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. 12/2019

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
1.	202/2019	**Junior Civilian Labour Officer** (BS-16), Ordnance Corps, GHQ, Ministry of Defence.	Law Graduate.	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 **L.LB.** Degree Program. - Labour Policies of the Government of Pakistan.
2.	224/2019	**Lady Physiotherapist** (BS-16) Naval Headquarters Ministry of Defence.	Second Class or Grade 'C' Bachelor's Degree in Physiotherapy	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test=80 marks	**Part-I** Grammar Usage, Sentence Structuring **Part-II** - Musculoskeletal Physical Therapy - Cardiopulmonary Physical Therapy - Pediatrics Physical Therapy - Neurological Physical Therapy - Sports Physical Therapy - Electrotherapy & Actinotherapy - Biomechanics and Kinesiology - Physiotherapy Skills & Techniques - Therapeutic Exercises & Techniques
3.	235/2019	**Sub Treasury Officer** (BS-16 plus 25% Special Pay), Finance Department, Gilgit Baltistan, Ministry of Kashmir Affairs and Gilgit Baltistan.	Second Class or Grade 'C' Bachelor's Degree in Business Administration (Finance/ Accounting)/ Commerce/ Economics/ Statistics/ Mathematics from a University recognized by HEC.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test=80 marks	**Part-I** Grammar Usage, Sentence Structuring **Part-II** - Accounting Principles & Procedures, - Scrutiny of Record for Audit Purposes, - Journal, Ledger & Cash Book, - Financial Planning & Cost Accounting, - Re-appropriation of Funds and Supplementary Grant, - Settlement of Audit Objections - Preparation of Pension Documents. - Public Procurement Rules, 2004

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
4.	237/2019	**Assistant Director** (BS-17) National Highways & Motorway Police, Ministry of Communications.	Second Class or Grade 'C' Master's degree in Economics/ Business Administration/ Commerce/ Public Administration.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test=80 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** • Civil Servants Act, 1973 • Rules of Business, 1973 • Secretariat Instructions and Office Procedure. • System of Financial Control and Budgeting, • Public Procurement Regulatory Authority (PPRA) Rules, 2004 • Basic Arithmetic − Algebra − Ratios − Percentages − Arithmetic Means • Basic knowledge of Computer/IT.
5.	239/2019	**Accountant** (BS-16), National Highways & Motorway Police, Ministry of Communications.	Second Class or Grade 'C' Bachelor's Degree in Commerce. OR Qualified as SAS/ AAT (PIPFA); OR Professional Examination of Institute of Cost and Management Accountants of Pakistan (ICMAP)/ Foundation Examination of Institute of Chartered Accountants of Pakistan.	Objective Type Test (MCQ) **Part-I** English =20 marks **Part-II** Professional Test =80 marks	**Part-I** Grammar Usage, Sentence Structuring **Part-II** • Accounting Principles & Procedures, • Scrutiny of Records for Audit Purposes • Journal, Ledger & Cash Book, • Preparation of Annual Budget, • Financial Planning and Cost Accounting • Heads of Accounts, Re-appropriation of Funds and Supplementary Grants • Settlement of Audit Objections. • Public Procurement Rules, 2004 • Basic IT Knowledge
6.	240/2019	**Computer Operator** (BS-16), National Highways & Motorway Police, Ministry of Communications.	Second Class or Grade 'C' Bachelor's Degree in Computer Science.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test=80 marks	**Part-I** Grammar Usage, Sentence Structuring **Part-II** • Program logic, • Visual Basic, C++, Java, Unix/Red Hat Linux Operating System, • Computer Networks and Internet, • Computer Graphics and Algorithms • Development of Basic Algorithms,

