

केन्द्रीय जल आयोग
Central Water Commission

59 वीं विभागीय परीक्षा – कें.ज.आ इंजीनियरिंग अधिकारियों के लिए
59th Departmental Examination for Engineering Officers of CWC

प्रोफेशनल पेपर - Professional Paper – I
(with three sections A, B & C)

समय Time: 3 hrs

अधिकतम अंक Max Marks: 100

सामान्य अनुदेश :-

- I. यह व्यवसायिक पत्र – I जिसमें 12 पृष्ठ हैं, तीन भागों में विभाजित किया गया है – क, ख और ग ।
- II. सिविल और मैकेनिकल उम्मीदवारों के लिए भाग – क जो कुल 60 अंक का है, एक समान है। भाग- क के दो भाग हैं, जिसमें भाग-1 कुल 20 अंकों का तथा भाग -2 कुल 40 अंकों का है ।
- III. भाग- ख सिविल इंजीनियरिंग उम्मीदवारों के लिए है, जो कुल 40 अंक का है । भाग- ख के दो भाग हैं, भाग- I कुल 10 अंकों का तथा भाग – II कुल 30 अंकों का है ।
- IV. भाग-ग मैकेनिकल इंजीनियरिंग उम्मीदवारों के लिए है, जो कुल 40 अंक का है । भाग- ग के दो भाग हैं, भाग-I कुल 10 अंकों का तथा भाग –II कुल 30 अंकों का है।

General Instructions:

- I. This professional paper-I containing 12 pages, divided into three sections- A, B & C.
- II. Section-A is common for Civil & Mechanical candidates with total marks of 60. Section-A has two parts, Part-I is 20 marks & Part-II of 40 marks.
- III. Section-B is only for Civil Engineering Candidates with total marks of 40. Section -B has two parts, Part-I of 10 marks & Part-II of 30 marks.
- IV. Section-C is only for Mechanical Engineering Candidates with total marks of 40. Section -C has two parts, Part-I of 10 marks & Part-II of 30 marks.

महत्वपूर्ण अनुदेश :

- I. सिविल इंजीनियर भाग –क और ख हल करें ।
- II. मैकेनिकल इंजीनियर भाग –क और ग हल करें ।
- III. बहुविकल्पीय प्रश्नों का उत्तर प्रश्न पत्र में ही दिया जाना है। अलग उत्तर पुस्तिका में लिखे गए उत्तरों का मूल्यांकन नहीं किया जाएगा ।
- IV. कृपया प्रश्न पत्र के प्रत्येक भाग पर अपना रोल नंबर लिखें ।
- V. प्रश्न पत्र को उत्तर पुस्तिकाओं के साथ वापस करना होगा ।
- VI. नकारात्मक अंकन नहीं किया जाएगा अर्थात् गलत उत्तरों के लिए कोई अंक नहीं काटे जाएंगे।

Important Instructions:

- I. Civil Engineers shall attempt Section A & B.
- II. Mechanical engineers shall attempt Section A & C.
- III. The multiple choice questions are to be attempted / answered in the question paper only. Answer in separate answer sheet shall not be evaluated.
- IV. Please write your Roll No. on each Section of the question paper.
- V. The question paper has to be returned back along with the answer sheets.
- VI. There is no negative marking i.e. no deductions shall be made for incorrect answers.

Roll No.....

Professional Paper-1

Section- A (Common to both Civil and Mechanical Engineers)

Maximum marks 60

Part-1 Multiple Choice objective type questions

Note- This part of Section A contains 20 questions. Every question is of 1 mark. Attempt all questions

- 1) Which of the following is the criteria for economic evaluation of Irrigation Project.
 - a) Financial Rate of Return
 - b) Internal Rate of Return
 - c) Benefit-Cost Ratio
 - d) Cost per hectare
- 2) Which of the following indicate the Major category of water resources project based on CCA (Ha).
 - a) CCA>2000 Ha
 - b) CCA>10000 Ha
 - c) CCA>20000 Ha
 - d) CCA>50000 Ha
- 3) The timeline for completion of appraisal/ examination of Pre - Feasibility Report is weeks as per the Guideline 2017.
 - a) 5
 - b) 6
 - c) 7
 - d) 8
- 4) Examination of which aspect is NOT necessary while appraising of Pre-Feasibility Report of the project.
 - a) Inter-State aspects
 - b) Hydrology aspects
 - c) Cost aspects
 - d) Irrigation aspects
- 5) In which River basin, International clearance of DPR/PFR of projects is NOT necessary.
 - a) Ganga Basin
 - b) Brahmaputra & Meghna Basin
 - c) Indus Basin
 - d) Godavari Basin
- 6) Advisory Committee for acceptance of Irrigation, flood Control and Multipurpose Projects is chaired by
 - a) Chairman, CWC.
 - b) Minister, MoJS.
 - c) Chief Engineer, PAO.
 - d) Secretary, DoWR, RD & GR.

- 7) Regulation and Development of inter-State rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament, by law, to be expedient in the public interest is under:
- Concurrent list
 - State list
 - Union list
 - State & Union list both
- 8) Which Water Dispute Tribunal has been constituted by Central Government without specific request of co-basin State(s)?
- Godavari Water Dispute Tribunal
 - Mahadayi Water Dispute Tribunal
 - Cauvery Water Dispute Tribunal
 - Ravi-Beas Water Dispute Tribunal
- 9) The percentage of Central assistance to projects in 8 North-Eastern, 2 Himalayan States is
- 60%.
 - 75%.
 - 90%.
 - 100%.
- 10) What is the maximum cost escalation allowed on the approved cost of the project for central assistance under PMKSY?
- 20%
 - 15%
 - 25%
 - 10%
- 11) The Scheme PMKSY-AIBP was launched in which Financial Year?
- 2014-15
 - 2015-16
 - 2016-17
 - 2017-18
- 12) A project may be considered as complete under PMKSY-AIBP on completion of % of works.
- 70%
 - 80%
 - 90%
 - 100%
- 13) Which department does the implementation of watershed management under the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)?
- Department of Agriculture Cooperation & Farmers Welfare
 - Department of Drinking Water and Sanitation
 - Department of Science and Technology
 - Department of Rural Development
- 14) Which type of RD form is used in CWC to record Rainfall data?
- RD-6
 - RD-12

