Ref No. -Ex/CE/5/T/201/2018(OLD)

B.C.E. (Evening) 2nd YEAR EXAMINATION, 2018

1st Semester (Old)

SUBJECT: Hydrology

Time: Three hours

Full Marks 100

(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	Part I	Marks
	Answer question no.1 (compulsory) and any two from the rest. Assume relevant data if necessary.	
Q1. a)	**Fill in the blanks:**	1×10=10
i.	A hyetograph is a plot of _____	
ii.	Anemometer is used to measure _____	
iii.	Diameter of ISI standard evaporation pan is _____	
iv.	Line joining points of equal depths of rainfall is _____	
v.	Orographic precipitation occurs due to air masses being lifted to higher altitudes by	
vi.		
vii.	Slope-area method is _____ determination of stream flow.	
viii.	Symons' gauge is _____ type rain gauge.	
ix.	The double mass curve technique is adopted to check	
	The maximum rate at which a given soil at a given time can absorb water is defined as	
x.	The science and practice of water flow measurement is known as	
b)	**Write short note on (any two):**	5×2=10
i.	Class A Evaporation Pan	
ii.	Isohyetal Method	
iii.	Water Budget Equation for the determination of lake evaporation	
Q 2.	**Distinguish between:**	3×5=15
i)	Infiltration capacity and infiltration rate	
ii)	Actual and potential evapotranspiration	
iii)	Field capacity and permanent wilting point	
iv)	Depression storage and interception	
v)	Mass curve and Hyetograph	
Q3.a)	Describe the Hydrologic Cycle with a neat sketch.	7
b)	The normal annual precipitation amounts at stations A, B, C and D are respectively 978, 1120, 935 and 1200 mm. In a year the station A was inoperative and the stations B, C and D recorded annual precipitations of 107, 89 and 122 mm respectively. Estimate the rainfall at station A in that year.	5
c)	What is PMP?	3

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No. of Questions	Part I	Marks
Q 4. a)	What is infiltration capacity? Discuss briefly the factors affecting the infiltration capacity of an area.	2 + 3=5
b)	Consider the statement: The 50 year 24 hr maximum rainfall at Kolkata is 160 mm. What do you understand by this statement? Determine the probability of a 24 hr rainfall of magnitude equal to greater than 160 mm at Kolkata occurring (a) once in 20 successive years (b) at least one in 20 successive years.	2+2+2=6
c)	Explain briefly the electromagnetic method of stream flow measurement.	4

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BACHELOR OF CIVIL ENGINEERING (PART TIME) SECOND YEAR FIRST SEMESTER EXAMINATION 2018(OLD)

HYDROLOGY

Time: Three Hours

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

No. of questions		Part II(HALF)	Marks
		*Answering any **two** questions from **three**.* *Assume reasonable values of data, if not supplied.*	
1.	a)	Determine the actual ground water velocity (v) in terms of total area (A); volume of void (V_v) to the total volume (V) of the soil sample and superficial velocity of flow (v') for laminar flow.	6
	b)	Draw a zone of subsurface water and explain the zone of aeration; saturation and rock flowage.	5
	c)	Define and explain the specific yield in terms of porosity and specific retention and storage co-efficient for artesian aquifer.	4
	d)	Water is percolating through a fine grain soil aquifer with hydraulic capacity of 10^{-2} cm/sec and porosity 45% toward a channel 110m away. If the slope of the water table is 1%, calculate the travel time of water to the stream.	10
2.	a)	What is an inverted cone of depression all around the well with figure?	3
	b)	Derive a formula of co-efficient of transmissibility (T) of well in a homogeneous confined aquifer assuming equilibrium flow conditions and in terms of difference of water level between the two observed wells.	12
	c)	A pumping test was made in a medium sand and gravel to a depth of 16m where a bed of clay was encountered. The normal ground water level was at surface. Observation holes were located at distance of 3.1 and 7.6m from the pumping well. At a discharge of 4 liters/sec from the pumping well, a steady state was attained in about 26hours. The draw-down at 3.1 and 7.5m was 1.7m and 0.4m respectively. Compute the co-efficient of permeability of the soil strata.	10

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BACHELOR OF CIVIL ENGINEERING (PART TIME) SECOND YEAR FIRST SEMESTER EXAMINATION 2018(OLD)

HYDROLOGY

Time: Three Hours

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

No. of questions	Part II(HALF)	Marks
3. a)	Differentiate between shallow dug wells and deep dug wells.	4
b)	What are the differences between a strainer well and a slotted well?	2
c)	How the effectiveness of well diameter is increased and to keep the fine material out of the well strainer?	4
c)	Design a tube well [(i) diameter of pipe; (ii) bore hole size; (iii) length of strainer; (v) type of pumped required and Capacity of motor] for required discharge of 4.3×10^{-2} cumec at a depression head of 5m. The average ground water level is 10m below the GL in December and maximum 16m in May. The bore log data at the boring site are given below,	15 (4+2+7+2)

Depth below GL in m	Type of strata
0-5	Surface clay
5-20	Sandy clay
20-30	Clay
30-55	Coarse sand
55-70	Clay
70-85	Medium coarse sand
Below 85	clay