall J. Boyle, 3rd Edition</td>
</tr>
</tbody>
</table>
PAPER-II: PROFESSIONAL

Max Marks: 100

Time Allowed: 3 Hours

Case No. F.4-83/2019-R

Particulars of post

Deputy Chief (IT) (BS-19), Federal Public Service Commission.

Minimum Qualification & Experience:

i. Second Class or Grade C Master Degree in Computer Science/ BCS (4 years)/ IT/ Electronics or equivalent. OR B.Sc. in Computer Engineering (software). OR Second Class or Grade C Master Degree in Mathematics/ Statistics/ Physics/ Economics and one year diploma in Computer from the recognized Institution.

ii. Twelve (12) years experience in the field of Electronic Data Processing/ IT/ System Analysis/ Computer Programming/ Management and Administration of Database System dealing with Recruitment/ Administration/ Accounts/ Examination Development/ LAN/ Management of Website/ IT Training.

Professional: 100 Marks

I. Data Structures and Algorithms

Abstract data types, Hardware Reverse Engineering of embedded systems, divide and conquer algorithms, Sorting algorithms (selection, insertion, merge, quick, bubble, heap, shell, radix, bucket), queue, dequeue, priority queues (linked and array implementations of queues), linked list & its various types, sorted linked list, searching an unsorted array, memory management and garbage collection.

II. Data Encryption and Security

Advanced Forensics Techniques for Windows/MMacOS/Linux/Andriod, Cryptographic algorithms and design principles, including conventional and symmetric encryption (DES, IDEA, Blowfish, Rijndael, RC-4, RC-5), public key or asymmetric encryption (RSA, Diffie-Hellman), key management, hash functions (MD5, SHA-1, RIPEMD-160, HMAC), digital signatures and certificates. Authentication protocols (X.509, Kerberos), electronic mail security (S/MIME, PGP), web security and protocols for secure electronic commerce (IPSec, SSL, TLS, SET). Security mechanism (ASLR, DEP, SHE, Android Permission Modelling and sandboxing)

III. Cyber Security


IV. Information Security

Information security foundations, security design principles; security mechanisms, symmetric and asymmetric cryptography, encryption, hash functions, digital signatures, key management, authentication and access control; software security, vulnerabilities and
protections, malware, database security; network security, firewalls, intrusion detection; security policies, policy formation and enforcement, risk assessment, cybercrime, law and ethics in information security, privacy and anonymity of data.

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PAPER-II: PROFESSIONAL

Max Marks: 100

Time Allowed: 3 Hours

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<tr>
<td>Particulars of post</td>
<td>Superintending Engineer (B&amp;R/E&amp;M), (BS-19), M.E.S, Ministry of Defence (Defence Division).</td>
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<thead>
<tr>
<th>Minimum Qualification &amp; Experience:</th>
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<tbody>
<tr>
<td>i. Second Class or Grade ‘C’ Master’s Degree in Civil/ Electrical/ Mechanical Engineering from a recognized University.</td>
</tr>
<tr>
<td>ii. Ten (10) years experience in the field of Civil/ Electrical/ Mechanical Engineering in BS-17 and above or equivalent.</td>
</tr>
</tbody>
</table>

Engineering: 100 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. **Costing, Accounting and Budgeting:**

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

III. **Mechanical Engineering Fundamentals**

Mechanics and Strength of Materials: Concept of Stress and Strain, bending, torsion, geometric properties of areas, principal stresses, Tensile testing, Stress- Strain curve, True Stress & Strain, Shear Stress & Strain, Concept of elastic and plastic deformation, Yield & ultimate Tensile strengths, Elongation, Toughness and Resilience, Ductility and Malleability, Hardness Testing, Brinell and Rock well Hardness test, bending moment, Fluid Mechanics: Properties and basics of fluid mechanics, loss of head, power transformation by fluids, pumps, turbines. Fluid static’s, Fluid dynamics, Types of flow: Turbulent and Laminar, Reynold’s number, Manufacturing: Different manufacturing processes like Casting, Forging, Machining, Rolling, Extrusion, Wire-drawing, welding, Turning (lathe), Milling, Shaping, Gear cutting, Drilling, Fitting.

