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# GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fourth Semester – Regular) Examinations, June – 2021

## BPCAG4030 – Watershed hydrology (Agricultural Engineering)

Time: 2 hrs

Maximum: 50 Marks

### Answer ALL Questions

The figures in the right hand margin indicate marks.

#### PART – A: (Multiple Choice Questions)

(1 x 10 = 10 Marks)

#### Q.1. Answer ALL questions

[CO#] [PO#]

- |  |  |   |
|--|--|---|
| a. The main components of hydrologic cycle are                                     | 1  | 1 |
| (i) Rainfall, evaporation and evapotranspiration                                   | (ii) Rainfall, evapotranspiration and runoff                           |   |
| (iii) Rainfall, and snowfall   | (iv) None of the above   |   |
| b. A rainfall is called light rainfall when its intensity is                       | 1  | 1 |
| (i) Less than 2.5mm/hr   | (ii) 2.5 mm/hr   |   |
| (iii) More than 2.5 mm/hr  | (iv) 6.25 mm/hr  |   |
| c. Bucket capacity of tipping bucket rain gauge is                                 | 1  | 1 |
| (i) 0.25 mm of rainfall  | (ii) 2.5 cm of rainfall  |   |
| (iii) 12.7 cm of rainfall  | (iv) 5.0 cm of rainfall  |   |
| d. The formula for recurrence interval return period is given by                   | 2  | 1 |
| (i) $T=1/p$  | (ii) $T=(P)^{1/2}$   |   |
| (iii) $T=(N-1)/M$  | (iv) Both (i) & (iii)  |   |
| e. A 60% index of wetness in a particular year reveals that                        | 2  | 1 |
| (i) The rainfall surplus is about 60%  | (ii) Rainfall deficiency is 40%  |   |
| (iii) Of the total length of record, 40% year are under surplus water              | (iv) Of the total length of record, 60% year are under moisture stress |   |
| f. A water year refers to  | 3  | 1 |
| (i) Expectance of a cycle of climatic changes                                      | (ii) Water budget having least amount of carry over                    |   |
| (iii) Completion of hydrologic cycle   | (iv) Both (i) & (ii)   |   |
| g. The form of linear relationship between rainfall (p) and runoff (Q) is given by | 3  | 1 |
| (i) $Q=ap+b$   | (ii) $Q=a \cdot \text{Exp}(p)^b$                                       |   |
| (iii) $Q=apb$  | (iv) None of the above   |   |
| h. The value of circulatory ration of a watershed varies from                      | 4  | 1 |
| (i) 0.2 to 0.8   | (ii) 0.4 o 1.0   |   |
| (iii) 1.0 o 1.5  | (iv) 1.5 o 2.0   |   |
| i. A flow duration curve is he plot of   | 4  | 1 |
| (i) Accumulated flow and time  | (ii) Discharge and time in chronological order                         |   |
| (iii) Stream discharge and percentage of time the flow is equalled or exceed       | (iv) Rainfall and runoff   |   |

- j. The Kirpich formula estimates the  $T_c$  is given by
- |       |                                    |      |                                |   |   |
|-------|------------------------------------|------|--------------------------------|---|---|
| (i)   | $T_c = 0.02[(L^3/H)^{1/2}]^{0.77}$ | (ii) | $T_c = 0.02L^{0.77}S^{-0.385}$ | 4 | 1 |
| (iii) | $T_c = 0.02(LS)^{-0.385}$          | (iv) | $T_c = 0.02(LS)^{0.77}$        |   |   |

**PART – B: (Short Answer Questions)**

**(2 x 5 = 10 Marks)**

Q.2. Answer **ALL** questions

	[CO#]	[PO#]
a. What is drainage density and index of wetness?	1	1
b. Differentiate between aquifuge and aquiclude	2	1
c. What are different type of precipitation?	3	1
d. Calculate Q if $C=0.3, I=5\text{cm/hr}, A=36\text{Ha}$	3	2
e. Distinguish between overland flow and interflow	4	1

**PART – C: (Long Answer Questions)**

**(6 x 5 = 30 Marks)**

Answer **ANY FIVE** questions

	Marks	[CO#]	[PO#]
3. Explain with help of a neat sketch hydrologic cycle in nature indicating its various phases	(6)	1	1
4. Enlist the different type of rainfall recording instruments and write about any two in brief	(6)	1	1
5. Show with a neat sketch different components of runoff hydrograph.	(6)	2	1
6. Distinguish between form factor and compactness coefficient	(6)	2	1
7. Explain the CN method of estimating runoff.	(6)	3	1
8. Write short notes on Lysimeter	(6)	3	1
9. What are the three basic properties of unit hydrograph theory	(6)	4	1
10. Define Drizzle, Dew, Fog, Frontal rainfall and cyclonic rainfall	(6)	4	1

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