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. 12/2022

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
1.	176/2022	**System Analyst** (BS-17), Pakistan Bureau of Statistics, Ministry of Planning, Development & Special Initiatives.	i) Second Class or Grade 'C' Master's degree in Computer Science. ii) One (1) year's post qualification experience of Programme writing and system designing. **OR** i) Second Class or Grade 'C' Master's degree in Statistics/ Economics with Statistics/ Mathematics with Statistics. ii) Training in Programming or system designing. iii) Two (2) years post qualification experience in programme writing and system designing iv) Should qualify Programmer's aptitude test. **OR** i) Second Class or Grade 'C' Bachelor's degree in Statistics/ Economics/ Mathematics. ii) Training in Programming and system designing. iii) Three (3) years post qualification experience in the field of data processing including two (2) years' experience in Programming/ System designing. iv) Should qualify Programmer's aptitude test.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test=80 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II** • Software Architecture, • Software Quality Assurance, • Coding, Writing, Testing and Debugging of Software Applications, • Computer Networks and Internet, • Object Oriented Programming, • Unified Modelling Language (UML) • Database Management Systems, • Online Systems, • IT Audit and Security, • Data Communication/Protocols

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
2.	179/2022	**Lecturer (Female) (Mathematics)** (BS-17), Islamabad Model Colleges, Federal Directorate of Education, Ministry of Federal Education & Professional Training.	Second Class or Grade 'C' Master's degree or equivalent in Mathematics.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Subject Test = 50 marks **Part-III** Professional Test = 30 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Master's Level)** • Calculus/Differentiation, Integration, Limits of Continuity • Discrete Structures/Discrete Mathematics, • Communication Skills for Mathematicians, • Computing Tools for Mathematicians, • Mathematical Statistics, • Real Analysis, • Mathematical Spaces (Sets, Vector Spaces, Metric Spaces, Topological Spaces, Tensors) • Differential Equations. **Part-III** • Teaching Techniques and Methodology • Classroom Management and Discipline • Testing and Evaluation • Knowledge of Bloom's Taxonomy
3.	180/2022	**Assistant Director (MIS)** (BS-17), Federal Board of Revenue, Revenue Division. **NOTE**: At first stage MCQs Screening Test shall be held, then on the basis of its result top merit position holders @ ten candidates per vacancy from respective quotas would be called for Descriptive Test.	Second Class or Grade 'C' Master's degree in Computer Science/ Information Technology or equivalent from a University recognized by HEC. **OR** Second Class or Grade 'C' Bachelor's degree in Computer Science/ BIT (4 years duration) or equivalent from a University recognized by HEC.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test = 80 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** • Computer Hardware & Software, , • Data Communication & Networking, • C/C++ Language, • Visual Basic, • Relational Database Management System (RDBMS), • Operating System Unix/Linux • Oracle/PLSQL, **Note**: For Pre-selected candidate, syllabus for Descriptive Test is at Page-10 below

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
4.	181/2022	**Inspector Customs/ Intelligence Officer** (BS-16), Federal Board of Revenue, Revenue Division. **NOTE**: At first stage MCQs Screening Test shall be held, then on the basis of its result top merit position holders @ ten candidates per vacancy from respective quotas would be called for Descriptive Test.	i) Second Class or Grade 'C' Bachelor's degree from a recognized University with Economics, Commerce, Statistics, Accounting, Computer Science, Law, Pharmacy, Chemistry or Physics as one of the subjects or B.Sc. Engineering in any specialty. ii) Computer literacy up to the level of MS Word, MS Power Point and MS Excel. iii) **Minimum Physical Standard**: (a) For Male candidates: Height 5′-6″, Chest 32″-33.5″ (b) For Female Candidates: Height 5′-2″. (Documentary proof from authorized Medical authorities required).	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test = 80 marks	**Part-I** Grammar Usage, Sentence Structuring **Part-II** • Basic Arithmetic – Algebra – Ratios – Percentages – Arithmetic Means • Current Affairs. – Issues/Challenges at National and International Level during the last 2 years – Basic Economic facts related to Pakistan. • Pakistan Affairs & Islamic Studies – Basic Level knowledge • Basic Computer Operation in MS Office **Note-I : (Equal weightage for each topic at Part-II)** **Note-II**: For Pre-selected candidate, syllabus for Descriptive Test is at Page-11 below
5.	182/2022	**Registrar** (BS-17), Accountability Courts, Ministry of Law & Justice.	i) Second Class or Grade 'C' Bachelor's degree in Law or equivalent qualification from a University recognized by HEC. ii) Two (2) years post qualification experience in legal matters.	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.** Degree Programme • Role of Lawyer/Prosecutor in Defending/ Pleading the Court Cases • Steps involved in Processing of Legal Cases. • Important principles established in case law.
6.	184/2022	**Senior Elementary Teacher (Physical) (Female)** (BS-16), Islamabad Model Schools/ Colleges (Ex. FG Schools), Ministry of Federal Education & Professional Training.	Second Class or Grade 'C' Master's degree/ Bachelor's degree (4 years duration) in Physical Education with Second Class or Grade 'C' M.Ed./ B.Ed./ B.Ed. (Hons)/ Associate Diploma in Education or equivalent qualification from a University recognized by HEC.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Subject Test = 50 marks **Part-III** Professional Test = 30 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II (Master's Level)** • Philosophy of Physical Education, • Psychology of Physical Education, • Rules of games • Basics of Human Anatomy • Administration and Management in Sports, • Sports Nutrition, • Trauma and Rehabilitation, • Research Methodology in Physical Education • Test, Measurement and Evaluation in Physical Education & Sports • Sports Injuries, • Sports with physical disabilities

