Code No. : 3067

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**.

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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
