

Central Water Commission
Establishment I Section


Sub: Uploading of question papers – 51st Departmental Examination of Engg. Officers of CWC – reg.

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The 51st Departmental Examination of Engg. Officers of CWC was held on 4th & 5th February, 2017.

In order to facilitate the candidates, a set of question papers, PP-I, PP-II, PP-III of the 51st Departmental Examination of Engg. Officers of CWC(copy enclosed) may be uploaded on CWC Website.

Encl: as above.


(R.K.Sharma)

Section Officer
Central Water Commission

The Deputy Director, SMD, CWC

CWC ID No.8/1/2016-Estt.I/ 499 dt: 28.2.2017

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28.2.17

SMD/Dep. Dir. /SMD /Dep.
ज. सं./Dy. No. 449
दिनांक/Date 28-2-17

Government of India
Central Water Commission

51st Departmental Examination for Engineering Officers of CWC

Time : 3 Hours

Max. Marks : 100

Professional Paper – I

(This paper containing 13 pages is divided into three sections – A, B & C. These sections are further subdivided into two parts – Part 1 & Part 2. Section A carries 60 marks, while section B & C carry 40 marks each)

Important Instructions

- a) Civil engineers shall attempt Section A & B. Mechanical Engineers shall attempt Section A & C.***
- b) The multiple choice questions are to be attempted/answered in the question paper only. Answers in separate sheet will not be evaluated.***
- c) Please write your Roll Number on each section of the question paper.***
- d) The question paper has to be returned back along with the answers sheets.***

Roll No.

SECTION A (Common to both Civil & Mechanical Engineers)

PART 1 Multiple Choice Objective Type Questions

Note : Attempt all questions. Each question carries 1 mark.

Indicate the Correct Choice

1. As per Accelerated Irrigation Benefits Programme (AIBP) Guidelines, 2013; the Major/Medium ERM Projects having investment clearance can be included under AIBP provided the projects are already completed and commissioned at least:

- (A) 15 years earlier from the proposed year of inclusion in AIBP
- (B) 10 years earlier from the proposed year of inclusion in AIBP
- (C) 20 years earlier from the proposed year of inclusion in AIBP
- (D) 5 years earlier from the proposed year of inclusion in AIBP

2. As per CAD&WM Guidelines, 2013; For Construction of Field, Intermediate and Link Drains under CAD&WM Programme the cost sharing between the Centre and the States would be:

- (A) 25:75
- (B) 75:25
- (C) 90:10
- (D) 50:50

3. As per Guidelines on Repair, Renovation and Restoration (RRR) of Water Bodies, 2013; the water bodies that can be included in the scheme has to be

- (A) Public owned
- (B) Community owned
- (C) Both public owned and community owned and also private owned
- (D) Both public owned and community owned but not private owned

4. As per the cabinet note approval for prioritized projects under PMKSY, fast track proforma clearance is needed for cost escalation more than

- (A) 15% over approved cost
- (B) 20% over approved cost
- (C) 40% over approved cost
- (D) 30% over approved cost

5. Concurrent Evaluation of projects included under AIBP and CAD&WM are to be carried out by:
- (A) State Irrigation / Water Resources Department
 - (B) State Level Monitoring Committee
 - (C) Independent Agency
 - (D) Central Water Commission
- 6 Inter-State River Water Disputes Act 1956 as amended is enacted under
- (a) Article 262
 - (b) Article 263
 - (c) Article 245
 - (d) Article 259
- 7 River Boards Act-1956 provides for establishment of
- (a) Water Disputes Tribunal
 - (b) Water dispute resolution Committee
 - (c) River Boards
 - (d) None of above
- 8 Entry 56 List 1 pertains to
- (a) Regulation of inter-State Rivers
 - (b) Development of inter-State Rivers
 - (c) Both (a) and (b) above
 - (d) None of above
- 9 What is the spatial resolution of Cartosat 1 Pan data
- a) 23.5 m
 - b) 2.5 m
 - c) 1 m
 - d) 5.8 m
- 10 Which one is not a purely Image processing software
- a) ARCGIS
 - b) ERDAS
 - c) ENVI
 - d) PCI-Geomatica

