


Central Water Commission
Establishment I Section

Sub: Uploading of question papers of 53rd Departmental Examination of Engineering Officers of CWC.

A set of question papers (PP-I, PP-II, PP-III) of 53rd Departmental Examination of Engineering Officers of CWC held on 01st and 2nd December, 2018 is enclosed.

It is requested that the question papers may please be uploaded on CWC Website.

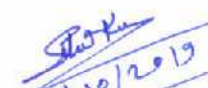
Encl: as above.


(R. K. Sharma)
Consultant (E-I)
BPL No. 3310
11/10/19

The Deputy Director, SMD, CWC

CWC ID No. 8/1/2018-Estt. I dated: 11.10.2019

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Central Water Commission
Government of India

53rd Departmental Examination for Engineering Officers of CWC

Time : 3 Hours

Max. Marks : 100

Professional Paper – I

(This paper containing 17 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 answer sheet.

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. Inter-State River Water Disputes Act 1956 as amended is enacted under
 - (a) Article 262
 - (b) Article 263
 - (c) Article 245
 - (d) Article 259
2. Which of the following water disputes tribunal was dissolved recently by Central Govt.
 - (a) Krishna Water Disputes Tribunal
 - (b) Vanshdhara Water Disputes Tribunal
 - (c) Cauvery Water Disputes Tribunal
 - (d) Mahadayi Water Disputes Tribunal
3. Party States in Vanshdhara River Water Disputes are
 - (a) AP and Odisha
 - (b) AP, Odisha and Telengana
 - (c) Telengana and Odisha
 - (d) None of the above
4. In 2018 which of the following tribunal submitted its report and decision
 - (a) Krishna Water Disputes Tribunal-II
 - (b) Vanshdhara Water Disputes Tribunal
 - (c) Cauvery Water Disputes Tribunal
 - (d) Mahadayi Water Disputes Tribunal
5. Velocity is observed by current meter at depth:
 - (a) 0.6d
 - (b) 0.3d

- (c) 0.4d
 - (d) None of the above
6. WMO recommendations for selection of Hydrological observation site are:
- I. The general course of stream should be straight for about 100m u/s and d/s from the site
 - II. No flow bypasses the site as sub surface flow
 - III. The stream bed is not subject to scour and fill
 - IV. The banks are permanent and high enough to contain floods
- (a) I and II
 - (b) Only IV
 - (c) III and IV
 - (d) I, II, III & IV
7. Suspended sediment sample collects at depth:
- (a) 0.2d
 - (b) 0.4d
 - (c) 0.6d
 - (d) At Surface
8. ADCP is used to measure the:
- (a) Discharge/Flow of river
 - (b) Velocity Profile
 - (c) Both (A) and (B)
 - (d) None of the above

9. Measurements recorded in RD-3 form is;
- (a) Discharge
 - (b) Hourly water level
 - (c) Summary of Discharge measurement
 - (d) None of the above
10. As per CWC norms the inspection of Executive Engineer at H.O/FF sites shall be:
- (a) All sites once in a Season (Monsoon/Non-Monsoon)
 - (b) Every month
 - (c) Minimum 40% & 20% (Non-Monsoon& Monsoon)
 - (d) All the above
11. Wading rod shall be used when velocity and depth are;
- (a) Low and less
 - (b) High and more
 - (c) Both
 - (d) None of the above
12. If surface level velocity is observed then it should be multiplied by what factor in order to get mean velocity;
- (a) 0.89
 - (b) 0.59
 - (c) 0.65
 - (d) None of the above

13. Zero of Gauge should be fixed;

- (a) Below minimum water level recorded
- (b) At M.S.L
- (c) I & II above
- (d) None of the above

14. A digital elevation model (DEM) is a: -

- a) Remote Sensed image
- b) 2D map of the surface
- c) Digital Model or 3D representation of a terrain's surface
- d) Tool for network analysis

15. As per National Water Mission for Climate Change the water use efficiency is to be increased by?

- a) 5%
- b) 10%
- c) 15%
- d) 20%

16. When was the Environment (Protection) Act enacted by the Parliament?

- a) 1976
- b) 1982
- c) 1986
- d) 1988

17. In the recent past, the major factor which contributed a substantial increase in the cost of Irrigation and Multipurpose projects in India is:

- a) Increase in cost of construction material
- b) Increase in cost of heavy machineries
- c) Increase in cost of Land acquisition & R&R Provision
- d) Global increase in oil prices.

