Total No. of printed pages = 6

CE 1318E032

Roll No. of candidate

The figures in the margin indicate full marks
for the questions.

Answer question No. 1 and any *three* from the rest.

1.   Choose the correct answer any five :   (5 × 1 = 5)

   (i)   The economic gains due to an increase in activities of the industrial linkage to the project is

      (a)   Primary benefits

      (b)   Secondary benefits

      (c)   Indirect benefits

      (d)   Direct benefits

[Turn over

(ii) For the same discount rate and life of the project the two methods which are numerically equivalent are

    (a) Annual cost and present worth

    (b) Annual cost and rate of return

    (c) Present worth and annual cost

    (d) Annual cost and benefit cost

(iii) For stability of the upstream slope of an earth dam, the most critical condition is

    (a) Over topping

    (b) Piping

    (c) Sloughing

    (d) Sudden drawdown

(iv) A fairly impervious barrier formed at the center of the base of an earth dam by extending the core up to the depth where impervious strata is reached is called

    (a) Core   (b) Cut off

    (c) Shell   (d) Rip Rap

(v) The discounting factor that indicates the number of rupees one can withdraw in equal installments at the end of each of n years if Rs. 1 is initially deposited at r% interest is called

    (a) Sinking fund factor

    (b) Series present worth factor

    (c) Capital recovery factor

    (d) Compound amount factor

(vi) When the reservoir is full the maximum compressive force in a gravity dam is produced at

    (a)   The toe

    (b)   The heel

    (c)   At the centre of the base

    (d)   Middle third of base

(vii) Trap efficiency of a reservoir is a function of

    (a)   Capacity / inflow ratio

    (b)   Capacity / outflow ratio

    (c)   Outflow / inflow ratio

    (d)   Inflow / capacity

(viii) The water stored in the reservoir below the minimum pool level is called

    (a)   Useful storage

    (b)   Dead storage

    (c)   Valley storage

    (d)   Surcharge storage

(ix) The maximum permissible eccentricity for no tension at the base of a gravity dam is

    (a) B/2   (b) B/3

    (c) B/4   (d) B/G

(x) Horizontal acceleration due to earthquake results in

    (a) Hydrodynamic pressure

    (b) Inertia force into dam body

    (c) Both (a) and (b)

    (d) None of the above

2. (a) How engineering economic study is useful in choosing project? (4)

    (b) Discuss the various steps involved in making economic study of an engineering project. (8)

    (c) What is a cash flow diagram? (3)

3. (a) State the purpose of collecting field data for project planning? Discuss their types. (3 + 6 = 9)

    (b) Write short notes on :

       (i) Discount rate

       (ii) Primary benefits

       (iii) Secondary benefits. (3 × 2 = 6)

4. (a) Describe the factors to be considered for selecting the type of a dam. What are their relative importances? (4 + 4 = 8)

    (b) What is meant by trap efficiency of a reservoir? What factors influence its value? (2 + 3 = 5)

    (c) What is economic life of a reservoir? (2)

5. (a) Discuss different methods available for reservoir sediment control. (5)

(b) What is the underlying principle in planning of multi-purpose projects? (4)

(c) What is cost allocation? Define joint cost and separable cost. (2 + 4 = 6)

6. (a) Discuss the failure of gravity dam and the stability criteria adopted in its design.(3 + 5 = 8)

(b) Explain the Separable cost-remaining benefit method of cost allocation. (7)

7. (a) Briefly discuss the water resources of North East and its use. (6)

(b) A reservoir has a capacity of 13 Mm³ at full reservoir level. The catchment area is 450 sq km. The average annual runoff of the catchment is 250 mm3 and sediment yield is 12.5 MN/km2. The sediment can be assumed to have an average in situ specific weight of 13.5 KN/m² after deposition. Estimate the time required for reservoir capacity to be reduced to 5.0 Mm³. Use uniform steps of capacity interval of 2 Mm³. The variation of the trap efficiency is given by the relation : (9)

$$\eta_e = 100 \times \left[1 - \frac{1}{\left(1 + 65\left(\frac{C}{I}\right)\right)} \right]^2$$

8. (a) National Home Builder's company plans to purchase new equipment. Two manufactures offered the estimates as given below :

	Vendor A	Vendor B
Initial cost Rs.	15,00,000	18,00,000
Annual O and M cost Rs per year	3,50,000	3,10,000
Salvage value Rs.	10,000	20,000
Life years	6	9

Determine which vendor should be selected on the basis of a present worth comparison, if the rate of interest is 15% per year. (8)

(b) What are the component parts of a zoned earth dam? Illustrate with a diagram. (3 + 4 = 7)

9. (a) Discuss the rate of return method of discounting. Briefly describe the procedure involved in using this method. (2 + 2 = 4)

(b) A dam 6.0 m high and 1.5 m wide at the top has vertical water face. Find the base width of the dam if no tension is to develop. Take unit weight of masonry as 20 kN/m^3 and c =1

Investigate the stability of the above dam if the co efficient of friction is 0.6 and maximum allowable compressive strength is 1800 kN/m^3. (8 + 3 = 11)

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