

Total No. of Questions : 6]

SEAT No. :

P49

[Total No. of Pages : 2

APR - 18/BE/Insem. - 1

B.E. (Civil)

DAMS AND HYDRAULIC STRUCTURES

(2012 Pattern) (Semester - II)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Use of electronic non-programmable calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

UNIT - I

- Q1)** a) Define a 'Dam' and differentiate between 'Large' and 'Small' dams. [2+3]
b) What is the necessity of dam instrumentation? Briefly explain the function of seismograph. [2+3]

OR

- Q2)** a) What is a piezometer? Briefly explain the process of measurement of uplift pressure using porous tube piezometer. [2+3]
b) Classify dams on the basis of structural design. Suggest a type of dam for the following situation. [2+3]
i) Impervious solid rock Foundation
ii) V-shaped narrow gorge
iii) Seismic zone

UNIT - II

- Q3)** a) State load combinations 'A, B, D and G' as per IS : 6512 - 1984. Briefly explain why silt pressure is normally neglected. [4+2]
b) State four advantages of buttress dams. [2]
c) Define 'Elementary Profile' of gravity dam. [2]

OR

P.T.O.

Q4) a) Following data is obtained while analyzing a concrete gravity dam with reservoir full condition. [8]

- i) Base width of dam = 73.1 m
- ii) Sum of net vertical forces = 58710.7 kN
- iii) Sum of net horizontal forces = 50408.8 kN
- iv) Sum of resisting moment about toe = 3693247 kNm
- v) Sum of overturning moment about toe = 2567220 kNm

Calculate the normal stresses at toe and heel. Find out the factor of safety against sliding and overturning. Also comment on the safety of dam. (Take $\mu = 0.75$).

b) Write a short note on arch dam. [2]

UNIT - III

Q5) a) Design an ogee spillway by USWES method for the following data. [8]

Peak discharge = 4000 cumec

Height of peak flow = 60 m

(measured from river bed)

Clear length of spillway = 120 m

(Total 6-spans of 20 m each)

Slope of upstream face = Vertical

Slope of downstream face = 0.7 H to 1V

Coefficient of discharge 'C' = 2.2

Take $K_p = 0.01$ and $K_a = 0.1$

b) Enlist various components of pumped storage power plant. [2]

OR

Q6) a) Write a note on bucket type energy dissipator. [4]

b) Enlist the forces to be considered while designing the hoisting arrangement for radial gate. [2]

c) Define the terms: [2+2]

i) Firm power

ii) Secondary power

x x x