FACULTY OF ENGINEERING

B.E. 3/4 (Civil) II Semester (Main) Examination, May/June, 2011

WATER RESOURCES ENGINEERING & MANAGEMENT – I

Time : 3 Hours]   [Max. Marks : 75

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

PART – A   (Marks : 25)

1. A catchment area has a total area of 400 Sq km. The outflow from a storm
    of duration 3 hours found to be 760 cumecs. Compute the direct runoff
    depth neglecting all losses and base flow.   2

2. A sample of water has a total volume of 9×10^4 mm^3. The sample of this
    soil was saturated and its weight was found to be 2.14 N and then the
    sample is drained by gravity and the weight of this found to be 1.83 N. The
    same sample is oven dried till it reaches a constant weight of 1.49 N.
    Compute the specific yield and specific retention of this sample.   3

3. Derive the relationship between Duty, Delta and Base period.   3

4. What do you understand by Balancing depth in canals and state its
    importance ?   3

5. A regime channel discharges 8 cumecs of water having Lacey's silt factor
    0.9. The side slopes are 1 : 1 compute the regime velocity of this channel.   2

6. Define Exit Gradient and state its importance.   3

7. Distinguish between a Weir and a Barrage.   2

8. What do you understand by a cross drainage work ? List the conditions of
    their selection.   3

9. Define single purpose and multipurpose projects with an example in each
    case.   2

10. Define Warabandhi scheme in water management scenario.   2

Part – B   (Marks: 50)

11. (a) With the help of neat sketch explain various processes of hydrologic
         cycle and how it is useful in Water Resources Engineering.   5
    (b) A large sample of peak flood data from a river has been available.
         The flood frequency studies were carried out for this river shows the
         following results. Estimate the flood magnitude for this river for a
         return period of 200 years.   5

S. No.	Return Period (T Years)	Peak Flood (Cumecs)
1	50	20,200
2	100	30,400

12. (a) With the help of neat sketches, explain briefly various methods of irrigation. 5

    (b) Design an irrigation channel based on Lacey's theory to carry a discharge of 16 cumecs. Assuming silt factor as 0.86 and side slopes 1 : 1. 5

13. (a) With the help of neat sketches, explain Khoshla's method of independent variables with all the necessary corrections. 5

    (b) With the help of neat sketch, explain the design principles of a vertical drop weir. 5

14. (a) Explain the functions of the following structures : 5
      (i) A Head Regulator
      (ii) A Cross Regulator

    (b) Derive the relationship between Sensitivity, Flexibility and Proportionality of outlet. 5

15. Write a note on the following : 10
    (a) Functional requirement of Multi-purpose projects.
    (b) Project formulation.
    (c) Farmer's participation in Water management.

16. (a) A 300 mm dia well penetrates 20 m below the static water table. After 24 hrs of pumping at 5000 liters per minute, the water level in the test well at 100 m away is lowered by 0.50 m and the well at 30 m away, the drawdown is 1.0 m. Determine the transmissibility of the aquifer. 5

    (b) Design a concrete lined channel to carry a discharge of 200 cumecs of water with a slope of 20 cm per km. Assume side slopes of 1.5 H: 1 V and limiting velocity as 2 m/sec. The Mannings Coefficient as 0.015. 5

17. (a) Explain the process of Runoff. And what are the various factors that govern the runoff ? 5

    (b) A weir section has a horizontal floor length of 50 m with a sheet pile at the beginning, middle and at the end having lengths 6 m at the beginning and 9 m each at intermediate and end positions. The steady seepage head may be taken as 5 m. Design the floor thickness required at the mid points of these sheet piles using Bligh's theory. Assume Bligh's coefficient as 12 and unit weight of floor material as 2.20. 5