- (c) RD-15
- (d) RD-1
- 15) Which instrument is used nowadays in CWC Level-III labs for analysis of Trace & Toxic Metals?
 - (a) Gas Chromatograph Mass Spectrophotometer
 - (b) Atomic Absorption Spectroscopy with auto-sampler
 - (c) Induced Coupled Plasma Mass Spectrophotometer
 - (d) Ion Chromatograph with auto-titration
- 16) Unit for measurement of Turbidity is?
 - (a) Mhos per cm
 - (b) Absolute number only
 - (c) NTU
 - (d) mg / L
- 17) If the spin is below 40 Sec, the current meter should be:
 - (a) discarded and a fresh current meter obtained.
 - (b) sent for servicing / repairs immediately.
 - (c) sent for re-rating to nearest OEM authorized center.
 - (d) None of the above.
- 18) Which of the following is an example of a hard engineering coastal protection structure?
 - (a) Beach nourishment
 - (b) Seawall
 - (c) Dune planting
 - (d) Mangrove restoration
- 19) As per the National Water Mission for Climate Change, the Water Use Efficiency is to be increased by:
 - (a) 15%
 - (b) 20%
 - (c) 25%
 - (d) 30%
- 20) Which of the following statements best describes remote sensing?
 - a) It refers to the process of physically touching and examining a geographic area.
 - b) It involves acquiring information about the Earth's surface from a distance using sensors and instruments.
 - c) It exclusively involves analyzing data collected through field surveys.
 - d) It is a method for directly manipulating geographical features in real-time.

Professional Paper-1

Section- A(Common to both Civil and Mechanical Engineers)

PART-2 Short Answer Type Questions

Note-This part of Section A contains 7 questions. Attempt any 5 questions. Every question is of 8 marks.

1. What are the various stages of approvals in the process of appraisal of a major irrigation project?
2. Write a short note on provisions in the Constitution of India on water and inter-State Rivers.
3. What are stages in processing the Central Assistance demand from project authority for the projects under AIBP-PMKSY?
4. Describe the role of the Central Water Commission's (CWC) in partnership of European Union for Urban Flooding?
5. (i) Write down on importance of fish-weight used in discharge observation in CWC.
(3.5 Marks)
(ii) Describe about Stage-Discharge curve with diagram.
(4.5 Marks)
6. Describe the effects of sea-level rise on coastal infrastructure and coastal management strategies to combat climate change.
7. How can remote sensing and GIS help in water resource management during natural disasters?

Roll No.....

PROFESSIONAL PAPER-I

Section B (For Civil Engineers only)

Maximum Marks - 40

PART-I Multiple Choice Objective Type Questions

This part of Section B contains 10 questions. Every question is of 1 mark. Attempt all 10 questions.

1. Pick up the correct sequence of the part of a canal system from the following:
 - (a) Head work-distributary-branch canal-minor
 - (b) Head works-main canal-branch canal-distributary-minor
 - (c) Head works-main canal-branch canal-minor-distributary
 - (d) Heads works-branch canal-main canal distributary, minor
2. The working tables are prepared to assess the success rate for different uses by matching availability of water with demand in tabular form for a specified period for dam reservoir of barrages. The working tables for a project prepared for period of 40 years indicate success in meeting the irrigation demand in 28 years after meeting the drinking water demand in all 40 years. As per the guidelines, the project is success full in respect of meeting:
 - (a) Both irrigation & drinking water demand
 - (b) Drinking water demand only
 - (c) Irrigation demand only
 - (d) None
3. The Delta for a crop when its duty is 1152 hectares/cumec on the field and base period is 120 days will be:
 - (a) 60 cm
 - (b) 90 cm
 - (c) 120 cm
 - (d) 160 cm
4. While estimating crop water requirement, percolation losses are considered for
 - (a) Semi dry crops
 - (b) Non ponded crops
 - (c) Poned Crops
 - (d) No such losses are considered
5. CCA of a project is 10000 ha. The intensity of irrigation in Kharif season, Rabi season and Zaid season is 90%, 60% and 20% respectively. The total irrigated area of the project (assuming no rain-fed irrigation) is:
 - a) 9000 ha;
 - b) 15000 ha;
 - c) 17000 ha;
 - d) None of the above.

6. A hydrograph is a plot of
 - a) rainfall intensity against time
 - b) stream discharge against time
 - c) cumulative rainfall against time
 - d) cumulative runoff against time
7. The basic assumptions of the unit-hydrograph theory are
 - a) nonlinear response and time invariance
 - b) time invariance and linear response
 - c) linear response and linear time variance
 - d) nonlinear time variance and linear response
8. The D-hour unit hydrograph of a catchment may be obtained by dividing the ordinates of a single peak direct runoff hydrograph (DRH) due to a storm of D hour duration by the
 - a) Total runoff volume (in cm)
 - b) Direct runoff volume (in cm)
 - c) Duration of DRH
 - d) Total rainfall (in cm)
9. The probable maximum flood is
 - a) The standard project flood of an extremely large river
 - b) A flood adopted in the design of all kinds of spillways
 - c) An extremely large but physically possible flood in the region
 - d) The maximum possible flood that can occur anywhere in the country
10. The basic action involved in sheep foot rolling is
 - a) Kneading
 - b) Pressing
 - c) Tamping
 - d) Vibration

Professional Paper-1

Section B : PART-II

This part of Section B contains 5 questions of short answer type. Every question is of 10 mark. Attempt any 3 questions.