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
7.	242/2019	**Librarian** (BS-17), National Transport Research Centre (NTRC), Ministry of Communications	Second Class or Grade 'C' Bachelor's Degree (04 years duration) or Master's Degree in Library Science or Library and Information Science or equivalent qualification from a University recognized by the HEC. **OR** i. Second Class or Grade 'C' Bachelor's Degree with Diploma in Library Science or equivalent qualification from a University recognized by the HEC. ii. Three (3) years post qualification experience in the relevant field.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test=80 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II** • Information Sources and Services • Cataloguing: Theory and Practice • Procurement and Maintenance of Library Books • Library Automation/Information Storage & Retrieval • Research Methods & Techniques for Librarians • Public Records, Rare Material & their Conservation • Management of Serials Publications • Rules & Procedure regarding Write Off the Library Losses
8.	248/2019	**Scientific Officer** (BS-17), Ministry of Science & Technology.	Second Class or Grade 'C' M.Sc. in Natural Sciences.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** General Science Test=80 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring **Part-II** • Matter and its Properties • Atomic Structure • Compounds and Bonding • Chemical Reactions • Acids and Bases • Phases of Matter • Gases • Organic Molecules • Organic Products (Polymers, Oil, Soaps, Paints, Varnishes and Detergents) • Organic Reactions • Radioactivity and its Applications • Metal and alloys • Periodic Table

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
9.	249/2019	**Junior Establishment and Finance Officer** (BS-16), OS Directorate, GHQ, Ministry of Defence.	i. Second Class or Grade 'C' Bachelor's Degree in Commerce or equivalent from a University recognized by the HEC. ii. Two (2) years post qualification experience in Administration and Finance.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test = 80 marks	**Part-I** Sentence Structuring, Grammar Usage **Part-II** • Civil Servants (Appointment, Promotion and Transfer) Rules, 1973 • Government Servants Conduct Rules, 1964 • Civil Servant (Appeal) Rules, 1977 • Public Procurement Rules, 2004 • Human Resource Management and Staff Development • System of Financial Control & Budgeting 2006 • Basic Knowledge of Computer/IT.
10.	250/2019	**Doctor (Female)** (BS-17), National Commission for Child Welfare and Development, Ministry of Human Rights.	MBBS or equivalent qualification recognized by PMDC.	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. • Health Policies of the Government of Pakistan. • Care vs Cure for Health Management. • Major Challenges being faced by the Health Sector.
11.	252/2019	**Assistant Dental Surgeon** (BS-17) Federal Government Polyclinic Islamabad, Ministry of National Health Services, Regulations & Coordination.	i. BDS or equivalent qualification recognized by PM&DC. ii. One (1) year House Job	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 **BDS** Degree Program. • Health Policies of the Government of Pakistan. • Care vs Cure for Health Management. • Major Challenges being faced by the Health Sector.
12.	256/2019	**Assistant Director (Programmer)** (BS-17), Anti Narcotics Force, Ministry of Narcotics Control.	i. Second Class or Grade 'C' Master's Degree in Computer Science/IT or equivalent qualification recognized by HEC. ii. Two (2) years post qualification experience in Programming	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test = 80 marks	**Part-I** Vocabulary, Grammar Usage, Sentence Structuring. **Part-II** • Programming in PHP, Ajex and Java Script • Designing, Analyzing & Maintenance of Software • Coding, Debugging, Testing and Documenting of Application Programme • Installation and Testing Software Package • Software Development Process, • Software Architecture, • Software Maintenance & Optimization

S. No	Case No. F.4-	Particulars of Post(s)	Qualifications/Experience for the Posts	Test Specification	Topics of Syllabi
13.	257/2019	**Range Forest Officer** (BS-16 Plus 25% Special Pay), Forest, Parks & Wildlife, Gilgit Baltistan, Ministry of Kashmir Affairs and Gilgit Baltistan.	B.Sc. Degree in Forestry.	Objective Type Test (MCQ) **Part-I** English = 20 marks **Part-II** Professional Test = 80 marks	**Part-I** Grammar Usage, Sentence Structuring. **Part-II** • Silviculture • Forest Management • Range Management • Watershed Management • Forest types of Pakistan and Gilgit-Baltistan • Forest mensuration/Biometrics • Forest Ecology • Forest Utilization
14.	258/2019	**Assistant Manager IT** (BS-17) Intelligence Bureau	i. Second Class or Grade 'C' Master's degree or equivalent in Computer Science. OR Second Class or Grade 'C' Bachelor's degree in Software Engineering or System Engineering/ Computer Engineering. ii. Certification in MTA (Microsoft Technology Associate) OR CCNA (CISCO Certified Network Associate) OR RHCSA (Red Hat Certified System Administrator) OR The officer will be required to qualify certification in either of the above during probation period.	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.
15.	260/2019	**Medical Officer** (BS-17), Airports Security Force, Cabinet Secretariat, (Aviation Division).	MBBS.	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. • Health Policies of the Government of Pakistan. • Care vs Cure for Health Management. • Major Challenges being faced by the Health Sector.