- 11 Under National Action Plan for Climate change, what is the goal for increasing water use efficiency?
- a) 30%
 - b) 10%
 - c) 20%
 - d) 15%%
- 12 Which is the Nodal ministry for giving Environment & Forest clearance for Water Resources Project?
- a) MoWR, RD&GR
 - b) MoEF& Climate Change
 - c) MoRD
 - d) MoT
- 13 Which one is not an Indian Remote Sensing Satellite?
- a) Spot
 - b) IRS- 1D
 - c) CARTOSAT
 - d) RISAT
- 14 Which one is correct option?
- a) Major project($CCA \geq 10,000$ ha), Medium irrigation ($2,000 \leq CCA < 10,000$ ha)
 - b) Major project($CCA \geq 15,000$ ha), Medium irrigation ($5,000 \leq CCA < 15,000$ ha)
 - c) Major project($CCA > 10,000$ ha), Medium irrigation ($2,000 \leq CCA \leq 10,000$ ha)
 - d) Major project($CCA > 10,000$ ha), Medium irrigation ($5000 \leq CCA \leq 10,000$ ha)
- 15 Which clearance is required to be submitted by Project Authorities before final acceptance of DPR?
- a) Forest and Environment Clearance form MoEF&CC
 - b) Clearance of R&R plan from MoTA
 - c) Concurrence of State Finance Department
 - d) all of above
- 16 Please read the following Statements
- i) B.C ratio should be equal to or more than 1.5 for Irrigation and Multipurpose projects
 - ii) In case the project benefits drought prone area and /or tribal area, B.C ratio ≥ 1 (one) is acceptable
 - a) Only (i) is correct
 - b) Only (ii) is correct

- c) (i) is correct but (ii) is not correct
d) Both (i) and (ii) are correct
- 17 Projects in which basins are sent to MoWR, RD&DR for examination from International Angle?
- a) Ganga and Indus Basin
b) Ganga, Brahmaputra and Indus Basin
c) Ganga, Brahmaputra, Indus and Krishna Basin
d) Ganga, Brahmaputra, Indus and Meghna Basin
- 18 Parameters, which can be measured through Telemetry system, are
- (a) Rainfall
(b) Water Level
(c) Discharge
(d) All of the above
- 19 Which of the following parameters is generally not measured at Level I water quality laboratory
- (a) Dissolved Oxygen
(b) Fluoride
(c) pH Value
(d) Electrical Conductivity
- 20 Sediment can be classified as fine sediment if particles diameter is
- (a) $< 0.2 \text{ mm}$
(b) $< 0.075 \text{ mm}$
(c) $< 0.75 \text{ mm}$
(d) $< 0.02 \text{ mm}$

SECTION A (Common to both Civil & Mechanical Engineers)

Part 2 Short Answer Type Questions

Note : Attempt any 5 questions. Each question carries 8 marks.

1.
 - i. Explain the importance of techno-economic appraisal of water resource projects. (4 Marks)
 - ii. What aspects of Hydro-electric project are examined in CWC for its appraisal? (4 Marks)
2.
 - i. What is remote sensing & GIS (4 marks)
 - ii. List out the different sensor resolution in remote sensing and explain them in brief (4 marks)

3. What are the environmental impact due to construction of water Resources projects and explain the measures to be undertaken for mitigating them. (8 marks)
4.
 - i. Explain the working of telemetry system with line diagram?(6 marks)
 - ii. How telemetry system is useful in flood forecasting / inflow forecast?(2 marks)
5.
 - i. Name the river basins for which decisions of water disputes Tribunals are in effect? (4 Marks)
 - ii. Briefly describe the provision of National Water Policy-2012 about water disputes resolution. (4 Marks)
6. As per the Guidelines, indicate the various criteria, which the proposals should satisfy for funding under the scheme on Repair, Renovation and Restoration (RRR) of Water Bodies. (8 marks)
7.
 - i. Describe various methods of measuring discharge. (4 marks)
 - ii. Explain suitability of each method of measuring discharge for different site conditions. (4 marks)

Roll No.

SECTION B (For Civil Engineers only)

PART 1 Multiple Choice Objective Type Questions

Note : Attempt all questions. Each question carries 1 mark.

Indicate the Correct Choice

1. A sample of 26 annual flood peaks is arranged in descending order with discharge values 5000 m³/sec and 4700 m³/sec occupying the first & second rank respectively. According to Weibull plotting position formula, exceedance probability of discharge measuring 4700 m³/sec is:

a) 0.012 b) 0.074 c) 0.5 d) 1

2. Match the following:

1. The inflow design flood for safety of the dam in case of large dams is	A. used for deriving Unit Hydrograph from multi peak flood hydrographs
2. Collin's Method	B. Probable Maximum Flood
3. The trap efficiency of the reservoir	C. used to estimate desired return period flood
4. Flood Frequency Analysis	D. estimated by Brune's curve
	E Standard Project Flood

a) 1-A, 2-B, 3-D, 4-C b) 1-B, 2-A, 3-D, 4-C c) 1-C, 2-D, 3-A, 4-B d) 1-A, 2-B, 3-C, 4-D

3. A unit hydrograph has one unit of

a) peak discharge
b) rainfall duration
c) direct runoff
d) the time base of direct runoff

4. The basic assumptions of unit hydrograph theory are

a) nonlinear response and time invariance
b) time invariance and linear response
c) linear time variance and linear response
d) nonlinear time variance and linear response

