Total No. of Questions : 12] SEAT No. :

P3028 [Total No. of Pages : 3

[5354]-514
B.E. (Civil)
DAMS AND HYDRAULIC STRUCTURES
(2012 Pattern) (Semester - II)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:-

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of electronic non-programmable calculator is allowed.***
5) ***Assume suitable data, if necessary.***

UNIT - I

Q1) Briefly explain any case of dam failure you have studied. What type of failure it is? Also suggest the instrument which would have given the sign of alert in that case. **[3+1+2]**

OR

Q2) Explain in detail different investigations required to be carried out while planning a water resource project. **[6]**

UNIT - II

Q3) a) What is a gallery? Briefly explain various types of galleries and their functions used in gravity dams. **[1+5]**

b) Briefly explain variable radius arch dam. **[2]**

OR

Q4) a) What is middle third rule? **[2]**

b) State various types of joints and keys provided in gravity dams. Also explain how the joints are sealed? **[4+2]**

P.T.O.

UNIT - III

Q5) a) Give classifications of spillways. **[4]**

b) Write a brief note on hydropower potential. **[2]**

OR

Q6) a) Write a note on emergency spillway. **[3]**

b) Briefly explain run-of-river hydropower plant. **[3]**

UNIT - IV

Q7) a) What is sudden drawdown condition? **[2]**

b) Determine the factor of safety of downstream slope of homogenous earthen dam (during steady seepage) drawn to a scale of 1cm = 4m, for the following data: **[8]**

i) Area of N-rectangles = 14.4 cm^2.

ii) Area of T-rectangles = 6.4cm^2.

iii) Area of U-rectangles = 4.9 cm^2.

iv) Length of slip circle arc = 12.6 cm.

v) Angle of internal friction = 26°

vi) Cohesion C = 19.5 kN/m^2

vii) Specific weight of soil = 19kN/m^3

c) Write a note on Khosla's theory of independent variables. **[8]**

OR

Q8) a) Write a note on measures adopted for safe drainage of seepage water in earthen dam. **[4]**

b) With the help of expression explain *'Exit Gradient'*. Also give permissible values of it for various soils. **[6]**

c) With the help of appropriate sketches explain Swedish slip circle method of stability analysis of earthen dam. **[8]**

UNIT - V

Q9) a) Design an irrigation canal in alluvial soil according to Lacey's theory. **[8]**

i) Full supply discharge = 12 m^3/s

ii) Lacey's silt factor = 1

iii) Canal side slope = ½ H: 1V

b) State the merits and demerits of canal lining. **[8]**

OR

Q10)a) State various types of canal falls. Explain any one of them in detail with the help ofneat sketch. **[8]**

b) Design a trapezoidal irrigation canal to carry a discharge of 40 m^3/s using Kennedy's theory. Assume ratio of base width (B) to depth (D) as 2.5, criticalvelocity ratio = 1, Kutter'srugosity coefficient n = 0.023 and side slope 1H : 2V. **[8]**

UNIT - VI

Q11)a) What is meant by Cross Drainage work? Explain level crossing with neat sketch. **[8]**

b) State and explain classification of rivers based on topography. **[8]**

OR

Q12)a) Write short notes on: **[8]**

i) Guide banks

ii) Pitched island

b) With the help of neat sketches explain: **[8]**

i) Syphon aqueduct

ii) Canal syphon