SUBJECTIVE TYPE IT PROFICIENCY TEST

<u>Max Marks: 100</u>   <u>Qualifying Standard 50%</u>   <u>Time Allowed: 3 Hours</u>

Case No.	F.4-258/2019-R
Particulars of post	**Assistant Manager IT** (BS-17) Intelligence Bureau
Minimum Qualification & Experience:	i. Second Class or Grade 'C' Master's degree or equivalent in Computer Science. OR Second Class or Grade 'C' Bachelor's degree in Software Engineering or System Engineering/ Computer Engineering. ii. Certification in MTA (Microsoft Technology Associate) OR CCNA (CISCO Certified Network Associate) OR RHCSA (Red Hat Certified System Administrator) OR The officer will be required to qualify certification in either of the above during probation period.

I.   Introduction to Computing

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

II.   Computer Communications & Networks

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

III.   Database Systems

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

IV.   Operating Systems & Web

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

SUGGESTED READINGS

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

Schemes and Syllabi for Written Examination (Descriptive) for all Posts in BS-20 advertised under Consolidated Advertisement No. 12/2019

i.	Case No.	**F.4-165/2019-R**
	Particulars of post	**Deputy Director General** (BS-20), Pakistan Bureau of Statistics, Statistics Division, Ministry of Planning, Development and Reform.
	Minimum Qualification & Experience:	i. Second Class or Grade 'C' Master's Degree in Statistics or Economics with Statistics or Mathematics with Statistics or Sociology with Statistics or Commerce with Statistics. ii. Seventeen (17) years post qualification professional experience in the required field in Government/ semi-Government/ Banks, Public/ Private Organizations. The candidate should also have to his/her credit publications of standard books or technical papers on Statistical/ Economics problems in Internationally recognized journals.
ii.	Case No.	**F.4-264/2019-R**
	Particulars of post	**Professor** (BS-20), Pakistan Institute of Medical Sciences (PIMS), Islamabad, Ministry of National Health Services, Regulations & Coordination.
	Minimum Qualification & Experience:	i. MBBS or equivalent Medical qualification recognized by PMDC. OR M.Sc. of a recognized University in case of Basic Science in the relevant subject (for non-medical graduates). ii. D.Sc., Ph.D., FCPS., M.D., M.S., M.Phil etc. in the respective subjects. FCPS/ M.D. with D.P.H. (for Public Health Institutions only). OR Equivalent qualification recognized by PMDC. iii. POST QUALIFICATION EXPERIENCE: Three years teaching experience as an Associate Professor in the respective subject provided that total experience as Assistant Professor/Associate Professor is not less than eight years in a postgraduate institute. OR Nine years as Assistant Professor or four years teaching experience as Associate Professor in under graduate institute provided that total experience as Assistant Professor/ Associate Professor is not less than twelve years in under graduate institute. iv. RESEARCH: Must have produced at least two research papers during three years as Associate Professor provided that total research papers as Assistant Professor/ Associate Professor are not less than five. OR At least three research papers during Associate Professorship provided that total research papers as Assistant Professor/ Associate Professor are not less than seven if experience is in under Graduate Medical college. NOTE: (a) For all Basic Science subjects a non-medical is eligible provided a medical graduate with requisite qualification is not available. (b) For appointment as a Professor, candidates possessing a D.Sc./ Ph.D. degree, the thesis or major subjects/ courses should be related to the subject in which they are appointed. (c) Candidates without a basic medical qualification are eligible for appointment as Professor provided they possess at least D.Sc./ Ph.D. degree and provided a medical graduate with the requisite qualification is not available. **CATEGORIES**: (A) GASTROENTEROLOGY (B) NEUROSURGERY (C) GENERAL SURGERY (D) CARDIAC SURGERY.

PAPER: ENGLISH (100 MARKS)

English Essay: Candidates will be required to write an Essay in English from three topics comprising approximately **2000 words**. Candidates are expected to reflect comprehensive and

research based knowledge on a selected topic. Candidate's articulation, expression and technical treatment of the style of English Essay writing will be examined.