- 1) Define reference evapotranspiration (ETo) and crop coefficient (Kc). An irrigation project irrigates wheat crop in an area of 20000 ha. Find the 10-daily water demand at the head of the dam if ETo (mm) is 5.5 mm/day, crop coefficient (Kc) is 0.6 and effective rainfall (Re) of the region is 0.65 mm per day. Assume field application efficiency and conveyance efficiency as 70% each.
- 2) Compute the B.C Ratio of Irrigation project having CCA of 18000 hectare and Annual Irrigation Intensity 120 % with following details:

Type of flow: Gravity

- | | | |
|--------|--|----------------------|
| (i) | Estimated life of the project: | 100 years |
| (ii) | Estimated cost of the project: | Rs. 900 crore |
| (iii) | Cost of Head works: | 20 % of project cost |
| (iv) | Cost of land development: | Rs. 20000/hectare |
| (v) | Gross value of farm produce before project: | Rs. 110 crore |
| (vi) | Gross value of farm produce after project: | Rs. 380 crore |
| (vii) | Expenditure on seed, manure and hired labour before project: | Rs. 45 crore |
| (viii) | Expenditure on seed, manure and hired labour after project: | Rs. 80 crore |
| (ix) | Annual Operation & Maintenance charge: | Rs. 1175 per hectare |

- 3) (a) The isohyets due to a storm in a catchment and area of the catchment bounded by isohyets is tabulated as below:

Isohyets (cm)	Area (km ²)
12	30
12-10	140
10-8	80
8-6	180
6-4	20

Estimate the mean precipitation due to the storm.

(5 Marks)

- (b) What are various components of flood hydrograph? Describe various methods of base flow separation of flood hydrograph.

(5 Marks)

- 4) (a) Define the return period flood. What are the different frequency distributions used to estimate the floods of various return periods? How flood frequency methods differ from hydro-meteorological approach of flood estimation?

(5 Marks)

(b) What is meant by Trap Efficiency of a reservoir? What factors influence its value. List different methods available for reservoir sediment control?

(5Marks)

- 5) Draw a rough Construction Schedule (PERT chart) of following activities during construction of Hydro Electric Project.
- a. Award of major works and equipment mobilization(4 months)
 - b. Construction of Diversion Tunnel (3 months)
 - c. Cofferdam (U/S & D/S) (4 months)
 - d. Dam Concreting (24 months)
 - e. Construction of power house complex (18 month)
 - f. Commissioning of Power House

Roll No.....

PROFESSIONAL PAPER-I

SECTION C (For Mechanical Engineering Only)

Maximum Marks - 40

Part-I Multiple Choice Objective Type Questions

This part of Section C contains 10 questions. Every question is of 1 mark. Attempt all 10 questions.

1. Which of the following cranes provide height lifting height with good Working radius and take up limited space?
 - a. Tower cranes
 - b. Heavy life cranes
 - c. Boom truck cranes
 - d. Hydraulic truck cranes
2. Specification of Batching and Mixing Plant is
 - a. Capacity of creating materials in cubic meter (cum)
 - b. Production of Concrete in Cum/hour
 - c. Capacity of Engine in HP
 - d. None of the above
3. What is the percentage value of the scrap to the original book value of the equipment in
 - a. 5%
 - b. 7.5%
 - c. 10%
 - d. 15%
4. A dummy activity
 - a. Is artificially introduced
 - b. Is represented by a dotted line
 - c. Does not consume time
 - d. All the above
5. The most popular type of organization used for Civil Engineering Constructions, is
 - a. Line organization
 - b. Line and staff organization
 - c. Functional organization
 - d. Effective organization
6. What is a Critical Path?
 - a. Path having maximum Float
 - b. Path having minimum Float
 - c. Shortest path
 - d. None of above
7. Various activities of a project, are shown on bar charts by
 - a. Vertical lines
 - b. Horizontal lines
 - c. Dots
 - d. Crosses
8. Provision of General purpose equipment and inspection vehicles are made under the
 - a 'C' Works
 - b 'J' Works

- c 'Q' Special T&P
 - d 'A' Preliminary
9. Sequences of for tendering process is
- a. Call of Submission
 - b. Bid Submission
 - c. Selection process
 - d. Formation of contract
- a. a-b-c-d
 - b. a-c-b-d
 - c. a-b-d-c
 - d. None of these.
10. Sequence of different stages in finalization of cost of Project:
- a. Design Finalization
 - b. Bill of Qualities
 - c. Selection of construction equipment with size & type
 - d. Construction Schedule
 - e. Cost estimate
- a. a-b-c-d-e
 - b. a-b-d-c-e
 - c. a-b-d-e-c
 - d. None of these.

Professional Paper-1

Section C: PART-II

This part of Section C contains 5 questions of short answer type. Every question is of 10 mark. Attempt any 3 questions.

1. (a) What is difference between CPM and PERT and explain with example where these methods are applied. (5 marks)
(b) What is difference between book value and scrap value of equipment? (5 marks)
2. (a) Write a note on hourly use rate. (5 marks)
(b) A machine was purchased on 1st January, 2018 at a cost of Rs. 50,00,000 and having its total working life as 1,00,000 hours. The scrap value may be considered as Rs. 50,000. During the year 2018, the machine worked for 2000 hours. Calculate the depreciation for the year 2018 and Book value of machine at the end of year 2018. (5 marks)
3. (a) Give various methods of tunneling through rock? (5 marks)
(b) What is mucking in respect of Tunnel Excavation? List some equipment used for the same activity? (5 marks)
4. (a) What are the factors affecting the selection of drilling equipment? (5 marks)
(b) What is rock bolting? Which equipment is generally used for the same? (5 marks)
5. What is Tower Crane? Describe it with proper diagram and also its application with respect to the construction of concrete gravity DAM.

केन्द्रीय जल आयोग
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59 वीं विभागीय परीक्षा – कें.ज.आ इंजीनियरिंग अधिकारियों के लिए
59th Departmental Examination for Engineering Officers of CWC

प्रोफेशनल पेपर – Professional Paper – II
(with three sections A, B & C)

समय Time: 3 hrs

अधिकतम अंक Max Marks: 100

सामान्य अनुदेश :-

- I. यह व्यवसायिक पत्र – II जिसमें 10 पृष्ठ हैं, तीन भागों में विभाजित किया गया है – क, ख और ग ।
- II. सिविल और मैकेनिकल उम्मीदवारों के लिए भाग – क जो कुल 50 अंक का है, एक समान है। भाग- क के दो भाग हैं, जिसमें भाग-1 कुल 20 अंकों का तथा भाग -2 कुल 30 अंकों का है ।
- III. भाग- ख सिविल इंजीनियरिंग उम्मीदवारों (सम्बन्धित पुस्तकों के साथ) के लिए है, जो कुल 50 अंक का है ।
- IV. भाग-ग मैकेनिकल उम्मीदवारों (सम्बन्धित पुस्तकों के साथ) के लिए है, जो कुल 50 अंक का है ।

General Instructions:

- I. This professional paper-II containing 10 pages, divided into three sections- A, B & C.
- II. Section-A is common for Civil & Mechanical candidates with total marks of 50. Section-A has two parts, Part-I is 20 marks & Part-II of 30 marks.
- III. Section-B is only for Civil Engineering Candidates (with related books) with total marks of 50.
- IV. Section-C is only for Mechanical Engineering Candidates (with related books) with total marks of 50.