18. 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

19. What is the criteria for economic evaluation of Irrigation Project presently being considered by the Advisory Committee of MoWR, RD&GR?

- a) Financial Rate of Return.
- b) Internal Rate of Return.
- c) Benefit-Cost Ratio.
- d) Cost per hectare.

20. Please read the following statements

- i. Flood schemes of Ganga basin are appraised in CWC (HQ).
- ii. Medium Irrigation schemes are appraised in CWC Regional office.

Pick the correct statement from below:

- a) Only (a) is correct
- b) Only (b) is correct
- c) Both (a) and (b) are correct.
- d) Both (a) and (b) are incorrect

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(2 marks each part)

(a) Name the four river basins for which water disputes Tribunals are functional.

(b) State the Entries and Articles in the Constitution of India related to water / inter-State rivers.

(c) Whether Bhakara Beas Management and Godavari River Management Boards are established under River Boards Act 1956? If not, mention the Acts under which these are established.

(d) Mention the relevant Section of Inter-State River Water Disputes Act, 1956 as amended under which Cauvery Water Management Authority constituted. State the party States of the said Authority and its objective.

2. (i) Write Down the equipments used for discharge measurement.

(4 Marks)

(ii) Explain the procedure for measurement of evaporation.

(4 Marks)

3. (i) Explain briefly, the methods of discharge estimation by stage-discharge relation & Area-Slope method. (4 marks)

(ii) Explain the installation of standard rain gauge (SRG) at CWC stations (with sketch) and briefly describe the measurement of rainfall and its frequency. (4 marks)

4. i) Write a brief Note on Pradhan Mantri Krishi Sinchai Yojna (PMKSY) highlighting the relevant aspects and main objectives.

(4

marks)

ii) What are the programme components of PMKSY. Give brief outlines about type of works covered in each of components. (4 marks)

5. (a) Write any eight environmental impacts due to construction of water resources projects? (4 marks)

(b)(i) Define Remote Sensing(RS) and Geographic Information System (GIS). (2 marks)

(ii) Write four applications of RS and GIS in water resources sector. (2 marks)

6. There is Advisory Committee for Consideration of techno-economic viability of Major, Medium Irrigation, Flood Control and Multipurpose project proposals.

(a) Who are the Chairman & Member Secretary of Advisory Committee? (2 marks)

(b) List the names of different chapters which a DPR of medium/major irrigation & multipurpose projects should contain? (2 marks)

(c) What is the process of appraisal being followed for appraisal of DPR of a new medium/major irrigation & multipurpose projects before a TAC Note (also known as Note for Advisory Committee) is finalized and placed before Advisory Committee ? (4 marks)

7. (a) What is the impact of climate change on water resources? (3marks)

(b) What are the classifications for water quality stations in CWC. What is the frequency of monitoring at each type of WQ stations. (3 marks)

(c)What are the regions into which India has been divided from the point of view of data dissemination as per 'Hydro-Meteorological Data Dissemination Policy' 2013? (2 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. The lag time of the basin is the time interval between the
 - a) centroid of the rainfall histogram and the peak of the hydrograph
 - b) beginning and end of direct runoff
 - c) Beginning and end of effective rainfall
 - d) centroid of the rainfall histogram and the centroid of the hydrograph
2. If N is the speed of the current meter in rpm, the velocity measured by it is proportional to
 - (a) $N^{1/2}$
 - (b) N
 - (c) $N^{3/2}$
 - (d) N^2
3. For natural channels, the value of Muskingham's parameter x is generally taken
 - (a) between 0.1 and 0.3
 - (b) between 0.1 and 0.6
 - (c) more than 0.5
 - (d) between 0.1 and 1.0
4. For identical channel cross-sections of the two natural streams
 - (a) the attenuation of flood peak will be more in the stream with higher bed slope
 - (b) the attenuation of flood peak will be more in the stream with lower bed slope
 - (c) the attenuation of flood peak will not depend on bed slope of the stream

5. Match the following:

1. Brune's curve	A. Borland and Miller classification of reservoirs
2. Trap efficiency of the reservoir	B. Methods used to predict sediment distribution in reservoirs
3. Area increment and Empirical area reduction methods	C. Used for estimation of trap efficiency of reservoirs