5. The double mass curve technique is adopted to
- a) find average rainfall of number of years
 - b) find number of rain-gauges required
 - c) check the consistency of rain-gauge records
 - d) estimate missing rainfall data
6. Ordinates of one hour unit hydrograph of a catchment at one hour intervals are 5,8,5,3 and 1 m³/sec. The catchment area represented by the above unit hydrograph is:
- a) 20 sqkm b) 200 sqkm c) 7.92 sqkm d) cannot be calculated
7. BC ratio for irrigation project in non drought prone area should be
- (a) More than 1.5
 - (b) More than 1.0
 - (c) More than 1.0 and less than 1.5
 - (d) None of above
8. Success rate for meeting irrigation demand from an irrigation project should be
- (a) More than 75%
 - (b) More than 65%
 - (c) Between 65% and 75%
 - (d) None of above
9. A Major irrigation project is categorised as a project having CCA
- (a) More than 10000 acres
 - (b) More than 10000 ha
 - (c) More than 10000 sq. M.
 - (d) None of above
10. While estimating crop water requirement percolation losses are considered for
- (a) Semi dry crops
 - (b) Non ponded crops
 - (c) Ponded Crops
 - (d) No such losses are considered

SECTION B (For Civil Engineers only)

Part 2 Short Answer Type Questions

Note : Attempt any 3 questions. Each question carries 10 marks.

1. (a) The ordinates of a 6-hour unit hydrograph of a catchment area are given below:

Time	0	6	12	18	24	30	36	42	48
Unit Hydrograph ordinates(m ³ /sec)	0	20	60	150	120	90	66	50	32
Time	54	60	66						
Observed Flows (m ³ /sec)	20	10	0						

A storm had two successive 6 -hour intervals with rainfall excess of 2 and 3 cm respectively. Assuming the base flow as 10 m³/sec, calculate the resulting flood hydrograph ordinates? (7 Marks)

- (b) Distinguish between Hydraulic and Hydrologic flood routing? (3 Marks)

2. (a) A project 'X' is proposed on river Dashan downstream of an existing project 'A'. The catchment areas upto project X and A are 3000 sqkm and 1000 sqkm respectively. The average sediment rate of the Dashan basin is 5 ham/100 sqkm/year. The average trap efficiency of both the projects may be treated as 90%. Based on the above data, estimate the sediment volume expected to be deposited in the proposed project X in next 50 and 100 years? (7 Marks)

- (b) Distinguish between Probable Maximum Precipitation and Standard Project Storm? (3 Marks)

3. Write short notes on any two (2X5=10 Marks)

- a) Importance of reservoir sedimentation studies during DPR preparation
- b) Distinguish between Hyetograph and Hydrograph
- c) Use of GIS technique in hydrological studies
- d) Define base period, Delta and Duty

4.

- i. CCA of project =15000 ha, area under Khariff =8000 ha, area under Rabi =9000ha, area under summer crop=500 ha. Find out gross irrigated area and intensity of irrigation? (4 marks)
- ii. Maximum irrigation water requirement for a project with irrigated area of 10000ha for 2nd fortnight of December is 500 mm. Find out the canal capacity at the head? (4 marks)
- iii. Define working table in relation to an irrigation project and indicate minimum time interval of working table for diversion and storage project. (2 marks)

- 5 Discuss about the need for conjunctive use of surface and ground water in irrigation planning. Explain briefly any two general strategies integrating surface and ground water use for conjunctive use plan. Also, discuss about their advantages and disadvantages in brief. (4+3+3 Marks)

Roll No.

SECTION C (For Mechanical Engineers only)

PART 1 Multiple Choice Objective Type Questions

Note : Attempt all questions. Each question carries 1 mark.

Indicate the Correct Choice

- Q1. Which one of the following factors is applicable while calculating the loose dry volume of the material excavated?
- a) Shrinkage factor
 - b) Bucket fill factor
 - c) Swell factor
 - d) Operating factor
- Q2. This equipment is used to transfer concrete from a higher elevation to a lower elevation
- a) Chutes
 - b) Buckets or hoppers
 - c) Motor propelled or manual buggies
 - d) Concrete pumps
- Q3. As per thumb rule, the production of 180HP dozer for a dozing distance of 100 ft, is about:
- a) 90 cum/hr
 - b) 180cum/hr
 - c) 270 cum/hr
 - d) 360 cum/hr
- Q4. Which one of the following electric motor is most suitable to compress 100 cubic ft of free air per minute at std. condition from atmospheric pressure to 100 psi pressure by using single stage compressor?
- a) 5 HP motor
 - b) 10 HP motor
 - c) 20 HP motor
 - d) None of these