महत्वपूर्ण अनुदेश :

- I. सभी उम्मीदवारों को पहले व्यवसायिक पत्र-2 के भाग – क को हल करने का प्रयास करना होगा, और इसके पूरा हो जाने के बाद वे इसे पर्यवेक्षक को सौंप देंगे और उसके बाद भाग- ख या ग, जैसा चाहें, को हल करने का प्रयास करेंगे ।
- II. सिविल इंजीनियर भाग –क और ख हल करें ।
- III. मैकेनिकल इंजीनियर भाग –क और ग हल करें ।
- IV. बहुविकल्पीय प्रश्नों का उत्तर प्रश्न पत्र में ही दिया जाना है। अलग उत्तर पुस्तिका में लिखे गए उत्तरों का मूल्यांकन नहीं किया जाएगा ।
- V. कृपया प्रश्न पत्र के प्रत्येक भाग पर अपना रोल नंबर लिखें ।
- VI. प्रश्न पत्र को उत्तर पुस्तिकाओं के साथ वापस करना होगा ।
- VII. नकारात्मक अंकन नहीं किया जाएगा अर्थात् गलत उत्तरों के लिए कोई अंक नहीं काटे जाएंगे।

Important Instructions:

- I. All Candidates shall first attempt Section-A of professional paper-II, and on completion of it they will submit it to the invigilator before they proceed to attempt Section- B or C as the case may be.
- II. Civil Engineers shall attempt Section A & Section B.
- III. Mechanical engineers shall attempt Section A & C.
- IV. The multiple choice questions are to be attempted / answered in the question paper only. Answer in separate answer sheet shall not be evaluated.
- V. Please write your Roll No. on each Section of the question paper.
- VI. The question paper has to be returned back along with the answer sheets.
- VII. There is no negative marking i.e. no deductions shall be made for incorrect answers.

ROLL NO.....

PROFESSIONAL PAPER-II

**SECTION – A
(COMMON TO BOTH CIVIL & MECHANICAL ENGINEERS)**

MAX MARKS: 50

PART 1 – MULTIPLE CHOICE OBJECTIVE TYPE QUESTIONS

Note:

- I. Please attempt ALL TWENTY multiple choice objective type questions. Choose the correct option.**
- II. All questions carry one mark each.**

1. Which of the following organisation has not been envisioned by Dam Safety Act, 2021?
 - a) National Committee on Dam Safety
 - b) State Dam Safety Organisation
 - c) National Dam Safety Authority
 - d) State Dam Safety Authority
2. Under the Dam Safety Act, 2021, what is the function of the State Committee on Dam Safety?
 - a) To construct new dams
 - b) To review the work done by the State Dam Safety Organisation
 - c) To manage interstate water disputes
 - d) To monitor rainfall and flood patterns
3. Which chapter of the Dam Safety Act, 2021 addresses offences and penalties?
 - a) Chapter VIII
 - b) Chapter IX
 - c) Chapter X
 - d) Chapter XI
4. In which year is the last National water policy formulated?
 - a) 2015 b) 2002 c) 2012 d) 1993
5. Which of the IWRM concept taken from Dublin Principles is not true?
 - a) Water is a finite and vulnerable resource

- b) Participatory approach
 - c) Role of women in safeguarding of water.
 - d) International Water Treaty
6. In the assessment of water resources using space based inputs to be carried out, different types of data are being utilized as inputs. Which one of the following is not a satellite based input data?
- a) Precipitation b) Reservoir Flux c) Land use -Land cover
 - d) Evapotranspiration
7. When India first National Action Plan was for Climate Change was launched?
- A. 2010
 - B. 2008
 - C. 2001
 - D. None of the above
8. The recently launched mobile App of CWC for viewing the flood situation is named
- a) Flood Watch India
 - b) Flood situation India
 - c) CWC flood India
 - d) Flood glance India
9. The level flood forecast is categorized as "severe" when water level in river level crosses
- a) Highest Flood Level
 - b) Warning Level
 - c) Danger Level
 - d) Plinth Level
10. RTDAS stands for Telemetry used in flood forecasting is an automatic tool for
- a) Real Time Data Acquisition System
 - b) Read Time Data Acquiring System
 - c) Reliable Time data Automatic System
 - d) Real Time Dashboard and System

11. Draft Flood Plain Zoning act was formulated by CWC in the year.
- a) 1970
 - b) 1975
 - c) 1980
 - (d) 1985
12. As per CWC, the area affected due to floods in India is
- a) 21.213 Mha
 - b) 49.815 Mha
 - c) 40 Mha
 - d) 24 Mha
13. During a topographic survey, what is typically measured to create accurate maps of the project area?
- A) Soil texture
 - B) Elevation and contours of the land
 - C) Water quality parameters
 - D) Air temperature
14. What is the purpose of a "hydrological survey" in water resource management?
- A) To assess soil stability
 - B) To measure and analyse water flow, distribution, and availability
 - C) To evaluate the economic impact of water use
 - D) To determine vegetation types in the watershed
15. What does "site reconnaissance" involve in the context of water resources projects?
- A) Initial site visit to gather preliminary information and assess site conditions
 - B) Detailed design of the water infrastructure
 - C) Finalizing the project's budget
 - D) Monitoring the long-term performance of the project
16. What is "cross-sectional surveying" used for water resources projects?
- A) To measure soil composition
 - B) To determine the shape and dimensions of a water body or channel
 - C) To assess the water quality parameters
 - D) To calculate the economic benefits of the project
17. What role does "geospatial analysis" play in water resources surveys?