OR

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

Schemes and Syllabi for Written Examination (Descriptive) for All Posts in BS-18 & BS-19 included in Consolidated Advertisement No. 12/2019

PAPER-I: ENGLISH

Max Marks: 100   Time Allowed: 3 Hours

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

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

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

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

Reading Comprehension (10 marks)

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

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

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

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

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

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

SUGGESTED READINGS

Sr. No.	Title	Author
1.	English Grammar in Use	Raymond Murphy (Cambridge University Press)
2.	Practical English Usage	M. Swan (Oxford University Press)
3.	The Little, Brown Handbook	H. Ramsey Flower & Jane Aaron (The Little, Brown & Co; Harper Collins)
4.	A University English Grammar	R. Quirk & S. Greenbaum (ELBS; Longmans)
5.	Write Better, Speak Better	Readers Digest Association
6.	Modern English in Action	Henry Christ (D.C. Heath & Co.)
7.	Exploring the World of English	Syed Saadat Ali Shah

PAPER-II: PROFESSIONAL

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

Case No.	F.4-181/2019-R
Particulars of post	**Assistant Chief (**BS-18), Energy Finance & Economic Section, Energy Wing, Ministry of Planning, Development and Reform.
Minimum Qualification & Experience:	i. Member ACMA (Associate Member of Institute of Cost and Management Accountant) or MBA with Finance major or M.A. (Economics). ii. Three (3) years post qualification experience in the relevant field.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II.

Part-II: (Professional)   75 Marks (Descriptive)

I.   Fundamental Accounting Principles, Concepts, Assumptions and Conventions: Nature and Scope of Accounting, Accrual/Matching Concept, Consistency of Presentation and Comparability, True and Fair View, Neutrality, Materiality, Prudence, Completeness, Going Concern, and Substance over Form.

II.   Accounting Cycle/Process and Financial Statements: Transactions and/or Events, General Journal, General Ledger, Trial Balance (Unadjusted),Adjusting Entries and Adjusted Trial Balance, Work Sheet, Financial Statements including Income Statement, Statement of Financial Position (Balance Sheet), Statement of Cash Flows and Statement of Changes in Equity in accordance with the Financial Reporting Framework as specified by International Accounting Standard Board (IASB) through IFRSs/IASs, and by Securities and Exchange Commission of Pakistan through Companies Ordinance 1984, and Closing and Reversing Entries.

III. Attributes, and Significance of Accounting Information: Attributes of Accounting Information, Information/Reporting Requirements of various Users/Stakeholders of Financial Statements including External (Investors/Shareholders, Creditors, Suppliers, Lenders/Financiers, Government Agencies etc.) and Internal (Board of Directors, Partners, Managers, Employees etc.) Stakeholders.

IV. Accounting for Associations Not-for-profit, and for Public Sector: Accounting **Principles** and Financial Statements - of Associations Not-for-profit, and – of Public Sector Entities as per Standardized Financial Reporting Framework provided by International Public Sector Accounting Standards (IPSAS) Board and Practices being followed in the country.

V.   Fundamental Cost Accounting Principles and Concepts: Nature and Scope of Cost and Managerial Accounting; Cost Concepts, Elements and Classification; Underlying Differences among Financial, Cost, and Management Accounting.

VI. Public Finance: The Role of Government in the Economy; The Tools of Political Economy; Principles of Budgetary Analysis; National Income and Product Accounts – importance in budgetary analysis; Federalism; Financial Administration in Pakistan.
VII. Business Finance: General Finance Concepts; Fundamentals of valuation;

Corporate Decision Making; Investor Decision Making
VIII. Statistics for Managers: Introduction; Managerial Application of Statistics; Estimation Theory; Sampling Theory; Project for Applied Statistics; Testing of Hypotheses; Correlation and Regression Analysis

SUGGESTED READINGS

S. No.	Title	Author
1.	Financial Accounting, and Intermediate Accounting	Kieso, Weygandt and Warfield
2.	Fundamentals of Accounting Principles	Wild. Larson. Chiappetta
3.	Accounting for Decision-making	Meigs, William and Haka
4.	Cost Accounting	Jain and Narang
5.	Public Finance and Public Policy	Jonathan Gruber,
6.	Comprehensive Notes for Essentials of Managerial Finance,	Scott Besley,
7.	Statistics for Management.	Levin, Richar I.
8.	Economic Surveys of Pakistan	
9.	Statistical Year Books of Pakistan	

