



**FACULTY OF ENGINEERING**  
**B.E. 4/4 (Civil) I Semester (Suppl.) Examination, July 2012**  
**WATER RESOURCES ENGINEERING AND MANAGEMENT – II**

Time: 3 Hours]

[Max. Marks :75

*Note : Answer all questions from Part A. Answer any five questions from Part B.*

**PART – A**

**(25 Marks)**

- |   |   |
|---|---|
| 1. Write about the safety criteria for Gravity Dams.  | 2 |
| 2. State the characteristics of seepage line in Embankment Dams.  | 2 |
| 3. Define the terms : Valley storage and surcharge storage.   | 2 |
| 4. State the various measures to control seepage through earth dams and their foundations.  | 2 |
| 5. With neat sketches state the functioning of slotted roller bucket type energy dissipators.                                     | 2 |
| 6. State the significance of flow duration curve in water power engineering.  | 3 |
| 7. Differentiate between retarding basin and a storage reservoir.   | 3 |
| 8. What do you understand by slip circle method ?   | 3 |
| 9. What are the various conditions pertaining to tail water curve and jump height curve for the design of scour protection works. | 3 |
| 10. Draw a neat sketch of a hydropower plant and show the various elements.   | 3 |



PART – B

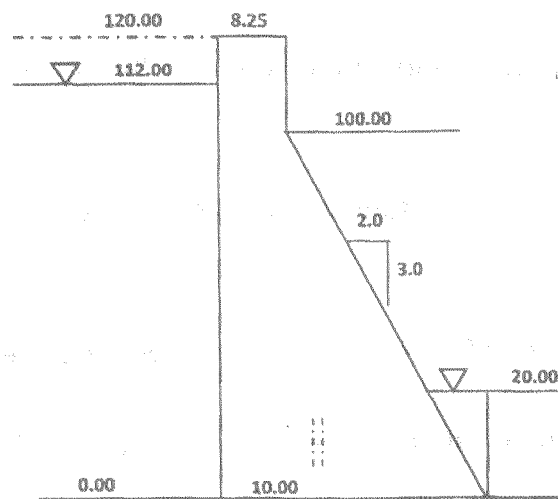
(50 Marks)

11. a) Describe briefly the techniques that are employed for computing the storage capacity of a reservoir for different water surface elevations. 5
- b) The yield of water in  $Mm^3$  from a catchment area during each successive month is given in the table below :

1.7	2.5	3.0	9.0	13.0	13.1
8.2	3.58	2.56	2.14	1.75	1.23

Determine the minimum capacity of a reservoir required to allow the above volume of water to be drawn off at a uniform rate assuming that there is no loss of water over the spillway. 5

12. The following are the details of a straight gravity concrete dam having specific gravity of 2.4. Take  $\mu = 0.7$ ;  $q = 735.75kN/m^2$  for the dam shown in Fig. below. 10



Determine maximum principal stress in the masonry of the dam and check for its safety.

13. a) What are rockfill dams and what are their advantages over earthen dams? Draw a neat sketch showing the cross section of a rockfill dam. 5
- b) How would you proceed to determine the phreatic line through homogeneous earthen dams provided with a horizontal filter? 5

14. a) What is a spillway ? What are the essential requirements of a spillway ? Describe the various components of spillways. 6
- b) Find the length of the spillway from the following data : 4
- |  |             |
|--|-------------|
| Height of the spillway crest from river bed    | 125 m       |
| Discharge                                      | 10200 cumec |
| Permissible level of submergence 3 above F.R.L | 12 m        |
| Maximum permissible span (clear)               | 15.0 m      |
| Thickness of each pier                         | 4.5 m       |
- Piers and abutments are rounded type.
15. a) Draw a neat sketch of a hydropower plant and show the various elements. 4
- b) A run-off river plant is installed on a river having a minimum flow of 15.75 cumec. If the plant is used as a peak load plant operating only for 6 hours a day, determine the firm capacity of the plant a) with pondage b) without pondage, but allowing 10% of water to be lost in evaporation and other losses. Head at plant is 20 m and the plant efficiency may be assumed as 75%. 6
16. a) Write a note on the selection of a suitable type of turbine for a hydroelectric scheme. 6
- b) Discuss the advantages and as well as the limitations of Siphon spillway. 4
17. Write a short note on the following : (2x5)
- a) Low and high gravity dams
- b) Reservoir sedimentation.