4. Gorge, Hilly region, Flood plain and Lake	D. Decreases as life of reservoir increases
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6. 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
7. Demands from diversion project are worked out on
 - (a) Weekly basis
 - (b) Fortnightly basis
 - (c) Seasonal basis
 - (d) Monthly basis
8. Success rate for meeting Domestic and irrigation demand from a irrigation project should be respectively
 - (a) 100% and 75%
 - (a) 90 % and 75%
 - (b) 75% and 65%
 - (c) None of the above
9. GCA,CCA, irrigation potential and cropping pattern are the terms generally related to
 - (a) Irrigation project
 - (b) Hydroelectric project
 - (c) Watershed management programme
 - (d) All of the above
10. For finalisation of irrigation planning aspect of an irrigation project, the following is prerequisite
 - (a) Finalisation of hydrological series of appropriate duration and time interval at the project
 - (b) Finalisation of water demand at canal head
 - (c) (a) and (b)above
 - (d) None of the above

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 isohyetal patterns of rainfall and the area between isohyets over a catchment are given in the following table. Prepare a Depth Area Duration (DAD) curve for the catchment if the rain depths are recorded from a 2-day storm.

Isohyet interval (cm)	> 50	40 – 50	30 – 40	20 – 30	< 20
Area bounded between isohyets (sq km)	219	242	82	44	3

(7 marks)

- (b) What is Probable Maximum Precipitation (PMP) and how it is different from Standard Project Storm (SPS)?

(3 marks)

2. (a) Distinguish between hyetograph and hydrograph.

(3 marks)

- (b) What is meant by 75% dependable annual yield of a catchment? For a catchment, the annual yield during the different years at its outlet is given in Table-1. Compute 75% and 90% dependable annual yield for the catchment using Weibull formula.

(7 marks)

Year	Annual yield (million cubic metre)
1966-67	765
1967-68	714
1968-69	578
1969-70	564
1970-71	570
1971-72	664
1972-73	709
1973-74	654
1974-75	568
1975-76	455
1976-77	470
1977-78	581
1978-79	622
1979-80	598
1980-81	776
1981-82	603
1982-83	733
1983-84	817
1984-85	736

1985-86	544
1986-87	620
1987-88	702
1988-89	750
1989-90	682
1990-91	534
1991-92	580
1992-93	414
1993-94	482
1994-95	574
1995-96	784
1996-97	713
1997-98	526
1998-99	618

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

Time	0	6	12	18	24	30	36	42	48	54	60	66
UH ordinates (m ³ /sec)	0	20	60	150	120	90	66	50	32	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) What is meant by trap efficiency of a reservoir? List important factors that influence its value.

(3 marks)

4. (a) Define any two (a) base period (b) Delta (c) Duty. (2 marks)

(b) CCA of project =10000 ha, area under Khariff =9000 ha, area under Rabi =5000ha, area under summer crop=1000 ha. Find out gross irrigated area and intensity of irrigation? (3 marks)

(c) Mention the various factors taken into account for estimation of crop water requirement at Canal head ? (3 marks)

(d) Base period of the crop is 120 days and duty of the irrigation water for the crop 1036.8 ha/cumecs. Find delta of the crop .(2 marks)

5. (a) State the procedure for estimating annual benefit from irrigation from an Irrigation

Project (2 marks).

(b) State the procedure for estimating annual cost of an Irrigation Project. (3 marks)

(c) Estimated net annual benefit from gravity medium irrigation project with CCA of 5000 ha and 90% irrigation intensity and estimated life of 50 years is Rs 500 Crore. Estimated cost of the project is Rs 3000 crore out of which cost of headworks is 20%. Assess the annual cost of the project and find out BC ratio. State if expenditure on such project is justified. (Assume land development charges as Rs 20000/- per ha and O&M charges as Rs 1175/- per ha.) (5 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 :

1. Critical path method
 - A. Is an improvement upon bar chart method
 - B. Provides a realistic approach to daily problems
 - C. Avoids delays which are very common in bar charts
 - D. All the above
2. For a given activity, the optimistic time, pessimistic time and the most probable estimates are 5, 17 and 8 days respectively, The expected time is
 - A. 8 days
 - B. 9 days
 - C. 10 days
 - D. 15 days
3. Which of the following surfaces will give highest rolling resistance for a vehicle having rubber tyres?
 - A. Concrete
 - B. Loose sand
 - C. Asphalt
 - D. Firm earth
4. Which of the following excavators is most suitable for digging underwater?
 - A. Dragline
 - B. Hoe
 - C. Clam shell
 - D. Dipper shovel
5. Consider the following statements:

Wheeled tractors are replacing crawler tractors because

1. Wheeled tractors travel faster.
2. Crawler tractors have stick control.
3. Crawler tractors are more expensive.
4. Track parts of a crawler wear out quickly.