PAPER-II: PROFESSIONAL

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

Case No.	F.4-223/2019-R
Particulars of post	**Assistant Professor (Botany)** (BS-18), Federal College of Education Islamabad, Ministry of Federal Education & Professional Training.
Minimum Qualification & Experience:	Second Class or Grade 'C' Master's Degree in the relevant subject with five (5) year post qualification teaching/administrative experience at College/ University level

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

Part-II: (Botany)   50 Marks (Descriptive)

I. Algae, Fungi and Bryophytes

- Phycology: Distribution, Classification, Structure, Life History and Economic importance of the main groups of Algae.
- Mycology and Plant Pathology: Structure, Reproduction, Classification and Economic importance of the main groups of Fungi. Diseases of economically important crops and general principles of their control
- Bryology: Structure and reproduction of bryophytes, Evolution of Gametophyte and Sporophyte.

II. Anatomy and Embryology

- Primary and secondary tissues. Meristems. Secondary growth in dicot stem. Anatomy of leaf, stem and root.
- Micro and megasporogenesis, pollination mechanism, fertilization, development of Embryo and Endosperm, Seed dispersal.

III. Plant Physiology

- Plant water relations, Osmotic Quantities, component potentials of water and their role in transport, water absorption by roots, transpiration. Role of essential mineral elements and their uptake. Plant hormones. Photoperiodism, Vernalization. Dormancy and Seed germination. Enzymes.
- Photosynthesis: Plant pigments, Light reaction, CO_2 fixation, Mechanism of photophosphorylation.
- Respiration: Glycolysis, Kreb cycle, Mechanism of oxidative phosphorylation.

IV. Ecology

- Influence of climatic, edaphic and biotic factors on plant growth. Vegetation sampling techniques. Concepts of ecosystems and their productivity, ecological energetics, Pyramids (of numbers, biomass and energy), trophic levels, food chains and food webs. Biogeochemical cycles (Hydrological and Nitrogen). Succession.
- Causes and reclamation of soil salinity and water logging in Pakistan. Soil erosion, its control and soil conservation methods. Deforestation. Biodiversity conservation. Pollution.

V. Cytology

- Cell cycle, cellular morphology, chemistry of cell wall and cell membrane, cell to cell communication, plant tissue and cell culture, cell senescence and cell death.
- Ultra-structure of various cell organelles: Mitochondria, Golgi bodies, Endoplasmic reticulum, Plastids, Ribosomes, Glyoxysomes, Vaculoes, Nucleus.

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

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

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

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

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

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

SUGGESTED READINGS

S. No.	Title	Author
1.	Esau's Plant Anatormy: Meristems, Cells and Tissues of the Plant Body: Their Structure, Function and Development	Evert, F.F. and S. Hichhorn 2006
2.	Cryptogamic Botany-Algae and Fungi	Smith, G. M. 2001
3.	Cryptogamic Botany-Bryophyte and Pteridophyte	Smith, G. M. 2001
4.	Comparative Morphology of the Vascular Plants	Foster, A.S. and E.H. Gifford. 1989
5.	Plant and Environment	Daubermine, R, F, 1974
6.	Plant Taxonomy and Biosystematics	Stac, C. A. 1980
7.	Plant Physiology	Taiz, L.& E. Zeiger 2006
8.	Genetics: A Conceptual Approach. 4th edition	Pierce, B. A. 2012
9.	Molecular Cell Biology	Lodish,H., A. Berk, S.L. Zipursky, P. Matsudaira, D. Baltimore and J. Darnell 2000
10.	Concepts of Genetics. 10th edition	William S. Klug. 2012
11.	Ilmi Biomolecules, Cell Biology and Genetics.	Cheema, T.A. and Cheema Z.T. 2009

S. No.	Title	Author
12.	Carvan Textbook of Botany Paper " A" (Morphology of Plants)	Malik, T. A. 2006
13.	Ecology (Principles and applications). 1st ed. Cambridge University Press UK.	Chapman, J.L. and Reiss, M.J. 1992.
14.	Fundamentals of Ecology	Odum, E.P. and Barrett, G.W. 2004
15.	Advanced Plant Taxonomy	Mondal, A. K., 2009
16.	Growth and Differentiation in Plants	Phillips and Wareings
17.	Research in Education	JW Best
18.	Integrating Education Technology into Teaching	Roblyer
19.	Curriculum Development	S. M. Shahid
20.	Educational Measurement and Evaluation	S. M. Shahid
21.	Educational Administration	S. M. Shahid