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
					Part-III • Teaching Techniques and Methodology • Classroom Management and Discipline • Testing and Evaluation • Knowledge of Bloom's Taxonomy

7.	185/2022	**Assistant Director (**BS-17), Airports Security Force, Ministry of Aviation.	Second Class or Grade 'C' Master's/ Bachelor's (16 years) degree or equivalent qualification from a University recognized by HEC.	Objective Type Test (MCQ)
				
				Part-I
				
				English = 20 marks
				
				Part-II
				
				General Intelligence/ Professional Test = 80 marks
					Part-I
					Vocabulary, Grammar Usage, Sentence Structuring
					Part-II
					• Basic Arithmetic
					  − Algebra
					  − Ratios
					  − Percentages
					  − Arithmetic Means
					• Current Affairs.
					  − Issues/Challenges at National and International Level during the last 2 years
					• Pakistan Affairs & Islamic Studies
					  − Basic Level knowledge
					• Security Measures to Maintain Law & Order

8.	186/2022	**Assistant Director** (BS-17), Directorate of Workers Education, Ministry of Overseas Pakistanis & Human Resource Development.	Second Class or Grade 'C; Master's degree in Economics/ Sociology/ Business Administration/ Public Administration from a University recognized by HEC.	Objective Type Test (MCQ)
				
				Part-I
				
				English = 20 marks
				
				Part-II
				
				General Intelligence/ Professional Test = 80 marks
					Part-I
					Vocabulary, Grammar Usage, Sentence Structuring
					Part-II
					• Basic Arithmetic
					  − Algebra
					  − Ratios
					  − Percentages
					  − Arithmetic Means
					• Current Affairs.
					  − Issues/Challenges at National and International Level during the last 2 years
					• Pakistan Affairs & Islamic Studies
					  − Basic Level knowledge
					• Development of Training Modules
					• Teaching Methodologies

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
9.	189/2022	**Junior Scientific Officer (JSO)** (BS-16), OS Directorate, Ministry of Defence.	Second Class or Grade 'C' B. Tech (Textile/ Mechanical) or equivalent qualification from a University recognized by the HEC.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Subject Test = 80 marks **Note**: Separate papers for candidates of Mechanical and Textile as there is no commonality in these disciplines.	**Part-I** Grammar Usage, Sentence Structuring **Part-II (For B. Tech. Textile candidates)** • General textile technology, • Spinning, Weaving, • Dyeing and finishing, • Testing and quality control, • Fabric design and structure, • Business management and industrial economics, • Industrial management and human relations. **Part-II (For B. Tech. Mechanical candidates)** • Heat Transfer • Thermodynamics • Industrial Materials • Machine Design and Drawing • Mechanics of Machines • Workshop Technology • Hydraulic Machines

10.	191/2022	**Civilian Store Officer, Grade-III** (BS-17), Corps of EME, Ministry of Defence.	Second Class or Grade 'C' Master's degree in Business Administration (Supply Chain Management) or equivalent qualification from a University recognized by the HEC.
			OR
			Major/ Captain (Retired) from EME Corps with requisite qualifications of the post.
				Objective Type Test (MCQ)
				Part-I
				English **=** 20 marks
				Part-II
				Professional Test = 80 marks
					Part-I
					Vocabulary, Grammar Usage, Sentence Structuring.
					Part-II
					• Basic Arithmetic
					  – Algebra
					  – Ratios
					  – Percentages
					  – Arithmetic Means
					• Basic knowledge of I.T
					• Procedures of Receipt and Issue of Stores
					• Stores handling procedures with relation to following topics:-
					  – Stock Taking
					  – Care and Preservation of Store items
					  – Ware House Management
					• Public Procurement Rules, 2004

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
11.	194/2022	**Civilian Security Officer Grade-III** (BS-17), Corps of EME, Ministry of Defence.	Second Class or Grade 'C' Master's degree in Public Policy & Strategic Security Management/ Criminology & Security Studies from a University recognized by HEC **OR** Retired Army Officers of the rank of Captain/ Major with requisite qualification of the post.	Objective Type Test (MCQ) **Part-I** English **=** 20 marks **Part-II** Professional Test= **8**0 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** • Terrorism, Radicalism and War on Terror • Media's representation of Crime and the Criminal Justice System • Modern Law Enforcement and Crime Prevention System • Human Rights Abuses and Protection, • Money-laundering • Cyber Crime • Role of NAB, FIA, ANF • Security Measures to Maintain Law & Order
12.	195/2022	**Establishment & Cash Officer, Grade-IV** (BS-16), Corps of EME, Ministry of Defence.	Second Class or Grade 'C' Bachelor's degree with Mathematics/ Statistics/ Economics/ Commerce/ Business Administration or equivalent qualification from a University recognized by the HEC. **OR** JCOs/ NCOs (Retired) from EME Corps with requisite qualification of the post.	Objective Type Test (MCQ) **Part-I** English **=** 20 marks **Part-II** Professional Test= **8**0 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** • Civil Servant Act 1973 and Rules made thereunder • Public Procurement Rules 2004 • Rules of Business, 1973 as amended • Secretariat Instructions and Office Procedures • System of Financial Control and Budgeting 2006 • Human Resource Management • Basic Computer Operation in MS Office