Of these statements

- A. 1, 3 and 4 are correct
 - B. 2, 3 and 4 are correct
 - C. 1, 2 and 3 are correct
 - D. 1, 2 and 4 are correct
6. Capital investment in general purpose equipments and inspection vehicles are accounted under following sub head of the Cost estimate:
- A. 'C' Works
 - B. 'K' Building
 - C. 'Q' Special T&P
 - D. 'M' Plantation
7. Consider the following operations:
1. Drilling
 2. Mucking
 3. Blasting
 4. Placing concrete
 5. Placing steel
- The correct sequence of these operations in tunnel construction is
- A. 1, 5, 4, 3,2
 - B. 1, 3, 2, 5,4
 - C. 1, 2, 3, 4,5
 - D. 1, 3, 4, 2,5
8. 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

9. Which type of concrete is usually termed as "transit-mixed concrete"?

- A. Central mixed concrete
- B. Shrink mixed concrete
- C. Truck mixed concrete
- D. All of the above

10. Which of the following is not used for Drill and Blast Tunneling Method?

- A. One Boom drill jumbo
- B. Two Boom Drill jumbo
- C. Jack Hammer
- D. Tunnel Boring Machine (TBM)

SECTION C (For Mechanical Engineers only)

Part 2 : Short Answer Type Questions

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

1. (a) What is Break Even Point? Describe it graphically by highlighting the profit-area, loss area, total fixed cost, and total variable cost.
(5Marks)

(b) In a manufacturing unit, the total fixed cost is Rs. 6,000/- and variable cost is Rs. 2/- per unit. If revenue is Rs.7/- per unit, calculate the Break Even Quantity. If the company has manufactured 1000 units in October 2018, calculate the total profit/loss of the company in October 2018.
(5 Marks)
2. Write short notes on process layout, product layout and mixed layout with their advantages and disadvantages. (3+3+4 Marks)
3. (a) Give various methods of tunneling through rock (5 Marks)

(b) What is mucking in respect of tunnel excavation? List some equipment for the same activity. (5 Marks)
4. a) What is the difference between transfer value, book value and scrap value of an equipment (5 Marks)

(b) What is the difference between PERT & CPM and explain with example where these methods are applied. (5 Marks)
5. Short notes on : (2 marks each)
(a) Optimistic Time

- (b) Construction Schedule
 - (c) Critical Path Method
 - (d) Deployment Schedule
 - (e) Free Float
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GOVERNMENT OF INDIA
CENTRAL WATER COMMISSION

53RD DEPARTMENTAL EXAMINATION FOR ENGINEERING OFFICERS OF CWC

TIME : 3 Hours

MAX MARKS : 100

PROFESSIONAL PAPER – II

(This paper containing 10 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 the 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)

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. Who heads the National Water Resources Council?
 - a) Minister of WR,RD,GR
 - b) Prime Minister of India
 - c) Secretary WR,RD,GR
 - d) Vice President of India
2. What was India's Water Resources potential as per 1983 assessment?
 - a) 1869 BCM
 - b) 1868 BCM
 - c) 1870 BCM
 - d) 1871 BCM
3. Which of the following has been entrusted with carrying out the studies for Interlinking of rivers?
 - a) Central Water Commission
 - b) National Water Development Agency
 - c) National Water Mission
 - d) National Institute of Hydrology
4. Virtual Water is:
 - a) Amount of water flowing in rivers that can be put to beneficial use
 - b) Amount of water present in the Root Zone Depth of soil
 - c) Amount of water required to produce one unit of goods or services
 - d) The hygroscopic water in soil that is unavailable to plants