IV. **Electricity & Electronics**

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

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

**AC Motors:** Induction motor, Synchronous motor, Performance, Efficiency. Single phase and three phase Motors.

**Generators:** Principle, Construction, Different components of generators. AC Generators, DC Generators.

VI. **Project Management:**

Time lines, milestones, resources allocation, dependency, Gant Charts, Preparation of PC-I, PC-II, PC-III & PC-IV, Financial Management of Projects

VII. **Inventory Management:**

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

VIII. **Quality Management Systems:**

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

**SUGGESTED READINGS**

<table>
<thead>
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<th>S.No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>2.</td>
<td>Strength of material</td>
<td>Andrew Pytel and Singer.</td>
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<td>3.</td>
<td>Civil Engineer’s Reference Book</td>
<td>LS Blake</td>
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<tr>
<td>5.</td>
<td>Public Health Engineering</td>
<td>STEEL.</td>
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<td>6.</td>
<td>Fluid mechanics with engineering applications</td>
<td>Finnemore/ Franzini.</td>
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<td>7.</td>
<td>Schaum Outline Series; Strength of Materials</td>
<td>Williym A. Nash</td>
</tr>
<tr>
<td>8.</td>
<td>Manufacturing Processes for Engineering Materials</td>
<td>Kalpakgjian</td>
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<td>Electrical Technology</td>
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<td>12.</td>
<td>Semiconductors</td>
<td>Manzar Saeed</td>
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<td>Handbook of Engineering Management</td>
<td>Dennis Lock</td>
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<td>Total Quality Management</td>
<td>Dale H. Besterfield, Carol Besterfield-Michna, Glen H. Besterfield, Mary Gesterfield-Sacre</td>
</tr>
</tbody>
</table>
Case No. | F.4-94/2019-R  
---|---  
Particulars of post | Officer IT Expert-II (BS-18), Ministry of Defence.  
Minimum Qualification & Experience: |  
i. M. Phil. in Computer Sciences/ Software Engineering/ Information Technology or equivalent qualification from a University recognized by HEC.  
OR  
i. Second Class or Grade ‘C’ Master’s degree in Computer Science/ Information Technology or equivalent qualification from a University recognized by HEC.  

Professional: 100 Marks

I. Data Structures and Algorithms

Abstract data types, Hardware Reverse Engineering of embedded systems, divide and conquer algorithms, Sorting algorithms (selection, insertion, merge, quick, bubble, heap, shell, radix, bucket), queue, dequeuer, priority queues (linked and array implementations of queues), linked list & its various types, sorted linked list, searching an unsorted array, memory management and garbage collection.

II. Data Encryption and Security

Advanced Forensics Techniques for Windows/MMacOS/Linux/Andriod, Cryptographic algorithms and design principles, including conventional and symmetric encryption (DES, IDEA, Blowfish, Rijndael, RC-4, RC-5), public key or asymmetric encryption (RSA, Diffie-Hellman), key management, hash functions (MD5, SHA-1, RIPEMD-160, HMAC), digital signatures and certificates. Authentication protocols (X.509, Kerberos), electronic mail security (S/MIME, PGP), web security and protocols for secure electronic commerce (IPSec, SSL, TLS, SET). Security mechanism (ASLR, DEP, SHE, Android Permission Modelling and sandboxing).

III. Cyber Security

IV. Information Security

Information security foundations, security design principles; security mechanisms, symmetric and asymmetric cryptography, encryption, hash functions, digital signatures, key management, authentication and access control; software security, vulnerabilities and protections, malware, database security; network security, firewalls, intrusion detection; security policies, policy formation and enforcement, risk assessment, cybercrime, law and ethics in information security, privacy and anonymity of data.