13.	196/2022	**Assistant Director Estate (Accounts)** (BS-17), Estate Office Management, Ministry of Housing & Works.	Second Class or Grade 'C' Master's degree in Business Administration/ Economics/ Mathematics/ Statistics/ Commerce/ LLB or equivalent qualification from University recognized by HEC.
			OR
			Final Examination Certificate awarded by Institute of Cost & Management Accountants of Pakistan (ICMAP) or Institute of Chartered Accountants of Pakistan (ICAP)/ Membership of the Association of Chartered Certified Accountants (ACCA), UK.
				Objective Type Test (MCQ)
				Part-I
				English **=** 20 marks
				Part-II
				General Intelligence/ Professional Test= **8**0 marks
					Part-I
					Vocabulary, Grammar Usage, Sentence Structuring.
					Part-II
					• Basic Arithmetic
					  − Algebra
					  − Ratios
					  − Percentages
					  − Arithmetic Means
					• Current Affairs.
					  − Issues/Challenges at National and International Level during the last 2 years
					• Pakistan Affairs & Islamic Studies
					  − Basic Level knowledge
					• Basic Knowledge of IT
					• Procedure for maintenance of Accounts of a Department
					• Handling of Audit matters
					• Functions of Ministry of Housing & Works and Estate Office

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
14.	197/2022	**Programmer** (BS-16), Estate Office Management, Ministry of Housing & Works.	Second Class or Grade 'C' Master's/ Bachelor's (16 years education) degree in Computer Science/ Information Technology/ Software Engineering or equivalent qualification from a University recognized by HEC. **OR** Second Class or Grade 'C' Bachelor's degree in Computer Engineering/ Computer System Engineering or equivalent qualification from a University recognized by PEC.	Objective Type Test (MCQ) **Part-I** English **=** 20 marks **Part-II** Professional Test= **8**0 marks	**Part-I** Grammar Usage, Sentence Structuring. **Part-II** - System Analysis and Design, - Coding, Writing, Testing and Debugging of Software Applications, - Integration and Maintenance of Software - Object Oriented Programming, - IT Audit and Security, - Data Communication/Protocols
15.	198/2022	**Assistant Director (Programmer)** (BS-17), Estate Office Management, Ministry of Housing & Works.	Second Class or Grade 'C' Master's/ Bachelor's (16 years education) degree in Computer Science/ Information Technology/ Software Engineering or equivalent qualification from a University recognized by HEC. OR Second Class or Grade 'C' Bachelor's degree in Computer Engineering/ Computer System Engineering or equivalent qualification from a University recognized by PEC.	Objective Type Test (MCQ) **Part-I** English **=** 20 marks **Part-II** Professional Test= **8**0 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** - Software Architecture, - System Analysis and Design, - Coding, Writing, Testing and Debugging of Software Applications, - Integration and Maintenance of Software - Computer Networks and Internet, - Object Oriented Programming, - Database Management Systems, - IT Audit and Security, - Data Communication/Protocols

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

16.	199/2022	**Administrative Officer** (BS-17), Federal Government Educational Institutions (Cantts/ Garrisons), Directorate, Ministry of Defence.	i) Second Class or Grade 'C' Master's degree from a University recognized by HEC.
			ii) Two (2) years post qualification experience in Administration/ Establishment/ Finance & Budget.
				Objective Type Test (MCQ)
				
				Part-I
				
				English **=** 20 marks
				
				Part-II
				
				General Intelligence/ Professional Test= **8**0 marks
					Part-I
					Vocabulary, Grammar Usage, Sentence Structuring.
					Part-II
					• Basic Arithmetic
					  – Algebra
					  – Ratios
					  – Percentages
					  – Arithmetic Means
					• Current Affairs.
					  – Issues/Challenges at National and International Level during the last 2 years
					• Pakistan Affairs & Islamic Studies
					  – Basic Level knowledge
					• Basic Computer Operation in MS Office
					• Civil Servant Act 1973 and Rules made thereunder
					• PPRA Rules 2004
					• Rules of Business, 1973 as amended from time to time
					• Secretariat Instructions and Office Procedures
					• System of Financial Control and Budgeting 2006
					• Human Resource Management

17.	200/2022	**Assistant Director (Database)** (BS-17), Estate Office Management, Ministry of Housing & Works.	Second Class or Grade 'C' Master's/ Bachelor's (16 years education) degree in Computer Science/ Information Technology/ Software Engineering or equivalent qualification from a University recognized by HEC. **OR** Second Class or Grade 'C' Bachelor's degree in Computer Engineering/ Computer System Engineering or equivalent qualification from a University recognized by PEC.	Objective Type Test (MCQ) **Part-I** English **=** 20 marks **Part-II** Professional Test= **8**0 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** • Integration and Maintenance of Software • Computer Networks and Internet, • Structure Query Language (SQL) • Database Management Systems, • Data backup and Recovery • Password Policy of database • Database Security