5. National Water Mission aims to increase water use efficiency by what percentage?
- a) 15%
 - b) 20%
 - c) 25%
 - d) 10%
6. DHARMA stands for:
- a) Dam Hazard And Risk Monitoring Application.
 - b) Dam Health And Rehabilitation Monitoring Application.
 - c) Dam Health And River Management Application
 - d) None of the above.
7. Number of Seismic zones in which India is divided are:
- a) 5
 - b) 4
 - c) 6
 - d) None of the above
8. Dams of National Importance are Dams with:
- a) Height greater than 100m and above.
 - b) Gross storage capacity of 1 BCM and above
 - c) a or b
 - d) None of the above
9. First major instance of Dam failure in India was observed in
- a) Kaila Dam, Gujarat
 - b) Nanaksagar Dam, Punjab
 - c) Tigra Dam, Madhya Pradesh
 - d) Kodaganar Dam, Tamilnadu
10. How the cost of various construction equipments used during the Construction is taken in the Cost Estimate of DPR.
- a) By average rate.
 - b) By Daily use rate.
 - c) By Hourly use Rate.
 - d) By Market Rate.
11. As per CWC guidelines for preparation of DPR of Irrigation & Multipurpose Project 2010, "Establishment" would be covered under:
- a) Indirect Charges
 - b) Direct Charges
 - c) Overhead Charges
 - d) Miscellaneous Charges

12. Hydrofracture test in drift of powerhouse is done to determine:

- a) In-situ stress of rockmass in powerhouse
- b) Deformation modulus of the rockmass
- c) shear parameters of concrete- rock and rock-rock interface
- d) None of the above

13. Normally in water resources projects exploratory drifts are excavated

- a) On each abutments of dam and in underground caverns
- b) On each abutments of dam only
- c) In underground caverns only
- d) In spillway portion of dam

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

1. *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) 326514
- b) 542136
- c) 346152
- d) 412365

15. 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

16. In the flood management project for Benefit-Cost ratio computations average annual damages should be computed on the basis of at least past data of:

- a) 10 years
- b) 15 years
- c) 20 years
- d) 25 years

17. Total numbers of Hydrological Observation station in the country are:

- a) 878
- b) 1598
- c) 720
- d) 1200

18. Flood Plain Zoning is an effective flood management method falling under:

- a) Non- Structural Measure
- b) Structural Measure
- c) Both
- d) None

19. Construction of embankment in Flood Protection schemes are designed for :

- a) 25 year return period flood for agricultural area
- b) 50 year return period flood for Urban area
- c) 100 year return period flood for agricultural area
- d) 50 year return period flood for agricultural area

20. Indira Sagar Polavaram Project, which is a National Project, is located in:

- a) Kerala
- b) Andhra Pradesh
- c) Karnataka
- d) Maharashtra

PART 2 - SHORT ANSWER TYPE QUESTIONS

Note:

- I. Please attempt **THREE** short answer type questions **OUT OF FIVE**.
- II. All questions carry **10 marks** each.

1. What do you understand by the terms: "Blue Water", "Green Water", "White Water", and "Virtual Water"? (Explain in brief)
2. In context of the Rehabilitation of Dams and Appurtenant Works, describe briefly Risk Analysis, Distress condition of Dam and mitigation measures.
3. Describe the failures and their causes associated with the various types of Dams.
4.
 - a) Briefly discuss the difference between intact rock and rock mass.
 - b) write the in-situ investigations to be conducted in drifts and boreholes
5. Briefly describe various structural and non structural methods of flood management.

ROLL NO.....

SECTION – B
(FOR CIVIL ENGINEERS ONLY)
(WITH RELATED BOOKS)

MAX MARKS : 50

Note:

- I. Please attempt **ANY TWO** questions out of three.*
- II. All questions carry **equal marks**.*

1. Answer the following:

- a) For given data, calculate the thickness of penstock steel plate for internal pressure: (10 marks)

Internal diameter of penstock = 5.0m
Design internal pressure = 24.0 kg/cm²
Allowable Stress for Steel = 1866 kg/cm²
Joint efficiency = 0.9

- b) Write in brief about the following: (10 marks)

- i. Various forces acting on the pressure conduits.
- ii. Different types of lining used for lining water conveyance system
- iii. FRL, MDDL, MWL, Dead storage Level and show them on the figure.

- c) Discuss different type of losses to be considered in design of water conductor system for hydroelectric projects. Also mention formula for calculating each of these losses. (5 marks)

2. Answer the following:

- a) A trapezoidal channel is to carry 500 cumec of water. The maximum allowable velocity of flow is 3.0 m/s. Determine the depth of flow, d , and the width of the channel bottom, B , if the hydraulic radius of the channel is one-half the depth of flow and side slopes are 1.5:1 (H:V). Also, determine the slope of the channel bottom. Use $n = 0.025$
- b) A sewer pipe, for which $n = 0.014$, is laid on a slope of 0.00018 and is to carry 2.76 m³/s when the pipe flows at 80 percent of full depth. Determine the required diameter of pipe. (Symbols have usual notifications)

(15 marks)

(10 marks)

3. Answer the following:

- a) You are a Project Engineer on a large earth dam project that has a volume of 5×10^6 cum of select fill, compacted such that the final voids ratio in the dam is 0.80. Your boss, the Project Manager delegates to you the important decision of buying the earth fill from one of three suppliers. Which one of the three suppliers is the most economical, and how much will you save?

