

**Government College of Engineering, Aurangabad**

(An Autonomous Institute of Government of Maharashtra)

**B.E. Civil (Regular) Revised**

End Semester Examination 2016-17, Semester-I

**CE 445: -Water Resources Engineering-II**

Time: Three Hours

Maximum Marks: 60

10 NOV 2016

*"Verify the Course Code and Check Whether You Have Got the Correct Question Paper"*

N.B.:- 1. All Questions are Compulsory. 3. Assume Suitable Data if Necessary and State it clearly.  
2. Figures to the Right Indicate Full Marks. 4. Use of Nonprogrammable Calculator is allowed.

- Q.1 Attempt any two 12
- i) Differentiate between (a) low dam and high dam and (b) elementary and practical profile of a gravity dam with the help of figure and two points in tabular form.
- ii) Annual runoff in terms of depth over the catchment area of 1720 Sq. km. of a reservoir is given below.
- |             |      |      |      |      |      |      |      |      |
|-------------|------|------|------|------|------|------|------|------|
| Year        | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| Runoff (cm) | 95   | 145  | 170  | 90   | 95   | 150  | 110  | 130  |
- Sketch the flow mass diagram. What is the average yield in million m<sup>3</sup> from the catchment?
- iii) How would you select suitable site for construction of a dam? Demonstrate with at least four geological and topographical features which affect the selection of type of a dam
- Q.2 Attempt any two 12
- i) What is an arch dam and hollow concrete gravity dam? State three types of arch dam and give suitability of each one.
- ii) Illustrate with sketches the following parts of an earthen dam.  
a) Hearting b) Cut off trench and c) Horizontal drainage blanket.
- iii) Illustrate two types of buttress dam with the help of figure.
- Q.3 Attempt any two 12
- i) Explain with the help of figure and equations step by step procedure involved in design of ogee spillway.
- ii) Describe with a neat sketch construction and working of "Radial gate".
- iii) Design a regime channel for a discharge of 50 cumecs and silt factor 1.1 using Lacey's theory.
- Q.4 Attempt any two 12
- i) Draw sketch of notch fall. State and how would you explain three merits of notch fall.
- ii) Explain the necessity of cross drainage structure. Suggest suitable cross drainage works, under the following situation and draw a neat sketch to illustrate the same. FSL/HFL, Bed level and Discharge for canal are – 125.00m , Bed level 120.0 m and 100 cumecs and that for the drainage are 124.0 m, 122.0 m and 20 cumecs.
- iii) What is meant by canal regulation? Explain in detail two types of canal regulation works.
- Q.5 Attempt any two 12
- i) What is the difference between a weir and a barrage? Why barrages are preferred over weir in modern days?
- ii) Can you explain the step by step procedure of design of weir by Khosla's theory.
- iii) What is river intake? State different types of river intakes and explain one with the help of figure.