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
18.	201/2022	**Assistant Director (Web Development)** (BS-17), Estate Office Management, Ministry of Housing & Works.	Second Class or Grade 'C' Master's/ Bachelor's (16 years education) degree in Computer Science/ Information Technology/ Software Engineering or equivalent qualification from a University recognized by HEC. **OR** Second Class or Grade 'C' Bachelor's degree in Computer Engineering/ Computer System Engineering or equivalent qualification from a University recognized by PEC.	Objective Type Test (MCQ) **Part-I** English **=** 20 marks **Part-II** Professional Test= **8**0 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** • System Analysis and Design, • Coding, Writing, Testing and Debugging of Software Applications, • Integration and Maintenance of Software • Operating Systems • Computer Networks and Internet, • Database Management Systems, • World Wide Web (WWW) • IT Audit and Security, • Data Communication/Protocols

Syllabus for Descriptive Test of

F.4-180/2022-R (Assistant Director MIS (BS-17))

Max Marks: 100   Qualifying Standard 40%   Time Allowed: 3 Hours

I.   Management Information System (MIS)

Introduction to Information Systems in Organizations; Business Process and Decision Making; Productivity, Innovation and Strategy; Database and Content Management; Decision Making and Business Intelligence; Competitive Advantage and Business Processes; Networks and Collaboration; ERP and E-commerce, Social Networking, and Web 3.0; Acquiring Information Systems through Projects; Structure, Governance, and Ethics; Managing Information Security and Privacy.

II.   Software Development

Basic programming elements and concepts, Problem Solving & Program Design, Components of a programming language, Program development and execution, Program structure, Data types and variable declarations, Standard I/O streams, and statements, Control structures, Standard library functions, User defined functions and parameter passing, Arrays, pointers, and strings, Structures, unions, and bit manipulation operators. 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.

III.   Database Systems

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

IV.   Operating Systems & Web

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

SUGGESTED READINGS

S. No.	Title	Author
1.	Experiencing MIS,	D. M. Kroenke, A. Gemino and P. Tingling.
2.	Business driven information systems,	P. Baltzan, B. Detlor, and C. Welsh,
3.	C++ How to Program	Harvey M. Deitel and Paul J. Deitel
4.	Data Structures and Algorithm Analysis in C++	Mark Allen Weiss
5.	Data structures	Aaron M. Tanenbaum,
6.	Data and Computer Communications	William Stallings
7.	Database Systems Concepts	Silberchatz, Abraham & Korth, Sudarshan
8.	Web Services: Principles and Technology	Michael Papazoglu

Syllabus for Descriptive Test of

F.4-181/2022-R (Inspector Customs/Intelligence Officer (BS-16))

Max Marks: 100   Qualifying Standard 40%   Time Allowed: 3 Hours

Part-I (English Essay): 40 Marks

Candidates will be required to write an Essay in English comprising **1000 words** from a set of **four given topics.** Candidates are expected to reflect comprehensive knowledge on a selected topic. Candidate's articulation, expression and technical approach to the style of English Essay writing will be examined.

Part-II (Current Affairs): 30 Marks

Candidates will be expected to demonstrate knowledge on current affairs related to the following:

- CPEC and Pakistan,
- Kashmir Issue,
- Pak US relations
- Afghanistan Crisis
- Basic Economic facts related to Pakistan

Part-III (Islamic Studies/Pakistan Studies): 30 Marks

I.   Islamic Studies

Introduction to Islam, Seerah of the Prophet Muhammad (PBUH) as Role Model, Status of Woman in Islam, Articles of Faith, Islamic Code of Life, Islamic Concept of Human Rights

II.   Pakistan Studies

Parliamentary democracy in Pakistan under 1973 Constitution, Salient features of the Constitution of Pakistan 1973, Economic Challenges for Pakistan, Major social problems of Pakistan.

SUGGESTED READINGS

S.No.	Title	Author
1.	Pakistan and World Affairs	Shamshad Ahmad (Edition-2015)
2.	Constitution of Pakistan 1973	
3.	Kashmir in Conflict: India, Pakistan and the Unending War.	Schofield, Victoria. New York: I.B.Tauria, 2003.
4.	Modern South Asia: History, Culture, Political Economy.	Jalal, Aisha and Bose, Sugata. New York: Routledge, 1998.
5.	Federalism and Ethnic Conflict Regulation in India and Pakistan.	Adeney, Katharine. , New York: Palgrave Macmillan, 2007.
6.	Issues in Pakistan's Economy	S. Akbar Zaidi
7.	Economic Survey of Pakistan	Government Publication
	For Islamic Studies	
8.	Introduction to Islam	Dr. Hamidullah
9.	Islam: its meaning and Message	Khurshid Ahmad
10.	Insan e Kamil	Dr Khalid Alvi
11.	Islami Tehzeeb Kay Chund Darakhshan Pehloo	Mustafa Sabali