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<td>Corporate Computer Society</td>
<td>Randall J. Boyle, 3rd Edition</td>
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</tbody>
</table>
PAPER-II: PROFESSIONAL

Max Marks: 100

Case No. F.4-95/2019-R

Particulars of post Director (LAB/NEQS) (BS-19), Pakistan Environmental Protection Agency (Pak-EPA), Ministry of Climate Change.

Minimum Qualification & Experience:

i. Second Class or Grade ‘C’ M.Sc. in Biology/ Chemistry/ Bio-Chemistry/ Chemical Technology.

ii. Twelve (12) years post qualification experience in BS-17 or above or equivalent in any of the prescribed educational qualification in Govt./ Semi-Govt./ Reputable Organization.

Professional: 100 Marks

I. Photosynthesis: Plant pigments, Light reaction, CO2 fixation, Mechanism of photophosphorylation.

II. Respiration: Glycolysis, Kreb cycle, Mechanism of oxidative phosphorylation.

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


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

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


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

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


XI. Environmental Pollution: Air Pollution, Water Pollution, Soil Pollution, Noise Pollution, Solid Waste, Water Logging & Salinity, Deforestation, Desertification, Eutrophication, Global and regional air pollution problems (Greenhouse effect, Global Warming/Climate Change, Ozone Depletion, Acid Rain).
XII. Climate Change: Climate Pattern at local, regional and global scale. Different types of climate including tropical and mid latitude climate, polar climates. Climate change processes, Drivers and Indicators of Climate Change, Effects of Climate Change on natural and societal systems. Carbon foot print. Climate change adaptation and mitigation, Clean Development Mechanism (CDM), REDD+. Global environmental politics on climate change: role of India, China and USA (Copenhagen Accord 2009).

XIII. Environmental Laws

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<tbody>
<tr>
<td>1.</td>
<td>Plant Physiology</td>
<td>Taiz, L. &amp; E. Zeiger</td>
</tr>
<tr>
<td>3.</td>
<td>Plant and Environment</td>
<td>Daubermine, R, F</td>
</tr>
<tr>
<td>4.</td>
<td>Environmental Science: Earth as a living Planet</td>
<td>Botkin, D. Keller, E.</td>
</tr>
<tr>
<td>5.</td>
<td>Environmental Health; Ecological Perspective</td>
<td>Kathryn Hilgenkamp</td>
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</table>
**PAPER-II: PROFESSIONAL**

Max Marks: 100  
Time Allowed: 3 Hours

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<tr>
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<tr>
<td>Particulars of post</td>
<td>Deputy Director (BS-18), Federal Seed Certification &amp; Registration Department, Ministry of National Food Security &amp; Research</td>
</tr>
</tbody>
</table>
| Minimum Qualification & Experience: | i. Second Class or Grade 'C' Master’s Degree in Agriculture in one of the subjects of Seed Technology, Plant Breeding, Plant Pathology, Plant Physiology, Agronomy, Plant Protection, Horticulture, Entomology and Agriculture Extension OR M.Sc. (Botany).  
ii. At least five (5) years post qualification experience in Seed certification and Seed testing. |

**Part-I: 20 Marks**  
(Basic Concepts only)

I. Public Administration  
II. Human Resource Management  
III. Financial Management  
IV. Information Technology and MS Office