- A) It helps analyse spatial relationships and patterns related to water resources using spatial data
 - B) It measures the depth of water bodies
 - C) It evaluates water quality directly on-site
 - D) It determines the financial viability of water projects
18. Provision of General purpose equipment and inspection vehicles are made under the following head of Cost estimate:
- a) 'C' Works
 - b) 'J' Works
 - c) 'Q' Special T&P
 - d) 'A' Preliminary
19. What is normal provision for A-Preliminary in a Flood Project
- a) 1-2 % of I-Work cost
 - c) 2-3% of I-Work cost
 - b) 1-2% of C-Work cost
 - d) 2-3% of C-Work cost
20. What are the criteria for economic evaluation of irrigation project?
- a. Financial Rate of Return
 - b. Internal Rate of Return
 - c. Benefit Cost Ratio
 - d. Cost per ha

PROFESSIONAL PAPER-II

PART II – SHORT ANSWER TYPE QUESTIONS

Please attempt three short answer type questions out of following 5 Questions. All Questions carry 10 marks each. Where sub-parts are there, all parts carry equal marks.

1. (a) What are the benefits derived from National Perspective Plan on Interlinking of Rivers projects?

(b) What is main objective of the proposed National Water Framework Law?
2. (a) Discuss the role of site reconnaissance in the early stages of a water resources project?

(b) Discuss the methodology and significance of a hydrographic survey in the context of designing a new reservoir?
3. Briefly describe various structural and non-structural methods of flood management.
4. (a) What are the criteria of submission of Revised Cost Estimate (RCE) of Irrigation Projects in CWC for approval?

(b) What are reasons for variation of Cost in RCE as per CWC guidelines?
5. Write short note of any TWO related to cost estimate of water resources projects.
 - a) National Committee on Dam Safety (NCDS)
 - b) National Dam Safety Authority (NDSA)
 - c) State Committee on Dam Safety (SCDS).
 - d) State Dam Safety Organisation (SDSO).

PROFESSIONAL PAPER – II

Section B (For Civil Engineers Only) (with related books)

Maximum Marks 50

INSTRUCTIONS

1. ATTEMPT ANY TWO QUESTIONS OUT OF THREE.
2. ALL QUESTIONS CARRY EQUAL MARKS

Q1)

1. What are the different types of spillways used in dam construction, and what are the key characteristics and functions of each type? (10 Marks)
2. What is a chute spillway? Discuss the following components of the chute spillway?
(10 Marks)

- i. Approach Channel
- ii. Control Structure
- iii. Discharge Carrier
- iv. Energy Dissipation arrangement at the bottom

3. Draw a detailed sketch of a siphon spillway, clearly indicating and labelling its main components. (5 Marks)

Q2)

1. What are the primary functions of a headrace tunnel in a hydropower system, and how does it contribute to the overall efficiency of the plant? (7 Marks)
2. How do the dimensions and alignment of a headrace tunnel influence the performance and operational stability of the associated powerhouse? (8 Marks)
3. Explain the difference between consolidated grouting and contact grouting? (5 Marks)
4. What are various factors to be considered while deciding the rock support system in HRT? (5 Marks)

Q3)

1. What are the various forces acting on a gravity dam, and how do they influence the overall stability of the structure?" (5 Marks)
2. Differentiate between the head regulator and the cross regulator? (5 Marks)
3. Explain various types of cross drainage works? (5 Marks)
4. Compare Lacey's theory and Kennedy's theory? (5 Marks)
5. What is a diversion flood, and how is it managed during the construction of hydraulic structures such as dams?" (5 Marks)

PROFESSIONAL PAPER – II

Section C (For Mechanical Engineers Only) (with related books)

Maximum Marks 50

INSTRUCTIONS

1. ATTEMPT ANY TWO QUESTIONS OUT OF THREE.
2. ALL QUESTIONS CARRY EQUAL MARKS

Question 1:

1 (a) What do you understand by “Load Amplifying Factor” with respect to fatigue design of mechanical components of a Gantry Crane? What value of “Load Amplifying Factor” is generally adopted in the design of Gantry cranes used in Hydro projects? Describe the purpose of lifting beam for handling stoplogs by gantry crane?
(3+2+3=8 Marks)

1 (b) List the various loads which are considered in the design of Gantry Crane? Define hoisting and traveling speed of Gantry crane and their values generally adopted during design?

(3+4=7 Marks)

1 (c) With respect to Gantry crane used in hydro projects, define (2x5=10 Marks)

- i. Cross Traverse motion & Longitudinal Travel motion
- ii. Dead loads & live loads
- iii. Wheel gauge & Wheel base
- iv. Cantilever Vs Centrally Lifted Crane
- v. UTS & YP of material

Question 2:

2 (a) Design hoist mechanism of gantry crane (i.e. Electric motor, E/M brake, Wire- rope, Rope drum and Reduction unit consisting of Worm Reducer & one set of open gearing) for operation of spillway stoplog of a Water Resources Project having following salient features/design data:

Hoist capacity	:	40 tons
Class & Duty of crane	:	Class-II (MS), Outdoor duty
Type of crane	:	Electrically operated
Total lift	:	20.0 m
Hoisting Speed	:	1.0 m/minute $\pm 10\%$
Electric Power supply	:	415 volt, 3 phase, 50cycles/sec

No. of rope drum	:	2 (two)
Nos. of rope fall per drum	:	4 (Four)

(20 Marks)

2 (b) What are the different types of sealing arrangements for hydraulic gates?

(3 Marks)

2 (c) What are static and dynamic seals?

(2 Marks)

Question 3:

3 (a) A Radial gate at spillway has following data:

Width of opening	:	12.0 m
Radius to inside of skin plate of gate leaf	:	10.0 m
Sill level of gate	:	410.7 m
Spillway crest level	:	410.9 m
Centre line of Trunnion	:	414.0 m
Full Reservoir Level (FRL)	:	418.9 m
Maximum Water Level (MWL)	:	419.9 m
Top of gate	:	419.2 m
Radial arms	:	Parallel
Type of anchorage	:	Bonded type
Width of Pier	:	3.5 m

Calculate resultant hydrostatic water thrust acting on radial gate for FRL and MWL Conditions. Assume any other data if required.

(15 Marks)

3 (b) What are the reasons for providing of an air vents downstream of control/regulating gates?

(5 Marks)

3 (c) What are the various factors affecting air demand for a gated installation?