Schemes and Syllabi for Written Examination (Descriptive) for Posts in BS-20 advertised under Consolidated Advertisement No. 12/2022

Case No.	F.4-188/2022-R
Particulars of post	**Fisheries Development Commissioner** (BS-20), Ministry of Maritime Affairs.
Minimum Qualification & Experience:	i. Ph.D. or M. Phil./ MS or Second Class or Grade 'C' Master's or Bachelor's (4 years education) degree in Fisheries & Aquaculture/ Marine Biology or Zoology with Specialization in fisheries or equivalent qualification from a University recognized by the HEC. ii. Thirteen (13) years post qualification experience in case of Ph.D. or Fifteen (15) years post qualification experience in case of M.Phil/ MS. Or Seventeen (17) years post qualification experience in case of Master's or Bachelor's (4 years education) degree in the field of Marine/ Inland Fisheries or Aquaculture Technology.

PAPER: PROFESSIONAL (100 MARKS)

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

OR

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

Schemes and Syllabi for Written Examination (Descriptive) for All Posts in BS-18 & BS-19 included in Consolidated Advertisement No. 12/2022

PAPER-I: ENGLISH

Max Marks: 100   Time Allowed: 3 Hours

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

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

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

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

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

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

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

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

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

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

SUGGESTED READINGS

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

PAPER-II: PROFESSIONAL

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

Case No.	F.4-177/2022-R
Particulars of post	**General Staff Officer, Grade-I (Classified Radiologist)** (BS-19), Diagnostic Radiology Department, Armed Forces Institute of Radiology and Imaging, Ministry of Defence.
Minimum Qualification & Experience:	i) MBBS or equivalent qualification from a University recognized by PM&DC. ii) FCPS (Radiology) or equivalent qualification recognized/ registered by the PM&DC. iii) Seven (7) years post qualification working experience at any renowned medical imaging setup.

Part-I: 25 Marks (MCQ)

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

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

Core courses of **MBBS Degree**

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

Core courses of FCPS (**Radiology**).

PAPER-II: PROFESSIONAL

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

Case No.	F.4-178-**A**/2022
Particulars of post	**Associate Professor (Female)** (**Islamiyat**) (BS-19), F.G Colleges, Directorate of Federal Government Educational Institutions (Cantts/ Garrisons), Ministry of Defence.
Minimum Qualification & Experience:	Ph.D. degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with Twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

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

Part-II: (Islamiyat) (Subjective): 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 Mohummad (PBAH) as;

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

III. Islamic Civilization and Culture:

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

IV. Islam and World

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

I. <u>اسلامی ضابطہ حیات</u>

⇦ اسلامی نظام کی نمایاں خصوصیات:

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

⇦ سرکاری ملازمین کی ذمہ داریاں

II. <u>سیرت النبی کا مطالعہ</u>

⇦ سیرت النبی کے مطالعہ کی اہمیت اور ضرورت بطور:

- نمونہ عمل
- پیغمبر امن
- مبلغ
- سفارت کار
- معلم انسانیت
- انقلابی رہنما

III. <u>اسلامی تہذیب و ثقافت</u>

⇦ اسلامی تہذیب و ثقافت کے معانی اور اہم اجزا
⇦ سماج اور انسانی شخصیت کی تعمیر میں تہذیب کا کردار
⇦ اسلامی تہذیب کے نمایاں اوصاف:

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

IV. <u>اسلام اور دنیا:</u>

⇦ اسلامی تہذیب کے مغرب اور مغرب کے اسلامی تہذیب پر اثرات
⇦ اسلام اور عصر حاضر کے چلینجز
⇦ مشرق اور مغرب کے درمیان بات چیت
⇦ جدید دنیا میں اسلام کا مقام

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

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

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

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

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

SUGGESTED READINGS

S. No.	Title	Author
1.	Islam: its meaning and Message	Khurshid Ahmad
2.	Islam: The Misunderstood Religion	Muhammad Qutub
3.	Towards Understanding Islam	Abul Aala Moudoodi
4.	Ideals and Realities of Islam	Hussain Nasr,
5.	A brief Survey of Muslim Science and Culture	Muhammad Abdur –Rahman
6.	Quranic Sciences	Afzalur Rahman
7.	Tahzeeb o Tamaddon e Islami	Rasheed Akhter Nadvi
8.	Islamic Civilization: Foundations Belief & Principles	Abul A' la Mawdudi
9.	Research in Education	JW Best
10.	Integrating Education Technology into Teaching	Roblyer
11.	Curriculum Development	S.M. Shahid
12.	Educational Measurement and Evaluation	S.M. Shahid
13.	Educational Administration	S.M. Shahid

PAPER-II: PROFESSIONAL

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

Case No.	F.4-178-**B**/2022
Particulars of post	**Associate Professor (Female)** (**Mathematics)** (BS-19), F.G Colleges, Directorate of Federal Government Educational Institutions (Cantts/ Garrisons), Ministry of Defence.
Minimum Qualification & Experience:	Ph.D. degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with Twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

