M. Tech.-II (Civil-Hydraulic Engineering) (CBCS – 2015 Course) :
SUMMER - 2019

SUBJECT : HYDRAULIC STRUCTURES

Day : Thursday
Date : 06/06/2019

Time : 11.00 AM TO 02.00 PM
Max. Marks : 60

S-2019-3398

N.B.

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Answer to both the sections should be written in **SAME** Answer book.
4) Use of non-programmable calculator is allowed.

SECTION – I

Q.1 **a)** Describe the principle stress distribution in the gravity dam. **(05)**

b) Derive the equation for 'No sliding' condition of an elementary profile of gravity dam. **(05)**

OR

a) What are different foundation problems occurring in the gravity dam? Explain the various treatments to overcome these problems. **(05)**

b) Why colgrout masonry is preferred over conventional masonry dam? Explain the method of construction using colgrout technique. **(05)**

Q.2 Explain the critical conditions for the stability of upstream and downstream slopes of an earth dam under various conditions. **(10)**

OR

a) What are the features and advantages of roller compacted concrete dam? **(05)**

b) Briefly explain with sketches the structural failure of an earth dam. **(05)**

Q.3 What is pore pressure? Brief the adverse effect of presence of pore pressure on the stability of earth dam. **(10)**

OR

Explain the function and design criteria for filters in the earth dam. **(10)**

SECTION – II

Q.4 **a)** Explain with a sketch protection measures for upstream and downstream slope of an earth dam. **(05)**

b) State the important design principles of concrete face rock fill dam. **(05)**

OR

a) State various measures adopted for safety of earth dam against earthquake forces. **(05)**

b) Explain the method of construction used for the earth core rock fill dams. **(05)**

P.T.O.

Q.5 **a)** What is side channel spillway? Where it is used? State important design parameters. **(05)**

b) State the type of energy dissipater to be provided below spillway based on relative positions of jump height curve and tail water rating curve. **(05)**

OR

a) The crest level of an ogee shaped spillway is at R.L. 310 m and maximum reservoir level is 315 m. Calculate the maximum discharge when the flow takes place through 5 gates of effective span 12 m each. Assume C = 2.2. **(05)**

b) Explain with neat sketch USBR type – II stilling basin used for energy dissipation below spill way. **(05)**

Q.6 **a)** What precautions are taken in design of barrage against seepage and uplift forces. **(05)**

b) State various instruments used in monitoring of gravity dam and state functions of each. **(05)**

OR

a) Explain the working of automatic gates used for discharging flood water. **(05)**

b) State and explain any two instruments used for monitoring of earth dams. **(05)**

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