

B.E. Eighth Semester (Civil Engineering) (CGS)  
10229 : Water Resources Engineering - II : 8 CE 01

P. Pages : 2

Time : Three Hours



AU - 2967

Max. Marks : 80

- Notes :
1. All question carry marks as indicated.
  2. Answer **Three** question from Section A and **Three** question from Section B.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answer necessary with the help of neat sketches.
  5. Use of pen Blue/Black ink/refill only for writing the answer book.

**SECTION – A**

1. a) What are different types of dams based on structural action? Describe in brief. 6  
b) Explain the procedure for fixing of the control levels of a reservoir. 7

**OR**

2. a) Explain the criteria for safe design of earth dams. 6  
b) A reservoir has a capacity of 3.6 Mha-m upto the level of the spillway crest. The average annual inflow is 1.5 Mha-m of water. The average annual sediment inflow is  $3 \times 10^{11}$  kg and mass density of sediment as  $1100 \text{ kg/m}^3$ . Assume that the usefulness of the reservoir is terminated when two-third of the total capacity is filled with sediments. Consider only six divisions of the total storage capacity and determine (i) The useful life of reservoir (ii) The total life of reservoir. 7

|                     |      |      |      |      |      |      |     |
|---------------------|------|------|------|------|------|------|-----|
| Capacity/Inflow     | 2.40 | 2.00 | 1.60 | 1.20 | 0.80 | 0.40 | 0.0 |
| Trap efficiency (%) | 98.2 | 98.0 | 97.5 | 97.0 | 96.0 | 95.0 | 0.0 |

3. a) What are different methods for the analysis of a gravity dam? State the assumptions made in the stability analysis. 7  
b) Derive an expression for stresses developed in the elementary profile of a gravity dam. 7

**OR**

4. a) Explain the methods for computing the uplift pressure force in a gravity dam when  
i) there is no drainage system. ii) there is a drainage system. 7  
b) Design practical profile for a gravity dam holding a water depth of 88m, wave height 2m, specific gravity of concrete 2.4, permissible compressive strength of  $300 \text{ tonne/m}^2$  and top width of dam is 5m. Draw a neat sketch of practical profile with dimensions. 7

5. a) What are the requirements for an ideal site for a diversion headworks? 6  
b) What are different types of I.S. stilling basins for the horizontal aprons? Sketch and name the components of IS-BASIN-II. 7

**OR**

6. a) How would you compute Khosla's safe exit gradient? What is its significance. 6

- b) Find the R.L of crest and size of tainter gate fitted over an ogee shaped crest from data given below 7
- i) Design discharge =  $1706 \text{ m}^3/\text{sec}$
  - ii) Gross length of spillway = 142 m
  - iii) No of spans = 13 No
  - iv) Width of pier = 1.0 m
  - v) Coefficient of discharge = 1.84
  - vi) R.L of HFL = 107.00 m
- Neglect velocity of approach.

**SECTION – B**

7. a) What is the balanced depth of cutting? Derive an expression for the balanced depth. 7
- b) Design a lined channel from the following data. 7
- i) Discharge = 100 cumecs
  - ii) B/D ratio = 6.0
  - iii) Side slope = 1.5:1.0
  - iv) Bed slope = 1 in 5000
  - v) Rugosity coefficient  $N = 0.016$ .

**OR**

8. a) What do you understand by the Lining of canals? What are the qualities of good Lining materials? Enumerate various types of Lining. 7
- b) Explain the procedure for the design of an alluvial channel by Kennedy's theory when 7
- i) Bed slope is given
  - ii) B/D ratio is given

9. a) What are different systems of classification of falls? Describe in brief. 7
- b) What is an escape? Explain the working of Tail escape. 6

**OR**

10. a) Describe the various types of cross-drainage works on a canal. 7
- b) What considerations will you have while selecting a type of outlet? 6

11. a) What are the various purposes for which river training is required? How they are classified depending upon purpose required? 7
- b) Explain briefly the soil conservation measures and its importance. 6

**OR**

12. a) Explain briefly :- 7
- i) Ground water harvesting.
  - ii) Co-operative water user's organization.
- b) Determine the length of the strainer of a tub well drilled in an unconfined aquifer from the following data :- 6
- i) Discharge =  $148 \text{ m}^3/\text{hr}$
  - ii) Diameter of well = 30 cm
  - iii) Drawdown = 5m
  - iv) Radius of influence = 250m
  - v) Coefficient of permeability =  $2 \text{ m/hr}$ .

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