

Total No. of Questions : 12]

P14

SEAT No. :

[Total No. of Pages : 3

[5871]-514

B.E. (Civil)

DAMS & HYDRAULIC STRUCTURES

(2015 Pattern) (Semester - II)

Time : 2½ Hours]

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.
- 2) Neat labelled diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of logarithmic tables, slide rule, molier charts, electronic pocket calculator and steam is allowed.
- 5) Assume suitable data if necessary.

[Max. Marks : 70

Q1) Define a "Dam" & differentiate between Large & small dams. [2+4]

OR

Q2) What is piezometer? Briefly explain following types of piezometers.

- a) Pneumatic piezometer
- b) Vibrating wire piezometer

[2+4]

Q3) Write any six external forces acting on gravity dam along with their equations.

[6]

OR

Q4) a) State the classification of Arch dams, when are the arch dams suitable. [4]

b) State advantages and limitations of 'Buttress dams'. [2]

Q5) a) What is meant by 'Spillway'? state its purposes Explain siphon spillway with sketch. [6]

b) Suggest a suitable type of spillway gate, if the span is 45m and height is 10m. [2]

OR

Q6) a) State four types of spillway gates and explain any one with neat sketch. [4]

b) Explain 'U.S.B.R stilling basin IV' with the help of neat sketch. [4]

P.T.O.

Q7) a) Determine factor of safety for the slope. In a slip circle analysis of downstream slope of a dam during steady seepage, the section of dam was drawn to a scale 1 cm = 5m & results obtained were.

- i) Area of N- rectangle = 15.25 cm²
- ii) Area of T-rectangle = 6.5 cm²
- iii) Area of L-rectangle = 5.2 cm²
- iv) Length of arc = 12.5 cm
- v) Effective angle of friction = 26°
- vi) Unit cohesion = 0.2 kg/cm²
- vii) Unit weight of Soil = 2g/cm³.

[8]

b) Write note on Khosla's theory application for design of structure on permeable foundations. Also explain the importance of exit gradient. [6]

c) Discuss various causes of modes of failure of earthen dams. Draw relevant sketches. [4]

OR

Q8) a) Define phreatic line [2]

b) Determine the phreatic line through homogeneous earthen dam section with following details [8]

- i) Slope of up stream face = 3:1
- ii) Slope of downstream face = 2.5:1
- iii) Top width = 10m
- iv) Height of dam = 23m
- v) Free board = 3m
- vi) Length of horizontal drainage blanket = 50m

Note : [For calculation, consider internal of x coordinates as 10m]

c) Draw a labelled sketch of diversion headworks. Also enumerate the function of each component. [8]

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- Q9) a)** Design an irrigation channel to carry 15 cumecs of discharge. The channel is to be laid at a slope 1:5000 the critical velocity ratio for the soil is Use kutters rugosity coefficient as 0.0225. **[8]**
- b)** Define canal falls and state any six types of canal falls. **[4]**
- c)** Explain trapezoidal notch fall with the help of neat sketch. **[4]**

OR

- Q10) a)** Design a regime channel for a discharge of 50 cumecs and silt factor 1.1, using Lacey's theory. **[8]**
- b)** Write short note on **[8]**
- i) Canal falls
 - ii) Canal outlets
 - iii) canal escapes
 - iv) Canal regulators

- Q11) a)** What do you mean by C.D. work? Write the factors for selection of C.D. work. Also Explain Design consideration of it. **[8]**

- b)** Write short notes on **[8]**
- i) Level crossing
 - ii) Inlet and outlet

OR

- Q12) a)** Write short note on **[8]**
- i) Super passage
 - ii) Siphon aqueduct
- b)** Write short note on **[8]**
- i) Embankment or levees
 - ii) Groynes or spurs

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