Code No. : **5039/M**

# FACULTY OF ENGINEERING
## B.E. 3/4 (Civil) II Semester (Main) Examination, May/June 2012
## WATER RESOURCES ENGINEERING AND MANAGEMENT – I

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 two disadvantages of recording rain guages. **2**
2. Find the radius of circle of influence if hydraulic conductivity is 40 m/day. **3**
3. Water is released at the rate of 12 cumecs at the head of a canal. If duty at the field is 1250 Ha/cumec and loss of water in transit is 20%, find the area of land that can be irrigated. **3**
4. Draw the section of canal in full filling. **2**
5. Write limitations of Bligh's theory. **2**
6. Draw the section of weir and barrage. **3**
7. Explain the differences between aqueduct and super passage. **3**
8. Show that for pipe outlet will be proportional when setting is equal to 0.3. **2**
9. Write functional requirements of a multipurpose project. **2**
10. Define Warabandhi system and explain its applications and limitations. **3**

PART – B **50 Marks**

11. a) Draw a neat sketch of hydrologic cycle in qualitative representation and explain it. **5**

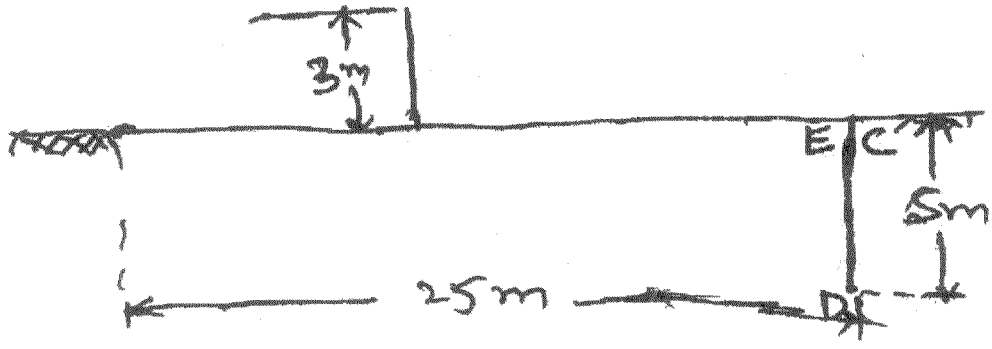
    b) From the historical data of annual flood peaks the mean and standard deviations are given as 20,000 and 10,000 $m^3/s$. A structure on this catchment has been designed for 40,000 $m^3/s$. Find its return period. Assume $\sigma_n = 1.06$ and $\bar{y}_n = 0.52$. **5**

12. a) From basics of Lacey's equation derive the relation between silt factor, discharge and bed slope of channel. 5

    b) The discharge of an outlet is 0.2 $m^3/s$ and average losses from outlet to field are 10% of water flowing through outlet, if kor period and kor depth for wheat and rice are 3 weeks, 120 mm and 2 weeks, 250 mm. Calculate how much area can be irrigated for each crop. 5

13. a) Briefly explain causes of failure of weirs on permeable foundations with neat sketches. 5

    b) Determine analytically the uplift pressure at points E, D and C and exit gradient for the figure given below. 5




14. a) Draw the sketches of cross regulator and head regulator and write their functions. 5

    b) Explain Hind's method of design transition. 5

15. a) Briefly explain the following. 5
    i) Project formulation.
    ii) Project evaluation.

    b) Write short notes on : 5
    i) Integrated water management.
    ii) Systematic canal operation.

16. a) Derive the equation of yield of an open well by recuperation test. 5

    b) A 500 $km^2$ watershed received a 8 hr-storm which produced hourly intensities of 6, 9, 20, 16, 4, 14, 12 and 2 mm/hr. If the initial abstractions are estimated as 15 mm and $\phi$ index as 5 mm/hr, what would be the runoff volume produced by storm ? 5

17. a) Compare Kenneddy's and Lacey's theory in detail. 5

    b) Find the field capacity of soil with the data, depth of root zone = 2 m, existing water content = 6 % dry, density of soil = 1400 $kg/m^3$, water applied to soil = 500 $m^3$, water lost due to evaporation = 10 %. Area of land irrigated = 1000 $m^2$. 5