Supplier A sells fill at Rs.5.28/cum with $e = 0.90$

Supplier B sells fill at Rs.3.91/cum with $e = 2.00$

Supplier C sells fill at Rs.5.19/cum with $e = 1.60$

(15 marks)

- b) If the fill dumped into the truck has an $e = 1.2$, how many truck loads will you need to fill the dam? Assume each truck carries 10 cum of soil. (symbols have usual notifications)

(5 marks)

- c) A contractor has compacted the base course for a new road and found that the mean value of the test samples shows $w = 14.6\%$, $G_s = 2.81$ and $\gamma = 18.2$ kN/m³. The specifications require that $e \leq 0.80$. Has the contractor complied with the specifications? (Symbols have usual notifications)

(5 marks)

ROLL NO.....

SECTION – C
(FOR MECHANICAL ENGINEERS ONLY)
(WITH RELATED BOOKS)

MAX MARKS : 50

Note:

*I. Please attempt **ANY TWO** questions out of three.*

*II. All questions carry **equal marks**.*

1. (a) Calculate resultant hydrostatic water thrust acting on a barrage radial gate for water head corresponding to pond level with below mentioned salient features.

- i) Sill Elevation of gate = El: 202 m (15 marks)
- ii) Top of the gate = El: 220.30 m
- iii) Centre line of Trunnion = El: 220 m
- iv) Pond level = EL: 220 m
- v) Width of the gate = 12 m
- vi) Radius of the skin plate = 20 m

- (b) Draw a line diagram of the installation showing radial gate/stoplog & their operating arrangements alongwith associated civil components for above said barrage.

Assume any other data required suitably. (10 marks)

2. a) Mention the advantages of radial gate over vertical lift gate. (5 marks)
- e) Draw the X-section of side rubber seal assembly for upstream and downstream sealing medium head vertical lift gate installation. (8 marks)
- f) Discuss the advantages and limitations of various type of hoisting arrangement generally used for operation of hydraulic gates in water resources projects. (12 marks)

3. a) Calculate & draw the pressure diagram in respect of the hydrostatic water load (under FRL condition) acting on a vertical lift fixed wheel intake gate with below given design data:

(15 marks)

- i) Intake opening size = 3000mm width x 5000mm height
- ii) Sill Elevation of Intake gate = El: 235.80 m
- iii) Centre line of Top seal = El: 240.85 m
- iv) Centre to centre of side seals = 3200mm
- v) Centre to centre of wheel tracks = 3600mm
- vi) Full Reservoir level = EL: 263.30 m

- b) Design the skin plate of gate leaf for above calculated water load.

(10 marks)

Assume any other data required suitably.

Government of India
Central Water Commission

53rd Departmental Examination for Engineering Officers of CWC

Time: 3 hours
Max. Marks:100

PROFESSIONAL PAPER – III (with Book)

(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 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.

Roll No.....

SECTION – A

Part-I Multiple choice objective type questions

Note: Attempt all questions. Each question carries 1 marks

Indicate the correct choice

1. TA Advance should be adjusted within days of completion of tour/
rejoining of duty if gone on leave immediately after completion of tour.
(a) 10 days.
(b) 15 days.
(c) 30 days.
(d) 60 days.
2. For Libraries having more than 20,000 books and up to 50,000 books, physical
verification of all the books should be taken at the interval of _____.
(a) Once in six month.
(b) Once in a year.
(c) Once in two year.
(d) Once in three year.
3. Power to incur Miscellaneous Expenditure comes under which schedule of Delegation of
Financial Power.
(a) Schedule II
(b) Schedule V
(c) Schedule VI
(d) Schedule VII
4. Encashment of EL while availing LTC is limited to _____ of EL on one occasion
without linkage to number of days and nature of Leave availed and total _____ days
of EL in the entire carrier.
(a) 10 days, 30 days
(b) 10 days, 45 days
(c) 15 days, 45 days
(d) 10 days, 60 days
5. LTC cannot be availed during:
(a) Transfer
(b) Duty Tour
(c) Suspension
(d) Promotion
6. For getting signed from DDO, the cashbook maintained by cashier is totalled.

