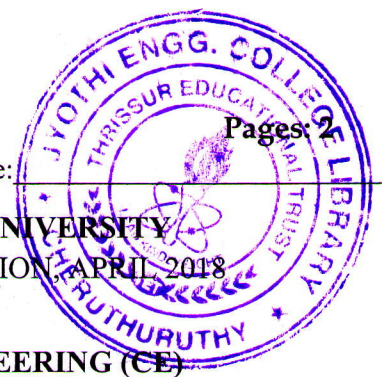Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018
Course Code: CE309
Course Name: WATER RESOURCES ENGINEERING (CE)

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks

Marks

1	a)	Explain the components in a hydrological cycle with a neat sketch.	(5)
	b)	How can you obtain the optimum number of rain gauges in a catchment area?	(5)
	c)	Differentiate mass curve and hyetograph.	(5)
2	a)	Explain the methods to find the average precipitation over a catchment area.	(6)
	b)	The isohyets for annual rainfall over a catchment were drawn and areas of strips between isohyets are obtained as below. Determine the average depth of annual rainfall over the area.	(5)

Isohyets(mm)	450-550	550-650	650-750	750-950	950-1150	1150-1250
Area (km^2)	1200	3000	2800	1000	900	600

	c)	Define infiltration indices.	(4)
3	a)	List and explain factors affecting runoff in a catchment area.	(5)
	b)	What is unit hydrograph? Stating the assumptions, explain the derivation of a unit hydrograph from a storm hydrograph.	(5)
	c)	Ordinates of 2 hour unit hydrograph are given below. Using this derive the ordinates of a 6 hour unit hydrograph using S hydrograph method.	(5)

Time (hrs)	0	2	4	6	8	10	12	14	16	18	20	22
Ordinate of 2 hour unit hydrograph (cumec)	0	25	100	160	200	170	110	70	30	20	8	0

PART B
Answer any two full questions, each carries 15 marks

4	a)	Write the environmental effects of irrigation.	(4)
	b)	Differentiate between flow and lift irrigation systems.	(4)
	c)	Gross command of a reservoir is 50,000 hectares. The CCA is 80% of GCA. Find out the capacity of the reservoir which is able to irrigate areas as given below. Reservoir and canal losses may be taken as 5% each of water required by crops.	(7)

Crop	Base period (days)	Duty (hectares/cumec)	Intensity of irrigation as % of CCA
Wheat	120	2000	25
Rice	140	900	18.75
Cotton	180	1600	12.50

5	a)	Define field capacity, permanent wilting point and available moisture.	(4)
	b)	A loam soil has field capacity 27% and permanent wilting percentage 12%. The dry weight of the soil is 13.73 kN/m^3. If the depth of the rootzone is 1 m, determine the storage capacity of the soil. Irrigation water is applied when the	(6)

moisture content drops to 15%. If the water application efficiency is 75%, determine the water depth require to be applied in the field.

c) Define duty and delta. Derive the relation between them.   (5)

6 a) What is river training? What are the objectives of river training? What are the   (8)
       classifications?

   b) Explain Guide banks and groynes with neat sketches.   (7)

PART C

Answer any two full questions, each carries 20 marks

7 a) What are the storage zones in a reservoir?   (5)

   b) Define trap efficiency. Explain the method to find useful life of a reservoir. (10)

   c) Differentiate mass curve and demand curve.   (5)

8 a) Define porosity, specific yieldand specific retention. Establish a relation between   (5)
       them.

   b) Explain and derive steady state flow to wells in a confined aquifer.   (10)

   c) Explain Darcy's law.   (5)

9 a) Explain recuperation method to find yield from an open well.   (5)

   b) A well is to be constructed in a fine sandy subsoil formation. The discharge of the   (8)
       well is anticipated to be 0.004 m^3/sunder depression head of 4 m. Find the
       diameter of the well. Given (K/A) for sandy soil = 0.5 $m^3/hr/m^2$ of area under
       depression head of 1 m.

   c) Explain with sketch strainer type tube well.   (7)

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