**Part-II: 80 Marks**  
(Professional)

I. **Concept of Integrated Agriculture**: Components of natural resources as bases for agriculture production (Land, Water, biological, Environmental, Solar, Energy)  
II. **Challenges in Pakistan’s Agriculture**: Present scenario and future prospects. Analytical overview: issues and strategies for improvement of crop management, livestock management, fisheries, cottage industry, resource management and rural development. Institutions and policies: issues and options.  
III. **Elements of Climate and their Relationship with Crop Growth**: Farming Systems, biological nitrogen fixation, soil profile, structure and texture, soil fertility, soil erosion and conservation, water logging and salinity  
IV. **Genetic Improvement for Crop Production**: GMO crops, Seed production technology.  
V. **Horticulture**: Floriculture, landscaping, pests and diseases of agriculture crops and their control, integrated pest management.  
VI. **Rainfed and Irrigated Agriculture**: Agriculture mechanization, land tenure and land reforms, role of agriculture in national economy.
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<td>1.</td>
<td>An Introduction to the Public Administration</td>
<td>E.N.Cladden</td>
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<td>3.</td>
<td>System of Financial Control and Budgeting, 2006</td>
<td>Published by Finance Division</td>
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<tr>
<td>4.</td>
<td>Understanding Computers: Today and Tomorrow</td>
<td>Deborah Morley, Charles Parker</td>
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<tr>
<td>6.</td>
<td>Participatory Rural Development in Pakistan</td>
<td>Khan, M.H.</td>
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<td>7.</td>
<td>Agriculture in Pakistan</td>
<td>Khan M.H.</td>
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<tr>
<td>8.</td>
<td>Fundamentals of Soil Science</td>
<td>Henry D. Foth</td>
</tr>
<tr>
<td>11.</td>
<td>Diseases of Field Crops</td>
<td>Dickson, J.G</td>
</tr>
<tr>
<td>13.</td>
<td>A Text Book of Plant Pathology</td>
<td>A.V.S.S. Sambamurti</td>
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<td>14.</td>
<td>The Principles of Agronomy</td>
<td>Harris, Franklin Stewart</td>
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PAPER-II: PROFESSIONAL

Max Marks: 100
Time Allowed: 3 Hours

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<th>Case No.</th>
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<td>Particulars of post</td>
<td>Database Manager/ IT Professional (BS-18), S.E.C. Division, Ministry of Foreign Affairs</td>
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Minimum Qualification & Experience:

i. Second Class or Grade ‘C’ Master’s degree in Computer Engineering/Computer Science/ Software Engineering/ Information Technology or equivalent qualification from a University recognized by HEC.

OR

Second Class or Grade ‘C’ Bachelor’s degree (4 years duration) in Computer Engineering/Computer Science/ Software Engineering/ Information Technology or equivalent qualification from a University recognized by HEC.

ii. Five (5) years post qualification experience in the relevant field.

Professional: 100 Marks

I. Data Structures and Algorithms

Abstract data types, Hardware Reverse Engineering of embedded systems, divide and conquer algorithms, Sorting algorithms (selection, insertion, merge, quick, bubble, heap, shell, radix, bucket), queue, dequeuer, priority queues (linked and array implementations of queues), linked list & its various types, sorted linked list, searching an unsorted array, memory management and garbage collection.

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Case No. | F.4-124/2019-R
---|---
Minimum Qualification & Experience: | i. Bachelor’s Degree in Electrical Engineering or an equivalent qualification from a recognized University/ Institution.  
ii. Twelve (12) years post qualification experience in Planning, Design or operation of Hydroelectric or Thermal Power Stations or High Voltage Transmission Systems, or distribution systems in BS-17 and above or equivalent in a Government/ semi-Government/ reputable private organization.

### Engineering: 100 Marks

#### I. Electricity & Electronics:

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

#### II. Electrical Machines:

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

**AC Motors:** Induction motor, Synchronous motor, Performance, Efficiency. Single phase and three phase Motors.

**Generators:** Principle, Construction, Different components of generators. AC Generators, DC Generators.

#### III. Power Systems:


#### IV. Costing, Accounting and Budgeting:

Net present value, Net future value, cash flows, auditing, income statement, balance sheet, taxation, financial risk management, cost analysis.
V. Project Management:
Time lines, milestones, resources allocation, dependency, Gant Charts,

VI. Inventory Management:
FIFO models, LIFI models, Identification Schemes, Inventory management systems.

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

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