



COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)
SHIVAJI NAGAR, PUNE - 411 005

END Semester Examination

(CE-14002) Dams and Hydraulic Structures

Course: B.Tech

Branch: Civil Engineering

Semester: Sem VII

Year: 2014-2015

Max.Marks:60

Duration: 3 Hours Time:- 2.00PM TO 5.00PM

Date: 26/11/2014

Instructions:

MIS No.

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1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper

(10)

Q.1 A 100 m high concrete gravity dam trapezoidal in cross-section has upstream face vertical, crest width 6 m, base width 75 m and free board equal to 4 m. Calculate the maximum principal stress at the toe when the reservoir is full. Take unit weight of concrete as 23.544 kN/m^3 . Neglect all the other forces except hydrostatic water pressure, uplift pressure and self weight. There is no drainage gallery and no tail water.

(3+7=10)

Q.2 (a) Discuss the design criteria of filters for Earth dams.

(b) Explain the procedure (in steps) for determination of the seepage line in a homogeneous earth dam body having a horizontal drainage blanket at the downstream toe. Also, derive the formula for the computation of the seepage discharge per unit length of the dam using Darcy's law.

(10)

Q.3 Design a suitable section for the overflow portion of a concrete gravity dam having the downstream face sloping at a slope of 0.7H : 1V. The design discharge for the spillway is 6000 cumecs. The height of the spillway crest is kept at RL 160.0m. The average river bed level at the site is 100.0m. The effective length of the spillway may be taken as 50m.

(3+7=10)

Q.4 (a) Explain Bligh's creep theory for the seepage flow in the foundation of a hydraulic structure.

(b) Design a trapezoidal concrete lined channel to carry a discharge of 350 cumecs at a slope of 1 in 6400. The side slopes of the channel may be taken as 1.5 : 1. The value of 'n' for the lining material may be taken as 0.013. Assume the limiting B/D ratio to be 5.

(2+8=10)

Q.5 (a) Explain the term 'Regime channel'.

(b) Design an irrigation channel to carry 60 cumecs of discharge. The channel is to be laid at a slope of 1 in 4000. The critical velocity ratio for the soil is 1.1. Use Kutter's rugosity coefficient as 0.023. Assume side slopes of the channel to be 0.5H : 1V.

(3+3+4=10)

Q.6 Write short notes on :

(a) Objectives of river training and its classification.

(b) Meanders and causes of meandering; meander parameters .

(c) Components of hydropower plants.