(5 Marks)

केन्द्रीय जल आयोग
Central Water Commission

59 वीं विभागीय परीक्षा – कें.ज.आ इंजीनियरिंग अधिकारियों के लिए
59th Departmental Examination for Engineering Officers of CWC

प्रोफेशनल पेपर - Professional Paper – III (with Books)
(with two sections A & B)

समय/Time: 3 hrs

अधिकतम अंक/Max Marks: 100

सामान्य अनुदेश :-

- i. यह व्यावसायिक पत्र-III में 12 पृष्ठ हैं, और यह दो खंडों में विभाजित है - क और ख ।
- ii. भाग - क अधिकतम 30 अंकों के बहुविकल्पीय/वस्तुनिष्ठ प्रकार के प्रश्न हैं ।
- iii. भाग - ख में लघु उत्तरीय प्रकार के 10 प्रश्न हैं, जिनमें प्रत्येक 7 अंकों का है ।
- iv. बहुविकल्पीय प्रश्नों के उत्तर केवल प्रश्न पत्र में ही दिए जाए। अलग उत्तर पुस्तिका में दिए गए उत्तरों का मूल्यांकन नहीं किया जाएगा । जब तक विशेष रूप से उल्लेख नहीं किया जाता है, बहुविकल्पीय/ वस्तुनिष्ठ प्रकार के प्रश्नों के केवल एक ही विकल्प ही सही उत्तर होगा । यदि एक से अधिक विकल्प चिन्हित किए जाते हैं, तो ऐसे उत्तर का मूल्यांकन नहीं किया जाएगा ।
- v. नकारात्मक अंकन नहीं किया जाएगा अर्थात् गलत उत्तरों के लिए कोई अंक नहीं काटे जाएंगे।
- vi. कृपया प्रश्न पत्र के प्रत्येक खंड पर अपना अनुक्रमांक लिखें ।
- vii. प्रश्न पत्र को उत्तर पुस्तिकाओं के साथ वापस करना होगा ।
- viii. उम्मीदवारों द्वारा उत्तर पुस्तिका में अनुभाग, भाग और प्रश्न संख्या का स्पष्ट रूप से उल्लेख किया जाना चाहिए।

General Instructions:

- i. This professional paper-III containing 12 pages, divided into two sections A and B.
- ii. Section- A is multiple choice objective type questions with maximum of 30 marks.
- iii. Section- B is short answer type questions with 10 questions with 7 marks each.
- iv. The multiple choice questions are to be attempted/ answered in the question paper only. Answers in separate answer sheet will not be evaluated. Unless specifically mentioned, each multiple choice/ objective type questions has one and only one correct answer out of four choices. If more than one choice is marked, the answer would not be evaluated.
- v. There is no negative marking i.e. no deductions shall be made for incorrect answers.
- vi. Please write your roll number on each section of the question paper.
- vii. The question paper has to be returned back along with the answer sheets.
- viii. Section, Part and Question numbers need to be clearly mentioned in answer sheet by candidates.

ROLL NO.....

PROFESSIONAL PAPER-III

Section -A

Part - I Multiple Choice / Objective Type Questions

Max Marks: 30

Note: Attempt all the Questions. Each Question carries 1 Mark

Indicate the correct choice

1. A Government servant who was on leave for the period 29.03.2022 to 29.04.2022. will be paid Transport Allowance:
 - a) Full
 - b) 50%
 - c) No transport allowance will be paid
 - d) None of above
2. Which of the following is correct classification based on annual turnover in respect of Micro, Small and Medium enterprises respectively?
 - a) Upto ₹1 Cr, ₹1 to ₹10 Cr and ₹10 to ₹50 Cr respectively
 - b) Upto ₹5 Cr, ₹5 to ₹50 Cr and ₹50 to ₹250 Cr respectively
 - c) Upto ₹0.1 Cr, ₹0.1 to ₹1 Cr and ₹1 Cr to ₹10 Cr respectively
 - d) Upto ₹10 Cr, ₹10 Cr to ₹100 Cr and ₹100 Cr to ₹500 Cr respectively
3. Original Work means:
 - 1) All new constructions, site preparation
 - 2) Works undertaken to maintain building and fixtures
 - 3) Additions and alteration to existing works

Which of the statement given above are correct?

 - a) 1, 2 and 3
 - b) 1 only
 - c) 2 and 3 only
 - d) 1 and 3 only
4. According to the manual, what is the significance of the 'Five R's of Procurement'?
 - a) Right Rules, Right Regulations, Right Requirements, Right Resources, and Right Reserves
 - b) Right Quality, Right Quantity, Right Time, Right Price, and Right Source
 - c) Right Quality,

- c) Right Quality, Right Requirements, Right Rights, Right Quantity, and Right Results
 - d) Right Responsibility, Right Price, Right Results, Right Source, and Right Revenue
5. A Government servant drawing pay at Rs. 39,200 in Level 5 was promoted to a higher post in Level 6 on 1-4-2022 and got his pay fixed on the date of next increment on 1-7-2022. When will he be entitled to his next increment?
 (a) 1-7-2022 (b) 1-4-2023 (c) 1-1-2023 (d) 1-7-2023
 6. What is the recommended procedure as per the procurement of works manual, if there is a discrepancy between the bid price in words and in figures?
 a) The bid is automatically disqualified.
 b) The higher of the two values is considered for evaluation.
 c) The lower of the two values is considered for evaluation.
 d) The value stated in words prevails.
 7. With effect from 01-01-2024, under Travelling allowance Rules, officers drawing Pay level 09 to 11 shall be entitled to reimbursement of Hotel accommodation up-to____:
 a) Rs.2813 per day
 b) Rs.5625 per day
 c) Rs.938 per day
 d) Rs.4375 per day
 8. Under which article of the Constitution all moneys received by or deposited with any officer employed in connection with the affairs of the Union in his capacity as such, other than revenues or public moneys raised or received by Government, shall be paid into the Public Account?
 a) Article 284
 b) Article 323-A
 c) Article 121
 d) Article 256-A
 9. Advertised Tender Enquiry should be resorted for procurement of goods of estimated value of Rs_____.
 a) Rs.10 lakhs and above.
 b) Rs.20 lakhs and above.
 c) Rs.25 lakhs and above.
 d) Rs.30 lakhs and above.
 10. What does the term "Note" mean?
 (a) A Note is a document submitted by the dealing officer after discussion with the Senior Officer, where the course of action is not clear.