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

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

I.   Vector Calculus

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

II. Statics

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

III. Dynamics

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

IV. Ordinary differential equations

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

V. Fourier series and partial differential equations

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

VI. Numerical Methods

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

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

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

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

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

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

SUGGESTED READINGS

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

PAPER-II: PROFESSIONAL

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

Case No.	F.4-178-**C**/2022
Particulars of post	**Associate Professor (Female)** (**Pak Studies)** (BS-19), F.G Colleges, Directorate of Federal Government Educational Institutions (Cantts/ Garrisons), Ministry of Defence.
Minimum Qualification & Experience:	Ph.D. degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with Twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

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

Part-II: (Pak Studies) (Subjective)   : 50 Marks

- Ideology of Pakistan-----definition and elucidation, historical aspects: Muslim rule in the Sub-Continent, its downfall and efforts for Renaissance. Movements for reforms-- Shaikh Ahmad Sarhindi, Shah Waliullah, Sayyid Ahmad Shaheed, Aligarh, Deoband, Nadwah, and other educational institutions-------Sindh Madrassah and Islamia College Peshawar. Ideology of Pakistan in the light of Speeches and statements of Allama Iqbal and Quaid- i Azam Muhammad Ali Jinnah.
- Changing Security Dynamics for Pakistan: Challenges to National Security of Pakistan
- Pakistan War on Terror
- Foreign Policy of Pakistan Post 9/11
- Evolution of Democratic System in Pakistan
- Hydro Politics ; Water Issues in Domestic and Regional Context
- Pakistan's Energy Problems and their Effects
- Pakistan's Relations with Neighbours
- Pakistan and India Relations Since 1947
- Kashmir Issue
- The war in Afghanistan since 1979 and its impact on, and challenges to Pakistan.
- War against Terrorism since 2001 onwards
- The Prevailing Social Problems of Pakistan and the Strategies to Deal with them: Over Population, Poverty, Education, Health and Sanitation.

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

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

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

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

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

SUGGESTED READINGS

S. No.	Title	Author
1.	Federalism and Ethnic Conflict Regulation in India and Pakistan.	Adeney, Katharine.
2.	Labour, Democratization and Development in India and Pakistan.	Candland, Christopher,
3.	Frontline Pakistan: The Struggle with Militant Islam.	Hussian, Zahid.
4.	Modern South Asia: History, Culture, Political Economy	Jalal, Aisha and Bose, Sugata.,
5.	Back to Pakistan: A Fifty Year Journey.	Mass, Leslie Noyes.
6.	Pakistan: Manifest Destiny.	Qureshi, Atiff.
7.	Pakistan, America, and Future of Global Jihad	Riedel, Bruce. Deadly Embrace:
8.	Kashmir in Conflict: India, Pakistan and the Unending War.	Schofield, Victoria.
9.	The Emergence of Pakistan	Ch. Muhammad Ali
10.	The Last Mughal	William Dalrymple
11.	Jinnah of Pakistan	Stanley Wolpert
12.	A Brief History of Pakistan.	Wynbrandt, James.
13.	Pakistan's Energy Sector: From Crisis to Crisis-Breaking the Chain	Zaid Alahdad
14.	Research in Education	JW Best
15.	Integrating Education Technology into Teaching	Roblyer
16.	Curriculum Development	S. M. Shahid
17.	Educational Measurement and Evaluation	S. M. Shahid
18.	Educational Administration	S. M. Shahid

PAPER-II: PROFESSIONAL

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

Case No.	F.4-178-**D**/2022
Particulars of post	**Associate Professor (Female)** (**Physics)** (BS-19), F.G Colleges, Directorate of Federal Government Educational Institutions (Cantts/ Garrisons), Ministry of Defence.
Minimum Qualification & Experience:	Ph.D. degree in the relevant subject with eight (8) years post qualification teaching and administrative experience at College/ University level. **OR** M. Phil degree in the relevant subject with ten (10) years post qualification teaching and administrative experience at College/ University level. **OR** Second Class or Grade 'C' Master's degree in the relevant subject with Twelve (12) years post qualification teaching and administrative experience at College/ University level.

Part-I: 25 Marks (MCQ)

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

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

I.   Mechanics

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

II.   Fluid Mechanics

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

III.   Waves and Oscillation

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

IV.   Heat and Thermodynamics

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

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

V. Electricity and Magnetism

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

VI. Modern and Quantum Physics

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

VII. Solid State Physics

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

VIII. Nuclear Physics

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

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

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

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

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

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

SUGGESTED READINGS

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

PAPER-II: PROFESSIONAL

Max Marks: 100   Time Allowed: 3 Hours

Case No.	F.4-183/2022-R
Particulars of post	**Deputy Director (Planning)** (BS-18), Marine Fisheries Department, Ministry of Maritime Affairs.
Minimum Qualification & Experience:	i) Second Class or Grade 'C' Master's degree in Economics with Statistics/ Statistics/ Mathematics with Statistics. ii) Five (5) years post qualification experience in Economics Development/ Research/ Statistical Analysis and Evaluation.

