

MANIPAL INSTITUTE OF TECHNOLOGY

IV SEMESTER B.TECH. (CIVIL ENGINEERING) END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: WATER RESOURCES ENGINEERING (CIE 2201)

## REVISED CREDIT SYSTEM DATE

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

✤ Answer ALL the questions.

✤ Missing data may be suitable assumed.

1 <b>A</b> .	Illustrate the method of theissen polygon method of estimating mean precipitation over a catchment and state its merits over the arithmetic average method.										3	
1B.	Hourly ordinates of the hyetograph of a rainfall over 40ha of watershed are 0, 3, 16, 23, 16, 18, 16, 3,0 mm/hr. The volume of runoff from this area was measured to be 3.20ha-m. Determine the $\phi$ index and W- index. Assume initial storm losses as 0.5cm. Also find out hourly values of runoff.									4		
1C.	Define evapotranspiration. What are the factors affecting infiltration?									3		
2A.	Explain the process of runoff with neat sketch.									3		
2B.	List the different methods of stream gauging and explain any one method.									3		
2C.	The followin catchment a of a 6-h ur baseflow of 2 Time (hr) Discharge (m <sup>3</sup> /s)	ng are area of nit hyd 20 m <sup>3</sup> / 0 40	the of 770kr drogra ⁄s. plot 6 65	ordinat n <sup>2</sup> due ph for the 6- 12 210	es of to a 6 the s h unit h 18 360	the sto 6-h iso same nydrogr 24 400	orm hy lated s catchm aph. 30 270	/drogra torm. [ ent. A 36 150	aph of Derive Assume 42 85	flow f the orc a co 48 56	rom a linates instant 54 35	5
3A.	What is meant by 'design flood', and what is its significants. "The results obtained by probability methods, for determining the design flood of 100 years frequency with 10 years past data cannot be relied upon. Discuss critically the above statement.									4		
3B.	Describe briefly any two type of river training works with neat sketch.									4		
3C.	Define the terms i) Net irrigation requirement, ii) water application efficiency, iii) delta. iv) Intensity of irrigation.								ciency,	2		
4A.	A soil with a dry unit weight of 13700 N / $m^3$ has a field capacity of 40%. The rootzone depth of the crop is 1.5m and permanent wilting point is 10%. Find (i) the equivalent depth of water available to plants at field capacity and at permanent wilting point (ii) If irrigation is to be done after 75% depletion of								5			

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	available moisture content, what should be the depth of irrigation. (iii) if daily consumptive use of crops is 23.6mm, what should be the maximum time interval between irrigation. Take water application efficiency equals to 75% and water conveyance efficiency equals to 60%.			
4B.	Following data is obtained from the analysis of a Gravity dam, 18m high, having U/S face with a slope of 1 horizontal to 10 vertical, top width = 4m, and base width = 16m. Assume that Tail water depth is 4m and free board is 2m. Find the maximum and minimum normal stresses in dam, its foundation. State their nature. Also, find the max. Shear stresses in the dam and its foundation. DATA OBTAINED: $\Sigma V = 2750 \text{ kN}$ ; $\Sigma H = 2063.11 \text{ kN}$ ; $\Sigma M_R = 42 \ 125.53 \text{ kNm}$ ; $\Sigma M_0 = 28502.20 \text{ kNm}$ .	5		
5A.	What are the limitations of Bligh's creep theory?	3		
5B.	Sketch the typical layout of diversion head work and explain the functions of marginal bund and fish ladder.			
5C.	What are the common canal diversion works? Explain any two with neat sketch.	4		