- (b) A Note is a communication sent in a case, along with approval of all stages of action taken by the Competent Authority to take a decision.
 - (c) A Note is remarks recorded on a case to facilitate its disposal and includes a precise of previous papers, analysis of issues, suggestions and final decision.
 - (d) A summary containing the process sheet, detailed information concerning certain aspects of the questions discussed on the file.
11. As per delegation of financial powers in respect of contingent expenditure under schedule-V and miscellaneous expenditure under schedule-VI order dated 28.02.2020, the extant of powers delegated to Executive Engineer, CWC for Telephone Charges is :
- a) Nil
 - b) 5000 in each case
 - c) 9000 in each case
 - d) Full power
12. Are the Children of a widowed daughter or widowed sister covered in the definition of family for LTC:
- a) Not covered under the definition of family for LTC.
 - b) Children of widowed sister only eligible.
 - c) Children of widowed daughter only eligible.
 - d) Children of both are eligible.
13. What is the full form of CRAC related to GeM?
- a) Customer Receipt and Acceptance Criteria
 - b) Consignee Receipt and Acceptance Criteria
 - c) Customer Receipt and Acceptance Certificate
 - d) Consignee Receipt and Acceptance Certificate
14. Charged expenditure is said so because it
- a) May be subject to the Vote of Lok Sabha
 - b) Is charged on Consolidated Fund
 - c) Is charged on Contingency Fund
 - d) Is charged on Public Account
15. When is a draft communication put up without an elaborate note?
- a) When the line of action is obvious
 - b) When the line of action is based on a clear precedent or practice
 - c) When the line of action has been indicated by a higher officer
 - d) Any one of the above

16. If a procuring entity determines that the bidder has breached the code of integrity it may debar a bidder or any of its successors from participating in any procurement process undertaken by it for a period
- Not exceeding two years
 - Not exceeding three years
 - Not exceeding five years
 - Not exceeding ten years
17. What is knowledge management in an organization?
- It is a process of creating, sharing, using and managing the knowledge and information of an organization and is an enabler of organizational learning.
 - It is an instrument which seeks to make every organization accountable and citizen friendly.
 - It provides information regarding services and functioning of an organization.
 - It is a process of analysis of issues requiring decisions on financial, legal or other implications.
18. A Physical Verification of all consumable goods and material should be undertaken at least once in :
- Every year
 - two year
 - six months
 - three years
19. If a Government Servant dies while in service leaving behind his parents (father and mother), one minor brother and two sisters (one married and other unmarried), how will the death gratuity be paid to the family:
- To all in equal share
 - Only to parents
 - Only to father
 - Only to parents, brother and unmarried sister in equal shares.
20. What is a grievance according to Grievance Redressal Mechanism?
- Expression of resentment against acts of omission or commission requiring corrective action
 - Requests for service delivery
 - Requests for replacement
 - Action to be taken against defaulting officers
21. A retired Group 'A' Officer will be required to obtain sanction permission of the Government, if he wishes to accept any commercial employment –
- Within one year of employment
 - Within two years of employment

- (c) Within three years of employment
(d) Within four years of employment
22. As per GFR, Two Bid System comprises of :
a) Advertised Tender and Limited Tender
b) Technical Bid and Financial Bid
c) Advertised Tender and Financial Bid
d) Technical Bi and Limited Tender
23. A Government servant has requested for credit of unavailed joining time of 6 days to his EL account which has a balance of 295 days of EL on 30th June. How many days of EL will be at his credit as on 1st July?
(a) 295 days
(b) 300 days
(c) 300 + 15 days
(d) 300 + 6 days
24. A Government servant shall be deemed to have been placed under suspension -
(i) With effect from the date of his detention, if he is detained in custody
(ii) With effect from the date of his conviction, if he is sentenced to a term of imprisonment exceeding 48 hours.
(a) Both (i) and (ii)
(b) (i)
(c) (ii)
(d) Neither (i) nor (ii)
25. What is the time-limit prescribed for sending an acknowledgement to a communication/letter received from the Members of Parliament as per the provision of Manual of Office Procedure?
a) Within 3 days
b) Within 7 days
c) Within 15 days
d) Within 30 days
26. QCBS stands for
a) Quantity and Cost Based Selection
b) Quantity and Criteria Based Selection
c) Quality and Cost Based Selection
d) Quality and Criteria Based Selection
27. Which of the following is not correct under RTI Act, 2005:
a) There is a fixed format for making an application under Section 6.
b) There is a fixed format for filing the second appeal.
c) The Act has overriding effect on official secret act.
d) CPIO/SPIO can act independently.
28. Which is the odd one among the following?

- a) QBS
- b) QCBS
- c) LCS
- d) BIS

29. As per Rule 7 (ii) of the CCS (Conduct) Rules, constitutes a strike.
- a) Mass abstention from work without permission
 - b) Refusal to work overtime
 - c) Go-slow or pen-down
 - d) All of the above
30. A Govt. official is promoted as Superintendent on 14.12.2023 and give option to fix his pay on accrual of normal increment on 01.07.2024 under FR22(I) (a) (1). If the official is on one week leave w.e.f. 01.07.2024 date of his normal increment date. What effect will be on pay.
- a) Benefit of increase of pay will be from 01.07.2024.
 - b) Benefit of increase of pay will be from joining of his duty after above leave.
 - c) Competent authority may decide.
 - d) None.

PROFESSIONAL PAPER-III

Section -B

Part-2 Short Answers

Max Marks: 70

Note: Attempt all question. Each Question carries 7 marks
Please also mention the rule position while making reply of Short Notes

1. Write Short Notes on

- | | |
|--|-----------|
| a) Performance Security | (3 Marks) |
| b) Contents of Bidding Documents | (2 Marks) |
| c) Purchase of goods without quotation | (2 Marks) |

- 2.** A Government Servant drawing the pay of Rs.92700/- in the pay level 10 is deputed to a post in level 11 within the same station from 01-04-2023. Fix his pay on deputation.