- Q5. What is the most important criteria for selection of type/size of Dumper-Loader combination
- a) Skill of the operator
 - b) Geographical terrain
 - c) Dump clearance
 - d) Lead distance for dumping
- Q6. Pick up the correct statement from the following:
- a) If the float is positive and the activity is delayed by a period equal to its total float, the completion of project is not delayed.
 - b) If the float of an activity is negative, delay in its performance is bound to delay the completion of project.
 - c) If the float of an activity is zero, the activity is critical and any delay in its performance will delay the whole project.
 - d) All the above
- Q7. Various activities of a project, are shown on bar charts by
- a) Vertical lines
 - b) Horizontal lines
 - c) Dots
 - d) Crosses
- Q8. The excavation of Head race tunnel (7.0 m dia, horse shoe shaped) is planned to be done by drill and blast method by deploying two boom drill jumbo for drilling the charge holes. The excavation is possible in:
- a) One part (full face excavation)
 - b) Two parts (heading and benching)
 - c) Three parts (heading, benching and invert benching)
 - d) Excavation is not possible
- Q9. 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
- Q10. Book Value of equipment includes
- a) Purchase Price
 - b) Purchase Price, Freight & insurance
 - c) Purchase Price, Freight & insurance, Taxes
 - d) Purchase Price, Freight & insurance, Taxes, erection & commissioning charges and other incidental charges

SECTION B (For Mechanical Engineers only)

Part 2 Short Answer Type Questions

Note : Attempt any 3 questions. Each question carries 10 marks.

1.
 - i. Calculate the no. of jack hammers are required for drilling the sufficient charge holes for blasting of rock at the rate of 20cum/hr. It is given that the average drilling rate for jack hammer is 6m/hr and pull effect is 50% . (6 Marks)
 - ii. Which factors affect the output of dozer? (4 Marks)

2. A hydraulic excavator of 2.0 cum bucket along with 25 T capacity rear dumpers are planned to be deployed for loading & hauling at quarry site of a project. Estimate the no. of dumpers required including standby provision for 2 shift working. (10 Marks)

Following data is given:

Output of hydraulic excavator:	120 cum/hr
Average Lead (assumed):	4 km
Travel Speed loaded/unloaded:	10 kmph / 15 kmph
Volumetric Capacity of dumper:	12 cum
Spotting time:	1.0 min
Dumping/Turning time:	2.0 min

3.
 - i. Give various methods of tunnelling through rock? (5 Marks)
 - ii. What is mucking in respect of Tunnel Excavation? List some equipment used for the same activity? (5 Marks)

4.
 - i. List some of the excavation equipment? (5 Marks)
 - ii. What is rock bolting? What equipment is generally used for the same activity? (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. (10 Marks)

**Government of India
Central Water Commission**

51st Departmental Examination for Engineering Officers of CWC

**Time: 3 hours
Max. Marks: 100**

PROFESSIONAL PAPER - II

(This paper containing 8 pages is divided into three Sections - A, B & C. Section A is further subdivided into two parts - Part-1 & Part-2. Section A carries 50 marks, while B & C carry 50 marks each.)

Important Instructions

- a. Candidates shall first attempt Section A, and on completion of it they will submit it to Invigilator before they proceed to attempt Section B or C as the case may be.
- b. Civil Engineers shall attempt Section A & B. Mechanical Engineers shall attempt Section A & C.
- c. The multiple choice questions are to be attempted / answered in the question paper only. Answers in separate answer sheet will not be evaluated.
- d. Please write your Roll No on each Section of the question paper.
- e. The question paper has to be returned back along with the answer sheets.

Roll No-----

SECTION-A (COMMON TO BOTH CIVIL & MECHANICAL ENGINEERS)

Maximum Marks 50

Note-

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

Part 1 - MULTIPLE CHOICE OBJECTIVE TYPE QUESTIONS

1. IWRM strategies for the basin planning are based on
 - a) Water is finite and vulnerable resource
 - b) Participatory approach
 - c) Social and economic value of water
 - d) All of these
2. The basic Water Balance equation is in the form of
 - a) $P=R + E \pm \Delta S$,
 - b) $P=R-E\pm \Delta S$
 - c) $P=R+E+\Delta S$
 - d) $P=R+E-\Delta S$,Where, **P** : precipitation, **R** : runoff, **E** : evaporation and **ΔS** : storage in the soil, aquifers or reservoirs.
3. If Potential ET is greater than Actual ET and Precipitation, and the soil is dry, then
 - a) soil water recharge is likely to occur
 - b) soil water surplus is likely to occur
 - c) soil water deficit is likely to occur
 - d) soil water utilization is likely to occur
4. As per CWC, the entire country has been divided into.....basins.
 - a) 18
 - b) 19
 - c) 20
 - d) 22

