Total No. of Questions : 8]

SEAT No. :

PE-2154

[Total No. of Pages : 2

[6584]-53
B.E. (Civil Engineering)
DAMS AND HYDRAULICS STRUCTURES
(2019 Pattern) (Semester - VIII) (401011)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q.1 OR Q.2, Q.3 OR Q.4, Q.5 OR Q.6, Q.7. OR Q.8.***
2) ***Neat sketches/diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks for the sub-questions.***
4) ***Assume suitable data if necessary and state them in your answer clearly.***
5) ***Use non-programmable pocket size electronic calculator is allowed.***

Q1) a) What are spillways and what is their necessity? **[5]**

b) Draw a labeled sketch of ogee spillway showing all components **[5]**

c) Explain 'Stilling Basin Types' according IS 4997-1968 **[7]**

OR

Q2) a) Explain importance of 'Energy Dissipators'. **[5]**

b) Explain in details 'Vertical Lift Gate'. **[5]**

c) Design an ogee spillway for concrete gravity dam, for the following data. **[7]**

i) Average river bed level = 100 m

ii) Slope of D/S = 0.7 H: 1V, u/s face is vertical

iii) Spillway crest RL = 204 m

iv) Design discharge = 8000 m^3/s

v) Spillway length is 6 spans with a clear length of 10 m each. Pier thickness = 2.5 m.

Q3) a) Explain function of pitching on U/S face of earthen dam & turfing. **[5]**

b) Explain in details homogenous embankment type of dam. **[5]**

c) Describe the method of plotting phreatic line for an earth dam with & without horizontal filter at the downstream side. **[8]**

P.T.O.

OR

Q4) a) Explain significance of drainage blanket in earthen dam **[5]**

b) Explain 'Seepage Failure' in earthen dam **[5]**

c) Determine the factor of safety of downstream slope of (homogeneous section) an earth dam drawn to a scale of 1cm = 4 m, for the following data : **[8]**

Area of N-rectangle = 24 cm^2
Area of T-rectangle = 12 cm^2
Area of U-rectangle = 8 cm^2
Length of slip circle arc = 20 cm
angle of internal friction = 25°
Cohesion c = 19.5 kN/m^2
specific weight of soil = 19 kN/m^3

Q5) a) Explain types of canals based on alignment. **[5]**

b) Explain in details limitations of Kennedy's theory. **[5]**

c) Design an irrigation channel by Kennedy's theory to carry a discharge of 36 cumecs. Take rugosity coefficient N = 0.0225 and critical velocity ratio m = 1.05. The channel has a bed slope of 1 in 5000 and side slope of 0.5 H:1 V. Take initial trial depth as 2m. **[8]**

OR

Q6) a) Explain various losses in irrigation of canals **[5]**

b) Explain the concept of canal fall and describe ogee fall in details **[5]**

c) Design a regime channel of trapezoidal section for carrying water at the rate 12 cumecs having side slopes 1 H: 2 V, if Lacey's slit factor is 0.90. **[8]**

Q7) a) Explain in details "Super Passage". **[5]**

b) Explain in details limitation of Bligh's Theory. **[5]**

c) Draw layout plan of a typical diversion head works and label all its part. Write functions of each part. **[7]**

OR

Q8) a) Explain in details "Level Crossing". **[5]**

b) Explain selection criteria for 'Diversion Head Work'. **[5]**

c) Explain 'Creep Theory by Bligh' for the hydraulic design of weir on a permeable foundation. **[7]**