- (a) Daily.
 - (b) Weekly.
 - (c) Monthly.
 - (d) Quarterly.
7. Scheme Estimates are approved by.
- (a) Planning Commission.
 - (b) Ministry of Finance.
 - (c) Respective department.
 - (d) None of the above.
8. Money received by the government in form of taxes and other sources is placed in which of the following account/fund?
- (a) The Consolidated Fund.
 - (b) The Public Account.
 - (c) The Contingency Fund.
 - (d) None of the above.
9. Appropriation or re-appropriation represents the allotment of a particular sum of money to meet expenditure on a specified job as enunciated in the.
- (a) Detailed Demands for Grants.
 - (b) Monthly Accounts.
 - (c) Abstract Contingent Bill.
 - (d) General Financial Rules.
10. Pension Head 2071 is operated by:
- (a) PAO only.
 - (b) CHQ-DDO only.
 - (c) Any of the 'a' or 'b'.
 - (d) None of the above.
11. Retirement Gratuity is admissible to all employees who retire on superannuation at the rate of _____ of Emoluments for each completed Six Month subject to maximum up to 16 ½ times of Emoluments or 20 Lakhs.
- (a) One-Fourth (1/4).
 - (b) One-Third (1/3).
 - (c) One-Two (1/2).
 - (d) Two-Third (2/3).
12. What is the minimum distance between place of duty and residence for grant of Special Casual leave if the absence of Government Servant is due to picketing or disturbance or curfew?
- (a) 5 miles
 - (b) 3 miles
 - (c) 2 miles
 - (d) Condition of distance not insisted upon.

13. Who is eligible to receive laptop, tablet, notepad, ultra books or similar devices for the discharge of official work?
- (a) S.O. or above.
 - (b) DS and above
 - (c) HOD
 - (d) Accounts officers and above.
14. What is the maximum age limit in case of appointment by deputation/deputation (including short- term contract) in respect of Posts in the SAG level and above?
- (a) 55 yrs.
 - (b) 56 yrs.
 - (c) 58 years
 - (d) 54 years
15. What are the circumstances under which the vigilance clearance for obtaining passport can be withheld by the Controlling Authority?
- (a) the officer is under suspension
 - (b) when a charge sheet has been issued and disciplinary proceedings is pending.
 - (c) The officer is involved in a case on the charges of corruption and investigation is pending.
 - (d) All of the above.
16. According to the definitions of CCS (CCA) Rules, who is defined as a Government Servant?
- (a) A member of a service who holds a civil post under the union who is temporarily placed at a disposal of the State Govt.
 - (b) A member of a service who holds a civil post under a state Government, who is temporarily placed at the disposal of Central Govt.
 - (c) A person in service of a local or other authority, temporarily placed at the disposal of the Central Govt.
 - (d) All of the above.
17. By which Amendment Act to the Constitution of India was the Goods and Services Tax introduced:
- (a) 100th
 - (b) 101st
 - (c) 102nd
 - (d) 122nd
18. What is the age limit of a permanently disabled dependent brother of a govt. servant for reimbursement of medical expenses?
- (a) 18 yrs.

- (b) 25 years
 - (c) No age limit
 - (d) 32 years
19. Which type of pensioner is not eligible for revision of pre-2016 pension vide OM, dated 12.5.2017?
- (a) Invalid Pensioner
 - (b) Compulsory retirement pensioner
 - (c) Voluntary retirement pensioner
 - (d) Premature retirement pensioner
20. Of the following records, which record is a permanent one according to the Manual of office procedure?
- (a) Record Review Register
 - (b) Inspection Reports
 - (c) Despatch Register
 - (d) Monitoring of Court CAT cases
21. An official is drawing pay @ Rs. 44,900 in level 6 from 1.7.2016 and promoted to level 7 on 1.10.2016. Indicate the pay fixed on the date of promotion?
- (a) Rs. 46,200
 - (b) Rs. 47,600
 - (c) Rs. 49,000
 - (d) Rs. 50,000
22. According to GFR 2017, the due date for payment of TA claim of a govt. servant is:
- (a) the date of completion of journey
 - (b) the date of submission of TA claim
 - (c) the date succeeding the date of completion of journey
 - (d) within 60 days of completion of journey.
23. What is the maximum limit of Medical Advance for IPD treatment under CGHS and CS(MA) Rules:
- (a) 50% of the approved CGHS package rates on receipt of a certificate from the treating physician
 - (b) 75% of the approved CGHS package rates on receipt of a certificate from the treating physician
 - (c) 90% of the approved CGHS package rates on receipt of a certificate from the treating physician
 - (d) 90% of the approved CGHS package rates on receipt of a certificate from the treating physician, irrespective of major or minor diseases.
24. As per the Annual Programme issued by Department of Official Language, the targets fixed for A to A region offices is:
- (a) 75%
 - (b) 90%