5. Which of the following is/are false w.r.t. water in India:
- a) water is a matter included in Entry 17 of List-II
 - b) water is a matter included in Entry 17 of List-I
 - c) Entry 17 is subject to the provision of Entry 56 of List-I
 - d) a & c
6. Which dam in India is having highest Gross Storage Capacities:
- (1) Bhakra
 - (2) Hirakud
 - (3) Indira Sagar
 - (4) Sardar Sarovar
7. Famous Mulla Periyar dam is located in the State of:
- (a) Tamil Nadu (b) Kerala (c) Karnataka (d) Gujarat
8. The ongoing Dam Rehabilitation and Improvement Project (DRIP) with World Bank assistance is being implementing in following nos of States:
- (a) 5 States (b) 7 States (c) 9 States (d) 15 States
9. The main criteria for defining a dam as large as per ICOLD definition is:
- (a) height of dam above deepest foundation level more than 15 m
 - (b) storage less than 60 MCM
 - (c) spillway capacity more than 500 cumec
 - (d) dam having high hazard potential
10. The area liable to be flooded in the country as per RBA report is:
- a) 1% - 5% b) 6 % - 10% c) 11% - 15% d) 16% - 20%
11. For economic viability of a flood management scheme, BC ratio should be:
- a) >1 b) >1.25 c) >1.5 d) >2
12. Flood Plain Zoning is an effective flood management method falling under;
- a) Non- Structural Measure
 - b) b) Structural Measure
 - c) Both
 - d) None
13. Telemetry used in flood forecasting is an automatic tool for:
- a) Data Collection

- b) Data Transmission
- c) Forecast Formulation
- d) Forecast Dissemination

14. For which of the following river system having international dimensions we have bilateral cooperation on flood management with China:

- a) Ganga & Brahmaputra
- b) Ganga & Indus
- c) Ganga, Brahmaputra & Indus
- d) Brahmaputra & Indus

15. In a hydro plant, if the discharge is $200 \text{ m}^3/\text{s}$ and the head of the water is 100 m. If the efficiency of the turbine alternator is set to 0.85, find the power developed

- a. 66.67 MW
- b. 166.7 MW
- c. 667.8 MW
- d. 176.52 MW

16. The location of surge tank is close to _____.

- a. Tailrace
- b. Dam
- c. Turbine
- d. Spillway

17. The limit of water head for the Francis turbines is _____.

- a. 200 m – 500 m
- b. 30 m – 200 m
- c. Less than 30 m
- d. More than 500 m

18. The following operations are generally employed for tunnelling in hard rock:

Removing ground water 2. Loading holes and firing the explosive 3. Setting up and drilling 4. Grouting & lining 5. Removing muck 6. Ventilation & removing explosion dust

The correct sequence is :

- a) 3 2 6 5 1 4
- b) 5 4 2 1 3 6
- c) 3 4 6 1 5 2
- d) 4 1 2 3 6 5

19. The bulb turbines are mainly_____.

- a. High speed turbines
- b. High head and axial flow turbines
- c. Low head and axial flow turbines
- d. High pressure turbine

20. For drifts the geological information is depicted by

- a) 1-D logging
- b) 2-D logging
- c) 3-D logging
- d) None of the above

Part-2 SHORT ANSWER TYPE QUESTIONS

Instructions:

Please attempt **THREE** short answer type questions out of five. All questions carry 10 marks each.

1. What is National Perspective Plan? Name some of the major interlinking/inter basin transfer projects in the country. What are the benefits of such projects? Also give major challenges faced by such projects.
2. What are the principles of *river basin management planning*? Explain them from the social, economic, legal and environment view point.
3. Explain 'Integrated Flood Management (IFM)' approach. Describe Flood Forecasting Set Up in the country and Role of CWC in the same. Elaborate on categories of flood depending on Warning Level, Danger Level and HFL. Also, comment on travel time, flood forecast frequency and advance warning time.
4. What are the various surveys and Investigations required for preparation of DPR of a Multipurpose Project?
5. Explain the following terms related to a Multipurpose Project:
 - (i) R&R (ii) IRR (iii) EIA (iv) FRL & MDDL (v) Environmental Flow

Roll No-----

SECTION-B (for Civil Engineers only) (with related books)

Maximum Marks 50

Instructions:

1. Please attempt any **TWO** questions out of three.
2. All questions carry equal marks

1. Answer the following:

- (i) List out the various loads and load combinations considered for design of Non-Overflow (NOF) section of concrete gravity dam. (9)
- (ii) Write down the basic design requirements of an embankment dam. Describe how these requirements are achieved while designing the embankment section. (8)
- (iii) How seepage from foundation of concrete gravity dam is controlled? (8)

2. (a) What are the hydraulic losses to be considered in the design of water conductor system for a hydroelectric project ? Write the formula for computation of each of these losses. (10)