Part-I: 25 Marks (MCQ)

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

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

I.   Project Management

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

II.   Scope Management

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

III.   Communications Management

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

IV.   Risk Management

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

V.   Statistical Techniques

All statistical techniques related to Planning & Research

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

I.   Probability Distributions

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

II.   Regression Analysis & Correlation Analysis

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

III. Sampling & Sampling Distributions

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

IV. Statistical Inferences

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

V. Design of Experiments

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

SUGGESTED READINGS

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

PAPER-II: PROFESSIONAL

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

Case No.	F.4-187/2022-R
Particulars of post	**Assistant Scientific Adviser** (BS-18), Ministry of Science & Technology.
Minimum Qualification & Experience:	i) Second Class or Grade 'C' M.Sc. in Natural Sciences or equivalent qualification from University recognized by HEC. ii) Five (5) years post qualification experience in Research & Development/ Science & Technology Management.

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

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

i. Communication Skills, Technical Writing and Presentation Skills

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

ii. Planning and Management

a) <u>Project Management</u>

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

b) <u>Time Management</u>

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

c) <u>Statistical Techniques</u>

All statistical techniques related to Planning & Research

Part-III: 25 Marks (Descriptive)
(General Science)

I.   Basic Inorganic Chemistry

Types of chemical bonding, ionic and covalent bonding, localized bond approach, theories of chemical bonding, valance bond theory (VBT), hybridization and resonance, prediction of molecular shapes using valence-shell electron-pair repulsion (VSEPR) model, Molecular orbital theory (MOT) applied to diatomic molecules, delocalized approach to bonding, bonding in electron deficient compounds, hydrogen bonding, Physical and chemical properties of p-block elements with emphasis on oxygen, carbon, chlorine, silicon, nitrogen, phosphorus and some of their representative compounds.

II.   Metabolism

Digestion; absorption and transport of proteins, carbohydrates, lipids and nucleic acids. Glycolysis; citric acid cycle, gluconeogenesis, glycogenesis, glycogenolysis and photosynthesis.

Biosynthesis of triglycerides, phosphides, steroids and bile acids and ketone bodies.

Biochemical reaction of amino acids: decarboxylation, deamination, transamination and transmethylation, etc., urea cycle, creatine and uric acid synthesis.

Catabolism of nucleosides, DNA polymerases and other enzymes involves in metabolism.

III. Mechanics

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

IV. Modern and Quantum Physics

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

Part-IV: 25 Marks (Descriptive)
(Human Resource, Financial Management & Quality Management)

I. Human Resource and Financial Management

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

II. Basic Concept of Quality Management

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

SUGGESTED READINGS

S. No.	Title	Author
1.	Practical English Grammar	A.J. Thomson and A.V. Martinet.
2.	Reading. Advanced	Brian Tomlinson and Rod Ellis.
3.	Study Skills	Richard Yorky
4.	Writing. Advanced	Ron White.
5.	College Writing Skills	John Langan.
6.	Project Management Body of Knowledge	Project Management Institute (PMI) standards committee
7.	Software Project Management	S.A. Kelkar, A Concise Study, Prentice Hall of India.
8.	Textbook of Inorganic Chemistry 2013	Chaudhary, S. U.
9.	Stereochemistry (Basic Concepts in Chemistry) 2002	Morris, D. G.
10.	Perspectives of Modern Physics.	A. Beiser.
11.	Introduction to Quantum Mechanics	D. Griffiths
12.	Human Resource Management	H.T. Graham &Roger Bennett
13.	Management	James A.F. Stoner, R. Eward Freeman, Daniel R. Gilbert Jr.
14.	Governance	Anne Mette Kjær

PAPER-II: PROFESSIONAL

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

Case No.	F.4-190/2022-R
Particulars of post	**Civilian Store Officer, Grade-I** (BS-19), Corps of EME, Ministry of Defence.
Minimum Qualification & Experience:	Ph.D. in Engineering Management or equivalent qualification from a University recognized by the PEC with Eight (8) years post qualification experience in BS-17 & above or equivalent relating to store supply and Logistics/ Engineering Management matters in a Government/ Semi-Government/ Autonomous/ Public/ Private Organization. **OR** M. Phil. in Engineering Management or equivalent qualification from a University recognized by the PEC with Ten (10) years post qualification experience in BS-17 & above or equivalent relating to store supply and Logistics/ Engineering Management matters in a Government/ Semi-Government/ Autonomous/ Public/ Private Organization. **OR** Second Class or Grade 'C Master's degree in Business Administration (Supply Chain Management) or equivalent qualification from a University recognized by the HEC with Twelve (12) years post qualification experience in BS-17 & above or equivalent relating to store supply and Logistics/ Engineering Management matters in a Government/ Semi-Government/ Autonomous/ Public/ Private Organization. **OR** Colonel/ Lieutenant Colonel (Retired) from EME Corps with requisite qualification and experience of the post.

Part-I: 25 Marks (MCQ)

▪ 25 MCQ Questions on Part-II & III.