- (c) 65%
 - (d) 100%
25. Limited Tender Enquiry method of obtaining bids may be adopted when estimated value of the goods to be procured is up to
- (a) Rs. 15 Lakh
 - (b) Rs. 20 Lakh
 - (c) Rs. 25 Lakh
 - (d) Rs. 30 Lakh
26. As per GFR 2017, goods may be purchased without quotation upto the value of
- (a) Rs. 10,000
 - (b) Rs. 15,000
 - (c) Rs. 20,000
 - (d) Rs. 25,000
27. Form to be used when a single payment is made for a job or contract i.e. only on its completion
- (a) CPWA 24
 - (b) CPWA 26
 - (c) CPWA 27
 - (d) CPWA 29
28. The successful tenderer is required to deposit an amount equal to _____ of the tendered and accepted value of the work as performance guarantee
- (a) 2%
 - (b) 5%
 - (c) 8%
 - (d) 10%
29. Performance Security should remain valid for a period of _____ beyond the date of completion of all contractual obligations of the supplier including warranty obligations
- (a) 30 days
 - (b) 45 days
 - (c) 60 days
 - (d) 120 days
30. Revised Technical Sanction shall be necessary when the technical sanction exceeds beyond _____.
- (a) 5%
 - (b) 10%
 - (c) 15%
 - (d) 20%

Roll No.....

Section-B
Part-2 Short Answers

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

1. Write a note on

- (i) Principles for Allocation of Expenditure between Capital & Revenue, (3 marks)
- (ii) Charged and Voted Expenditure, (2 marks)
- (iii) Finance Account, (2 marks)

2. (a) What are the three parts in which the accounts (funds) of Government are kept?

(2 marks)

(b) As on 30.06.2018 Shri "X" Executive Engineer "I" Division is having the following in his cash chest.

(5 marks)

	(In ₹)
1) Note & Coins	- 2008.00
2) Revenue Stamps	- 100.00
3) Temporary advance with Assistant Engineer M	- 16000.00
4) Undisbursed pay & allowances of work charged staff converted in to regular establishment	- 1800.00
5) Permanent Imprest with: Assistant Engineer A	- 1000.00
Assistant Engineer B	- 1000.00
6) Undelivered cheque on account of scooter advance to Sh. A Junior Engineer	- 13000.00
7) Deposit Receipt of PNB Bank towards Earnest Money Deposit received from contractor "L" for construction of Over Head Tank for Kendriya Vidyalaya Sangathan (Autonomous Body)	- 15000.00

Calculate the opening balance as on 01.07.2018.

3. Write a note on:

- (i) Public Finance Management System, (3 marks)
- (ii) Direct Benefit Transfer, (2 marks)
- (iii) Difference between Capital and Revenue Expenditure, (2 marks)

4. 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? (7 marks)
5. Suppose you are the custodian of APARs of employees in your office. You have communicated the adverse remarks contained in the APARs of Mr. X. He/ She represents against the adverse entries. What are the procedures that you will adopt to deal with the case? (7 marks)
6. Your office 'X' has hired a private accommodation for office purpose. The lease of the office is going to expire in January 2019. The approval of the Ministry is required, as it is the competent authority in the matter. Elaborate on the process as to what are the essential documents that have to be incorporated before submitting the proposal for approval? (7 marks)
7. What is the procedure to be adopted to initiate disciplinary action against an official for his misconduct in the official dealing? (7 marks)
8. Write Short Notes on
- (i) Earnest Money (2 marks)
 - (ii) Pre-bid Conference (2 marks)
 - (iii) e-procurement (3 marks)
9. (a) List the standard method of obtaining bids for procurement of goods. (3 marks)
- (b) Explain two Stage Bidding (4 marks)
10. (a) Write short notes on the following (3 marks)
- (i) Limited Tender Enquiry
 - (ii) Proprietary Article Certificate
- (b) List Methods of Selection/ Evaluation of Consultancy Proposals. Explain any one method. (4 marks)