(b) What do you understand by the Rock Quality Designation (RQD)? Write its indicative values for different rock mass classification. (5)

(c) Explain the importance of Contact Grouting and Consolidation Grouting in the tunnels. (5)

(d) Why surge tanks are needed in a water conductor system of a Hydroelectric Plant? (5)

3. (a) Explain the following:

- I. RoR, Storage and Pumped Storage Power Plants
- II. Economical Diameter of Penstock
- III. Different types of turbines

(5x3)

(b) Draw a schematic diagram of an RoR underground hydroelectric project and label the different components. (10)

Roll No-----

SECTION-C (for Mechanical Engineers only) (with related books)

Maximum Marks 50

Instructions:

1. Please attempt any **TWO** questions out of three.
2. All questions carry equal marks

Q. 1 (a) Draw the pressure diagram & design Skin plate, Vertical Stiffeners and Horizontal Girders for vertical lift fixed wheel type gate having following design data:

1.	No. of openings	26 (Twenty Six)
2.	Clear opening (Width)	12.00m
3.	Spillway Crest/ Sill Level of gate	EL 241.50m
4.	Full Reservoir Level (FRL)	EL 246.50m
5.	Top of the gate	EL 246.70m
6.	Top of piers/deck level	EL 251.00m
7.	C/C of side seals	12.150m
8.	C/C of wheel track	12.600m
9.	End to End of gate groove	13.000m

Assume any other required data suitably. (20)

(b) What is the permissible deflection of gate in following cases: (5)

1. Fixed wheel vertical lift crest gates.
2. Gates having top seal in the upstream side.

Q.2 (a) Calculate the resultant hydrostatic water thrust acting on a radial gate for FRL and MWL Conditions with the below given design data:

1.	No. of openings	6 (Six)
2.	Clear opening (width)	12.00m
3.	Radius to inside of skin plate of gate leaf	10.00m
4.	Sill Level	EL 410.70m
5.	Spillway Crest Level	EL 410.90m
6.	Centre line of Trunnion	EL 414.00m
7.	Full Reservoir Level (FRL)	EL 418.90m
8.	Maximum Water Level (MWL)	EL 419.90m
9.	Top of gate	EL 419.20m
10.	Radial arms	Parallel
11.	Type of anchorage	Bonded type
12.	Pier thickness	3.5m

Assume any other required data suitably. (15)

(b) What are the reasons for providing of an air vents downstream of control/regulating gates? (5)

(c) What are the various factors affecting air demand for a gated installation? (5)

Q.3 (a) Write down main advantages of a radial gate over a vertical lift gate. (5)

(b) Explain requirement of trunnion tie and thrust pad in a radial gate installation. (5)

(c) Calculate hoist capacity required for operating a vertical lift fixed wheel type regulating gate of a Water Resources Project having following salient features/design data:

1.	Sluice/Vent Size	3.0m width x 5.0m height
2.	Sill Level of gate	EL 235.00m
3.	Full Reservoir Level (FRL)	EL 260.00m
4.	C/L of top seal	EL 240.05m
5.	C/C of side seals	3.20m
6.	C/C of wheel track	3.60m
7.	Operating condition	Raising and lowering of the gate under flowing water.
8.	Gate Weight	10.0 tons
9.	Gate is subjected to following hydrodynamic forces during raising/lowering operation: (a) Maximum Uplift of 3.0 ton while lowering the gate. (b) Maximum Downpull of 20.0 ton while raising the gate.	
9.	Skin plate provided in the Upstream side.	
10.	Music note (J-type) Teflon clad Rubber Seal provided in the downstream side.	
11.	Wheel provided with Anti-friction roller bearing.	

Assume any other required data suitably. (15)

Government of India
Central Water Commission
51st Departmental Examination for Engineering Officers of CWC

Time: 3 hours
Max. Marks: 100

PROFESSIONAL PAPER – III (With Books)

(This paper containing 8 pages is divided into two Sections – A & B. Section A carries 30 marks, while B carries 70 marks.)

Important instructions:

- a. The multiple choice questions are to be attempted / answered in the question paper only. Answer in separate answer sheet will not be evaluated.
- b. Unless specifically mentioned, each multiple choice question has one and only one correct answer out of the four choices. If more than one choice is marked, the answer would not be evaluated.
- c. There is no negative marking i.e. no deductions shall be made for incorrect answers.
- d. Please write your Roll No on each section of the question paper.
- e. The question paper has to be returned back along with the answer sheets.
- f. Questions pertaining to Accounts are marked with "Asterisk (*)".

Candidates, who could not qualify Paper-III of Old Syllabi, shall attempt all questions OTHER THAN those marked with *.

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SECTION "A"

Part-1 Multiple choice objective type questions

Note : Attempt all questions. Each question carries 1 marks

Indicate the Correct Choice:

1. *The LTC advance can be drawn before days of commencement of Journey.
 - (a) 30 days.
 - (b) 50 days.
 - (c) 60 days.
 - (d) 75 days.

