

**SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE  
EXAMINATION, DECEMBER 2008**

CE 04 606 – HYDROLOGY AND IRRIGATION ENGINEERING

(2004 admissions)

Time : Three Hours

Maximum : 100 Marks

*Assume any missing data suitably.*

- I. (a) Draw a neat diagram of hydrologic cycle and name different components.  
 (b) Distinguish between surface run off and subsurface run off.  
 (c) With a neat sketch explain the role of flow duration curve in estimation of flood.  
 (d) What are the disadvantages of reservoir sedimentation? Explain any *one* method to control the reservoir sedimentation.  
 (e) What do you understand by crop rotation? Why it is necessary?  
 (f) Define tangible and intangible benefits in a multipurpose project.  
 (g) "Drainage is as important as Irrigation" justify the above statement.  
 (h) Explain the merits and demerits of lining of canal with cement mortar against tiles.

(8 × 5 = 40 marks)

- II. (a) Distinguish between convective precipitation and orographic precipitation.  
 (b) Define unit hydrograph. What are the two important assumptions made? Explain the limitations of UH.  
 (c) Rainfall data for five stations are shown below. Find the Mean rainfall by Therin Polygon method.

Station	A	B	C	D	E
Area (km <sup>2</sup> )	400	450	600	380	500
Rainfall (mm)	100	125	150	75	50

(5 + 5 + 5 = 15 marks)

*Or*

- (d) Explain the role of Depth-Area-Duration curve in hydrologic design.  
 (e) Ordinates of 3 HR unit hydrograph is given below. Derive the ordinates of 9 HR unit hydrograph.

Time (HR)	0	3	6	9	12	15	18	21	24
Ordinate of 3 HR OH (cumecs)	0	1.5	4.5	8.6	12.0	9.4	4.6	2.3	0.8

**Turn over**

- III. (a) Explain the steps involved in estimation of flood by unit hydrograph method.  
 (b) Draw a mass curve and explain how it is used in fixing the reservoir capacity.  
 (7 + 8 = 15 marks)

Or

- (c) Define "GROYNE". Explain its role in river training.  
 (d) In a catchment 50 years data is available. The mean value of flood is 1500 cumecs and variance is 1600 cumecs. Estimate the magnitude of 100 year flood.  
 (5 + 10 = 15 marks)

- IV. (a) What are the advantages of sprinkler irrigation?  
 (b) Define irrigation efficiency and water application efficiency.  
 (c) Find the data for a crop if the duty for a base period of 120 days is 1500 ha/cumec. Estimate the total quantity of water in litres for the entire crop growth in an area of 100 ha.  
 (5 + 5 + 5 = 15 marks)

Or

- (d) Write a note on "consumptive use". How it differs from Evapotranspiration?  
 (e) Define Field capacity and Wilting point.  
 (f) Explain Bligh's creep theory.  
 (5 + 5 + 5 = 15 marks)

- V. (a) Write a note on water logging.  
 (b) Design an Irrigation channel using Lacey's theory to carry a discharge of 41.5 cumecs. Assume silt factor  $f = 1.0$  and side slope of  $\frac{1}{2} : 1$ .  
 (5 + 10 = 15 marks)

Or

- (c) Compare Kutter's Theory and Lacey's regime Theory.  
 (d) Write a note on maintenance of irrigation canals.  
 (10 + 5 = 15 marks)  
 [4 × 15 = 60 marks]