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

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

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

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

IV. PPRA Ordinance 2002 and Rules 2004.

V. Procedures for Receipt and Issue of Stores

VI. Stores procedures with relation to following topics:-

− Stock Taking

− Care and Preservation of Military Stores

VII. Ware House Management

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

I. Human Resource and Financial Management

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

II. Basic Concept of Quality Management

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

SUGGESTED READINGS

S. No.	Title	Author
1.	An Introduction to the Public Administration	E.N. Cladden
2.	Public Administration for a Welfare State	Paul Abbleby
3.	Warehouse Distribution & Operation Handbook	Mulcahy, D.E.
4.	Inventory Control and Management	Walters, D.
5.	The Bureaucracy of Pakistan	Charles F. Kennedy
6.	Human Resource Management	H.T.Graham &Roger Bennett
7.	Management	James A.F.Stoner, R.Eward Freeman, Daniel R.Gilbert Jr.

PAPER-II: PROFESSIONAL

Max Marks: 100   Time Allowed: 3 Hours

Case No.	F.4-192/2022-R
Particulars of post	**Senior Research Officer Grade-II** (BS-18), Corps of EME, Ministry of Defence.
Minimum Qualification & Experience:	Second Class or Grade 'C' Master's degree in Computer Science/ Information Technology or equivalent qualification from a University recognized by the HEC with Five (5) years post qualification experience relating to research and/ or works relating to engineering matters in a Government/ Semi-Government/ Autonomous/ Public/ Private Organization. **OR** B.Sc Engineering in Electrical/ Mechanical/ Electronics from a University recognized by the PEC with Five (5) years post qualification experience relating to research and/or works relating to engineering matters in a Government/ Semi-Government/ Autonomous/ Public/ Private Organization.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

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

I.   Electricity & Electronics

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

II. Electrical Machines

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

III. Electronics:

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

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

IV. Electricity and Magnetism

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

V. Mechanical Engineering Fundamentals

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

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

I. Human Resource and Financial Management

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

II. Basic Concept of Quality Management

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

SUGGESTED READINGS

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

PAPER-II: PROFESSIONAL

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

Case No.	F.4-193/2022-R
Particulars of post	**Assistant Chief Pharmacist** (BS-18), Defence Division, Ministry of Defence.
Minimum Qualification & Experience:	i) Second Class or Grade 'C' Master's Degree in Pharmacy or equivalent qualification recognized by Pharmacy Council of Pakistan (PCP) and HEC. ii) Five (5) years post qualification experience in relevant field.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

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

I.   Pharmaceutical Preparations

Pharmaceutical Calculations, Galenical Preparations: Infusions. Decoctions. Extracts. Fluid extracts. Tinctures. Aromatic Waters, Extraction Processes: Maceration, Solvents used in Pharmaceutical Preparations, Oral Solutions, Syrups, Elixirs and Spirits, Oral Suspensions, Emulsions, Magma and Gels, Transdermal Drug Delivery Systems, Ophthalmic, Nasal and Otic Preparations, Suppositories And Vaginal Suppositories

II.   General Pharmacology

Routes of drugs administration, Pharmacokinetics, Pharmacodynamics

III. Dispensing and Community Pharmacy

Basic Principles of Compounding and Dispensing Including, Extemporaneous Dispensing of: Solutions, Suspensions, Emulsions, Creams, Ointments, Pastes and gels, Pharmaceutical Incompatibilities, Classical dosage Forms. Radio-Pharmacy — Techniques and Applications,

IV. Pharmaceutical Chemistry

Theory, Instrumentation and Pharmaceutical Applications of the following Spectroscopic Methods:

- Spectroscopic methods
- Chromatographic methods:
- Electro chemical methods
- Differential scanning calorimetry

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

I.   Human Resource and Financial Management

Definition, Significance and Scope of Human Resource Management; Organization— Types of Organization, Theory of Organization, Principles of Organization, Organization of the Federal and Provincial Governments, Public Sector Enterprises; Approaches to Human Resource Management. Personnel Administration—Tools of Personnel Management: Selection, Training, Promotion, Compensation, Discipline; Communication, Communication Channels and Principles of Public Relations; Human

Behaviour and Organizations Administration.—Elements of Financial Administration, Performance Programmed Budgeting, Capital Budget, Principles of Budgeting, Auditing and Accounting.

II. Basic Concept of Quality Management

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

SUGGESTED READINGS

S. No.	Title	Author
1.	Pharmaceutics	Michel E Aulton
2.	Essential of Medical Pharmacology	J D Tripathy
3.	Clinical Pharmacy & Therapeutics	Cate Whittlesea & Karen Hodson
4.	Basic and Clinical Pharmacology	Katzung B G
5.	Pharmacology	Lipponcott
6.	Fundamentals of Experimental Pharmacology.	Qayum A
7.	Management of Drug Users in the Community: A practical Handbook.	Roy Robertson
8.	High Performance Liquid Chromatography	Lough W J
9.	William Kemp, Organic Spectroscopy	
10.	Theory and Practice of Chromatography	M Aminuddin & Javed Iqbal
11.	Practical Pharmaceutical Chemistry	A H Beckett and J B Stennlake
12.	Jenkins's quantitative Pharmaceutical Chemistry	A M Knevel and F E Digangi
13.	Human Resource Management	H.T.Graham &Roger Bennett
14.	Management	James A.F.Stoner, R.Eward Freeman, Daniel R.Gilbert Jr.