Schemes and Syllabi for Written Examination (Descriptive) for All Posts in BS-18 & BS-19 included in Consolidated Advertisement No. 04/2022

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 (Cambridge University Press)
2.	Practical English Usage	M. Swan (Oxford University Press)
3.	The Little, Brown Handbook	H. Ramsey Flower & Jane Aaron (The Little, Brown & Co; Harper Collins)
4.	A University English Grammar	R. Quirk & S. Greenbaum (ELBS; Longmans)
5.	Write Better, Speak Better	Readers Digest Association
6.	Modern English in Action	Henry Christ (D.C. Heath & Co.)
7.	Exploring the World of English	Syed Saadat Ali Shah

PAPER-II: PROFESSIONAL

Max Marks: 100 Time Allowed: 3 Hours

Case No.	F.4-65/2022-R
Particulars of post	**Joint Commissioner for Indus Waters** (BS-19), Office of the Pakistan Commissioner for Indus Waters, Ministry of Water Resources.
Minimum Qualification & Experience:	i. Bachelor's Degree in Civil Engineering/ Agricultural Engineering, Registration with PEC required or recognized by HEC. ii. Twelve (12) years post qualification experience in any or all the fields of Designing/ Construction/ Maintenance and operation of irrigation or River Works in responsible position equivalent to BS-17 and above in Govt./ Semi Govt./ Public or highly reputable private Organization.

Part-I: 25 Marks (MCQ)

- 25 MCQ Questions on Part-II.

Part-II: Professional: 75 Marks (Descriptive)

1. **Concrete Technology**
   Constituent materials of concrete & their properties; Hydration, setting & hardening of cement; Testing of cement & aggregates; Types of concrete & their properties; Batching, mixing, transportation & placing of concrete; Properties of fresh and hardened concrete as well as factors affecting them; Testing of concrete for various properties including physical & strength tests.

2. **Ultimate strength method**
   Analysis and Design of prismatic and non-prismatic sections in flexure, compatibility based analysis of sections and code requirements for flexure; Analysis of one-way and two-way solid slabs with general discussion on other slab systems; Design for flexure.

3. **Canal Irrigation System**
   Alluvial and Non alluvial canals; Alignment of canal; Distribution system for canal irrigation, Basic definitions, Determination of required canal capacity, Canal losses, Evaporation, Seepage, Empirical formula for channel losses, Channel section for minimum seepage loss. Cross drainage works.

4. **Design of Irrigation Channel**
   Design of stable channel, Regime Channels, Kennedy's theory, critical velocity ratio, Kutter's formula, Manning's formula, Lacey's theory, Design procedure for Lacey's theory, Estimation of transported sediment, bed load equations, Meyer-peter's and Einstein's formula, Muneer and Qureshi formula, Design procedure for lined/non-erodible irrigation channel, Maintenance of irrigation channels.

5. **Reservoir Planning and Dams in General**
   Types of reservoirs, Flood control reservoir Multipurpose reservoir; Capacity of reservoirs, Storage zones of reservoirs, Reservoir yield, Estimation of demands and optimal reservoir operation, Flooding routing or flood absorption, Reservoir sedimentation, Silt control in reservoir, selection of suitable site for reservoir; Economics of combined project, Cost-benefit consideration and general principle of optimizing capital budget.

6. **Design of Drainage Systems**
   Surface drainage, Design of open ditches, Maintenance of alignment Drainage, Open drains, Methods of construction, Subsurface drainage, Tile drains, Mole drains,

Determining depth and spacing of drains. Drainage coefficient, Size of the tile drain, Outlets for drains, Envelop material, Installation and maintenance of Tile Drains.

7. **Canal Lining**
   Lining and its types, Financial justification and economics of canal lining, Design of lined irrigation channels, Permissible velocities in lined channels, Construction of various types of lining.

8. **Indus Waters Treaty 1960 and its implementation**
   Historical background of Indus Water Treaty, 1960, Transitional Arrangements, Functions of Permanent Indus Commission, Challenges in implementation of the Treaty, Implications and limitations, Disputes resolution mechanism, Current water issues/disputes with India, Benefits or otherwise of the Treaty for Pakistan and India.

9. **International Water Treaties**
   Knowledge pertaining to International water treaties governing relations between neighbouring/regional countries like: India Vs Bangladesh, India Vs Nepal, European Countries sharing River Danube and Rhine, US Vs Canada, US Vs Mexico, South Asian countries sharing Mekong River.

10. **Customary International Law**
    - The Helsinki Rules, 1966 adopted by International Law Association (ILA) in its 52nd Congress held in Helsinki in August 1966
    - Vienna Convention on the Law of Treaties, 1969

11. **International Water Conventions**
    - The 1992 UNECE Convention on the protection and use of Transboundary Watercourses and International Lakes
    - The 1997, UN Convention on the Law of the Non-Navigational uses of International Watercourses

12. **Impact of Climate Change on River System**
    Salient topographic and climatic features of Indus basin and inflows of Eastern and Western Rivers, Irrigation water requirements of Pakistan and the sources from which these are met, Latest research and its findings about the fate of glaciers of the Indus basin, Pakistan's hydro-meteorological network, Projection of long-term water availability particularly in Western Rivers of the Indus basin i.e. the Indus including Kabul, Jhelum and the Chenab.

SUGGESTED READINGS

S. No.	Title	Author
1.	Conflict and cooperation on South Asia's International Rivers: A Legal Perspective	M.A. Salman
2.	Indus Water Treaty: Political and Legal Dimensions	Ijaz Hussain
3.	Pakistan's Water: in the line of Action for Global Warming	Dr. Raja Rizwan Hussain, Engr. Raazia Attique
4.	Climate Change Profile of Pakistan	Asian Development Bank
5.	Design of Reinforced Concrete Structures	Hassoun, M.N.
6.	Reinforced Concrete Design	Wang, C.K. & Charles G.S.
7.	Irrigation and Drainage	Sharma, R.K. and T.R.Sharma,
8.	Water Resources Engineering	Linslay, R.K. and Joseph, B.F.