2. *The permission to travel by private Airlines on tour is to be obtained from
 - (a) Ministry of Finance.
 - (b) Ministry of Civil Aviation.
 - (c) Secretary of the Ministry concerned.
 - (d) Financial Advisor of concerned Ministry.

3. *The list of Major and Minor Head of Central Govt. contains.
 - (a) The heads to which the expenditure, revenue and loan & advances are to be classified.
 - (b) The heads to which expenditure is to be classified.
 - (c) The heads to which the revenue receipt is to be classified.
 - (d) None of the above.

4. *Which of the following is entrusted to mention the Consolidated Fund of India?
 - (a) Ministry of Finance, Department of expenditure.
 - (b) Reserve Bank of India.
 - (c) State Bank of India.
 - (d) World Bank.

5. *The financial powers which have not been delegated to any authority remains with.
 - (a) Secretary of the Ministry.
 - (b) Prime Minister.
 - (c) Ministry of Finance.
 - (d) None of the above.

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6. *Rule 146 of GFR Provide purchase of goods by Purchase Committee for the Value.
- (a) Between Rs. 75,000/- to Rs. 1,50,000/-.
 - (b) Between Rs. 15,000/- to Rs. 1,00,000/-.
 - (c) Between Rs. 50,000/- to Rs. 2,00,000/-.
 - (d) None of the above.
7. *The due date of LTC claims submission for payment where advance is drawn.
- (a) 15 days after the completion of return journey.
 - (b) One month from the completion of return journey.
 - (c) Two months from the completion of return journey.
 - (d) Three months from the completion of return journey.
8. *The competent authority to sanction the long term advance is.
- (a) President of India.
 - (b) Secretary.
 - (c) Head of Office.
 - (d) Head of Department.
9. *The authorize bank to maintain the NPS funds is.
- (a) State Bank of India.
 - (b) Reserve Bank of India.
 - (c) Syndicate Bank.
 - (d) Bank of India.
10. * of the following is true? (Tick all correct answers)
- (a) The Non Cheque Drawing DDO'S are appointed where the Pay and Accounts office is situated.
 - (b) Cheque Drawing DDOs are appointed where there is no Pay and Accounts office.
 - (c) The Non Cheque Drawing DDO'S are appointed where there is no Pay and Accounts office.
 - (d) Cheque Drawing DDO are appointed where the Pay and Accounts office is situated.
11. *Who maintains the Provident Fund Accounts (except for Group-D staff)?
- (a) Head of Office.
 - (b) DDO.
 - (c) PAO.
 - (d) None of the above.

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12. *Who is responsible for finalization of pension cases?
- (a) Head of Office.
 - (b) DDO.
 - (c) PAO.
 - (d) All of the above.
13. *What are primary objectives of web-based budget information system?
- (a) Avoid manual calculations / compilation.
 - (b) Automatic generation of reports.
 - (c) Avoid duplication / redundancy of data.
 - (d) All of the above.
14. *If a vehicle is to be condemned, then certificate from which of the following authority is required?
- (a) Electrical or Mechanical workshop of the National Airports Authority.
 - (b) Workshop of a State Road Transport Corporation.
 - (c) Certificate from both (A) and (B).
 - (d) Either Certificate from (A) or Certificate from (B).
15. *Which of the following(s) are covered under SR (Supplementary Rules)?
- (a) Pay.
 - (b) Retirement.
 - (c) Travelling allowance.
 - (d) Government residence license fees.
16. *As per financial power rules, the term "Re-appropriation" means:.
- (a) Assignment to meet specified expenditure of funds.
 - (b) Transfer of funds from one primary unit of appropriation to another such unit.
 - (c) Both (A) and (B).
 - (d) Neither (A) nor (B)
17. *TDS (Tax Deducted at Source) report is to be filed to tax authority by DDO at _____ basis.
- (a) Daily
 - (b) Weekly
 - (c) Monthly
 - (d) Quarterly

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18. *The physical verification of T&P account is to be carried out
- (a) monthly
 - (b) Quarterly
 - (c) Annually
 - (d) Once in 5 year
19. The signature of the contractor or his authorised representative should be obtained in the Measurement Book.
- (a) for each set of measurements
 - (b) At each page of measurements
 - (c) At the end of measurements
 - (d) None of these
20. The form used for all running and final payments to contractors and suppliers (other than those relating to lump sum contracts)
- (a) CPWA 24
 - (b) CPWA 26
 - (c) CPWA 27A
 - (d) CPWA 27B
21. Item rate tender is invited in
- (a) CPWD Form 6
 - (b) CPWD Form 7
 - (c) CPWD Form 10
 - (d) CPWD Form 9
22. A pre-bid conference may be held after sale of tenders with the intending tenderers at least -----before the last date of submission of the tenders as per details given in the tender documents for clarification of any doubts of the intending tenderers or for modification on any condition of the contract, specification etc.
- (a) 7 days
 - (b) 5 days
 - (c) 10 days
 - (d) 15 days
23. Which one of the following acts is not considered to be sexual harassment according to CCS (Conduct) Rules?
- (a) Physical contact and advances
 - (b) A demand or request for sexual favours
 - (c) Sexually coloured remarks
 - (d) Greeting a working woman on any special occasion or her birthday