PAPER-II: PROFESSIONAL

Max Marks: 100   Time Allowed: 3 Hours

Case No.	F.4-241/2019-R
Particulars of post	**Assistant Professor (Computer Science) (Male)** (BS-18), Federal Government Colleges for Men, Federal Directorate of Education, Ministry of Federal Education and Professional Training.
Minimum Qualification & Experience:	Ph. D Degree in the relevant subject with one (1) year post qualification teaching experience at College/ University level. **OR** M. Phil Degree in the relevant subject with three (3) year post qualification teaching experience at College/ University level **OR** Second Class or Grade 'C' Master's Degree in the relevant subject from a University recognized by HEC with five (5) year post qualification teaching experience at College/ University level

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II & III.

Part-II: (Computer Science)   50 Marks (Descriptive)

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

Asynchronous and Synchronous transmission, LAN/WAN/MAN, Network layers, Transport layer protocols TCP/IP, UDP, Error Control, Flow Control, Multiplexing, Routing, Bridging, Network security issues.

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) 25 Marks (Descriptive)

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

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

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

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

SUGGESTED READINGS

S. No.	Title	Author
1.	Modern Operating Systems	Andrew S. Tanenbaum
2.	Operating System Concepts	Addison-Wesley
3.	Algorithms and Data Structures	N. Wirth
4.	Data structures	Aaron M. Tanenbaum,
5.	Database Systems: A Practical Approach to Design, Implementation and Management	R.Connolly and P.Begg
6.	Introduction to Computer Networks	A. S. Tanenbaum
7.	Computer Networks and Internets	Douglas E. Comer
8.	Computer Architecture: A Quantitative Approach	Hennessy & Patterson
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.4-259/2019-R
Particulars of post	**Deputy Director** (BS-18), Federal Board of Revenue, Revenue Division.
Minimum Qualification & Experience:	i. Second Class or Grade 'C' Master's Degree or equivalent qualifications in Economics/ Statistics/ Business Administration. ii. Five (5) years post qualification experience of work or Research relating to Statistics/ Public Finance or related fields.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II.

Part-II: (Professional)   75 Marks (Descriptive)

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 of the 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 "schools of thought"), Inflation.

III. **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.

IV. **Statistical Inferences:** Estimation: Point Estimation, Properties of a good Estimator. Interval Estimation. Interval Estimation of Single Population means and Single proportion. Difference between two means and Difference between two proportions.

Hypothesis Testing: Types of errors. Hypothesis Testing for Population Mean. Inferences for difference between Two Population Means. Inferences for the difference between Means of Two Normal Populations using Independent Samples (variances are assumed Equal) for sample size. Inference for Two Populations Mean using Paired Samples. Hypothesis testing for Single Population Proportion and difference between two population proportions. Estimation of sample size

Analysis of categorized data. Goodness of fit tests. Contingency tables. Test of independence in contingency tables.

V. **Statistics for Managers:** Introduction; Managerial Application of Statistics; Estimation Theory; Sampling Theory; Project for Applied Statistics; Testing of Hypotheses; Correlation and Regression Analysis

VI. **Public Finance:** The Role of Government in the Economy; The Tools of Political Economy; Principles of Budgetary Analysis; National Income and Product Accounts – importance in budgetary analysis; Federalism; Financial Administration in Pakistan.

SUGGESTED READINGS

S. No.	Title	Author
1.	Microeconomic	Ferguson, C.E. & Gould, J.P., Nicholson, Mankiw
2.	Macroeconomics	Rudigar Dorubush and Stanley Fisher Blanchard
3.	Introduction to Statistical Theory, Part-II	Chaudhry, S.M. and Kamal, S.
4.	Statistics for Management.	Levin, Richar I.
5.	Public Finance and Public Policy	Jonathan Gruber,
6.	Comprehensive Notes for Essentials of Managerial Finance,	Scott Besley,
7.	Economic Surveys of Pakistan	
8.	Statistical Year Books of Pakistan	