Pay Matrix (Level10&11)

Pay band		Rs.15600-Rs.39100	
Level		10	11
Cell Sr. No.	18	92700/-	
	19	95500/-	
	20	98400/-	
Cell Sr. No.	12		93800/-
	13		96600/-
	14		99500/-

- | | |
|---|-----------|
| (a) If he opts to draw his pay in the ex- cadre post. | (3 Marks) |
| (b) If he opts to draw deputation allowance. | (3 Marks) |
| (c) Which option is better out of (a) and (b) | (1 Marks) |

3. Define

- | | |
|---|-----------|
| (a) Goods, Services and Works with reference to their procurement by Government Organisations | (4 Marks) |
| (b) Preference for Make in India | (3 Marks) |

4. Post the following transactions in the Cash Book of the X Ex. Engineer, Building Division, for the month of May 1995 indicating classification of each item and close the cash book giving an analysis of the balance:

01-05-95	Opening balance:	(Rs.)
(i)	Notes and coins	205/-
(ii)	Revenue Stamps	25/-
(iii)	Self-Cheque No.15 dated 30-04-1995	2000/-
(iv)	Service Postage Stamps	35/-
(v)	Fixed Deposit Receipt received from contractor On account of Security Deposit	25000/-
(vi)	Imprest with the sub divisional officer	500/-
(vii)	National Savings Certificates rendered by Cashier as Security	1000/-
(viii)	Temporary Advance with overseer A	2500/-
(ix)	Cheque No.A211 dated 26-04-1995 received from the Sub-Divisional officer on account of Travelling Allowance overdrawn in March, 1995	200/-
(x)	Cheque No.B198 dated 02-04-1995 received from Contractor B on 30-04-1995 for putting thereon the signatures of the Executive Engineer which was omitted	4000/-

Date	Transactions	
03-05-95	Self Cheque No.15 dated 30-04-95 is encashed and Cheque No.A211 dated 26-04-95 for Rs.200/- from the Sub-Divisional officer is remitted with Bank. Returned Cheque No.A200 dated 20-04-95 to Contractor 'B' after obtaining signatures of the Executive Engineer on the cheque.	
05-05-95	Wages for April, 1995 paid to work-charged Establishment in cash	790/-
	Sold Revenue Stamps for cash	5/-
06-05-95	Remitted into the Bank the revenue realised on 06-05-95 in cash-	
	(i) Sale proceeds of fruits from Trees in the PWD Inspection Bungalow	200/-
	(ii) Rent of Inspection Bungalow	

	Value of work done	100/-	
(iii)	Sale proceeds of old furniture		400/-
11-05-95	Overseer 'A' renders account of Temporary advance as under:		
(i)	Paid to labourers	2100/-	
(ii)	Payment of cartage for cement		150/-
(iii)	Lost in transit	50/-	
(iv)	Refunded in Cash	200/-	
12-05-95	Cheque No.16 issued to Treasury Officer for purchase of Service Postage Stamps		250/-
17-05-95	Paid 2 nd running bill of Contractor 'A' for the work of an additional room for Income Tax office by Cheque No.17.		
	Value of work done since previous Bill	17000/-	
	Advance Payment	3000/-	
	Less:		
	Security Deposit	1700/-	
	Income Tax	340/-	
	Cement issued for the Work	850/-	
	Hire Charges of concrete mixer		450/-
	Fine for delay in completion of another work	500/-	
20-05-95	Sub-Divisional officer renders account of Imprest		
	Sweeper's Salary	150/-	
	Repair of office furniture	40/-	
	Purchase of Stationery articles		110/-
	Balance		200/-
	Imprest recouped for full amount.		
25-05-95	Issued Cheque No.18 in lieu of time barred Cheque No. A/C 37 dated 06-08-94	1100/-	
31-05-95	Cash found surplus	20/-	

- (7 Marks)**
5. a) Explain the terms:
- | | |
|---------------------------|----------------|
| a) Public Authority Party | b) Information |
| | c) Third |
- (1 mark each)**

- b) Who is appointing authority for CIC & SIC?
(2 Marks)
- c) A person, who desires to obtain any information under RTI Act, shall make request in writing or through electronic means in which languages?
(2 Marks)
6. Explain
- a) Difference between Open Tender Enquiry and Limited Tender Enquiry
(4 Marks)
- b) Electronic Reverse Auction.
(3 Marks)
7. a) Explain the terms:
- | | |
|---------------------------------|------------------------------------|
| a) Attached Office
(1 Mark) | b) Sub-ordinate Office
(1 Mark) |
| b) Statutory Bodies
(1 Mark) | d) Autonomous Bodies
(1 Mark) |
- b) What is difference between HOO & HOD?
(1 Mark)
- c) What is problem solving case?
(1 Mark)
- d) What is difference between PUC & FR?
(1 Mark)
- OR
1. Government has recently announced the Unified Pension Scheme (UPS), pls explain the scheme in brief.
(3 Marks)
2. Explain the terms:
- | | |
|----------------------------|----------|
| a) Retiring Pension | (1 Mark) |
| b) Compassionate Allowance | (1 Mark) |
| c) Invalid Pension | (1 Mark) |
| d) Superannuation Pension | (1 Mark) |
8. A Government Servant whose date of birth is 15-06-1983 entered Central Government service as a Group 'C' employee on 01-07-2002. He was holding a Group 'A' post in the pay of Rs.84900 in pay level 10 from 01-07-2021. He was sent on deputation on foreign service terms to a Public sector undertaking to a post in the pay level 11 for a period of one year from 01-01-2022. He opted to draw his pay plus

Deputation (Duty) allowance @ 10%. Calculate the Pension and leave salary contribution payable by the foreign employer to the Government.
(DA rate wef 1-1-2022@34% and on 1-7-2022@38%, % of pension contribution@18% and leave salary contribution.

(7 Marks)

9. Explain :

a) What do you understand by Article 335 of our constitution?

(2 Marks)

b) What is the current position of RIGHT TO PROPERTY Act?

(3 Marks)

c) What do you understand by the term 'Pro-tem Speaker' in our parliament?

(3 Marks)

10. Write Short Notes on:-

a) e-procurement

(2 Marks)

b) Government e Market (GeM)

(3 Marks)

c) Central Procurement portal (CPP)

(3 Marks)