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24. Qualifying service required for earning an increment on 1st July of a year is-
- (a) 3 months and above
 - (b) 5 months and above
 - (c) 6 months and above
 - (d) 12 months and above
25. What is the date of retirement of a Government servant, whose date of birth falls on 1st July 2016?
- (a) 30th June 2016 (AN)
 - (b) 1st July 2016 (AN)
 - (c) 31st July 2016 (AN)
 - (d) 1st July 2016 (FN)
26. Under Pension Rules is there any eligibility of Family Pension for children from a void or voidable marriage of a pensioner?
- (a) Not eligible
 - (b) Eligible
 - (c) At the discretion of the pension sanctioning authority
 - (d) Eligible for 1/3rd of Family Pension
27. Which of the following advances are recommended to be continued by the Seventh Pay Commission Report?
- (a) PC Advance
 - (b) House Building Advance
 - (c) Advance of Pay on Transfer
 - (d) All the above
28. The CPIO is required to supply the information/ documents/records to the applicant within days of receipt of application under RTI Act
- (a) 5 days
 - (b) 20 days
 - (c) 25 days
 - (d) 30 days
29. At the time of availing LTC encashment the EL at credit should not less than
- (a) 40 days
 - (b) 30 days
 - (c) 20 days
 - (d) 25 days
30. Suspension shall not be valid after this unless after review before expiry of days
- (a) Sixty days
 - (b) Thirty days
 - (c) Forty days
 - (d) Ninety days

SECTION B**Part -2 Short Answers**

Note: Attempt all questions. Write Short Answer to the following Questions. Each question carries 7 marks.

1. Define

(i) Original work

(ii) Single tender enquiry

(iii) Cost plus contract

(2 marks)

(3 marks)

(2 marks)

(7 marks)

2. Write a note on e-tendering.

3. Explain the different stages for execution of work.

(7 marks)

4. *Define the duties and functions of DDO.

(7 marks)

5. *(a) As on 30.11.2016 Shri "X" Executive Engineer "X" Division is having the following in his cash chest.

1) Notes	-	35,000.00
2) Coins	-	125.00
3) Postage Stamps	-	1067.00
4) Revenue stamps	-	365.00
5) Cheque in favour of Executive Engineer	-	25000.00
6) Cheque in favour of Contractor "M"	-	70,75,000.00

Calculate the opening balance as on 01.12.2016.

(5 marks)

*(b) Comments on the following.

The Executive Engineer encashed the cheque of Rs. 25,000/- received as security deposit and utilised it for the petty payment of the Division.

(2 marks)

6. (a) Within what time the charge sheet is to be served upon the charged officer after putting him/her under suspension.

(2 marks)

(b) Differentiate the term Major and Minor Penalty.

(3 Marks)

(c) What is the difference between punishment of Dismissal and Removal?

(2 Marks)

7. * (a) When the Pay bill is to be signed and presented to the Accounts Office in case the payment is to be made to an employee at a very remote area. (3 marks)
- * (b) Pay on promotion is required to be fixed under Fundamental Rules? Name the Rule under which the pay is fixed when the scales are revised? (2 Marks)
- * (c) Can a person be allowed to be restored his $1/3^{\text{rd}}$ commuted portion which he got along with the terminal benefits while he opted for full commutation of pro rata pension on absorption in a PSU with the prior permission of the Govt. (2 Marks)
8. (a) How much amount of Subsistence Allowance is admissible during suspension? (2 Marks)
- (b) What are the permissible recoveries from the Subsistence Allowance? (2 Marks)
- (c) An employee disappears and a certificate of not traceable despite all efforts has been issued by the Police. What will be action on the part of the Administration to settle the dues to the family? (3 Marks)
9. (a) Write steps for Recording of measurements in MB's in the case of bills for works done. (4 marks)
- (b) Explain the concept of collective responsibility in the execution of civil works and write short notes on Test Check to be made at different level of Officers on the entries made in the MB's in case of bills of works done. (3 marks)
10. (a) Write short notes on the following (3 Marks)
- (i) Earnest Money
- (ii) Performance Guarantee.
- (b) Write down the procedure for call of tenders under two/three envelope system. (4 marks)
