



Roll No.

**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING**

**TEST - 1**

**Even Semester:** 2018-19

**Course Code:** CIV 216

**Course Name:** Hydrology and Water Resources Engineering

**Programme & Sem:** B.Tech & VIII Sem (Group-I)

**Date:** 05 March 2019

**Time:** 1 Hour

**Max Marks:** 40

**Weightage:** 20%

**Instructions:**

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

**Part A**

Answer **all** the Questions. **Each** question carries **five** marks.

(3Qx5M=15)

1. Define the following:

- a) Hyetograph
- b) Runoff Coefficient.
- c) Precipitation
- d) Ridge line
- e) Normal Rainfall

2. List the various methods to reduce loss of water due to evaporation in reservoir

3. Write a short note on the components of runoff.

**Part B**

Answer **both** the Questions. **Each** question carries **seven and half** marks.

(2Qx7.5M=15)

4. Describe the Symon's rainguage with a neat sketch. What are the criteria to be followed while installing the rainguage?

5. The rain gauge station D was in operative for a part of a month during storm occurred. The storm rainfall recorded at the three surrounding stations A, B, and C was 91.11, 72.23, and 79.89 cm respectively. If the average normal annual rainfall of the stations A,B,C and D are 80.97, 67.59, 76.28 and 92.01 cm respectively. Estimate the storm rainfall at station D.

### Part C

Answer the Question. Question carries **ten** marks.

(1Qx10M=10)

6. A lake had a water surface elevation of 103.200 m above datum at the beginning of a certain month. In that month the lake received an average inflow of 6.0 m<sup>3</sup>/s from surface runoff sources. In the same period the outflow from the lake had an average value of 6.5 m<sup>3</sup>/s. Further, in that month, the lake received a rainfall of 145 mm and the evaporation from the lake surface was estimated as 6.10 cm. Write the water budget equation from the lake and calculate the water surface elevation of the lake at the end of the month. The average lake surface area can be taken as 5000ha. Assume that there is no contribution to or from the groundwater storage.



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**PRESIDENCY UNIVERSITY**  
**BENGALURU**  
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**TEST - 2**

Even Semester: 2018-19

Date: 15 April 2019

Course Code: CIV 216

Time: 1 Hour

Course Name: Hydrology and Water Resources Engineering

Max Marks: 40

Program & Sem: B. Tech & VIII Sem (Group-I)

Weightage: 20%

**Instructions:**

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

**Part A**

Answer **all** the Questions. **Each** question carries **four** marks. (3Qx4M=12)

- 1. Define the following:  
a) Attenuation, b) Risk, c) Effective rainfall and d) Unit hydrograph
- 2. Briefly explain the factors affecting a flood hydrograph.
- 3. What is flood routing? What are the basic equations used for flood routing by Hydrologic method and Hydraulic method?

**Part B**

Answer **both** the Questions. **Each** question carries **eight** marks. (2Qx8M=16)

- 4. Explain any two methods of base flow separation with a neat sketch.
- 5. In a 350 ha watershed the CN values was assessed as 70 for AMC –III. Estimate the value of direct runoff volume for the following 4 days of rainfall. The AMC on July 1<sup>st</sup> was of category III. Use standard SCS-CN equations.

Date	July 1	July 2	July 3	July 4
Rainfall (mm)	50	20	30	18

**Part C**

Answer the Question. The Question carries **twelve** marks.(1Qx12M=12)

- 6. The ordinates of a 6-h unit hydrograph are as given below:

Time(h)	0	3	6	9	12	18	24	30	36	42	48	54	60	66
Ordinate 6-h UH, m <sup>3</sup> /s	0	150	250	450	600	800	700	600	450	320	200	100	50	0

A storm had three successive 6-h intervals of rainfall magnitude of 3, 5 and 4 cm, respectively. Assuming  $\phi$  – Index of 0.20 cm/h and a base flow of 30 m<sup>3</sup>/s, determine the resulting hydrograph of flow.



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BENGALURU**

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END TERM FINAL EXAMINATION**

**Even Semester:** 2018-19

**Course Code:** CIV 216

**Course Name:** Hydrology and Water Resources Engineering

**Program & Sem:** B. Tech & VIII Sem (Group-I)

**Date:** 21 May 2019

**Time:** 3 Hours

**Max Marks:** 80

**Weightage:** 40%

**Instructions:**

- (i) Read the question properly and answer accordingly.
- (ii) The question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

**Part A**

Answer **All** the Questions.

(3Q=20M)

1. The question consists of **Five** multiple choice questions. **Each** MCQ carries **One** marks. Choose **Only One** appropriate choice. (5Qx1M=5 Marks)

- (i) The most suitable chemical which can be applied to the water surface for reducing evaporation is
  - a) Methyl alcohol
  - b) Ethyl alcohol
  - c) Cetyl alcohol
  - d) Butyl alcohol
- (ii) The shape of recession limb of a hydrograph depends upon
  - a) Basin characteristics only
  - b) Storm characteristics only
  - c) Both (a) and (b)
  - d) None of the above
- (iii) Levees and flood walls,
  - a) Are designed to carry unbalanced water load
  - b) Are designed with adequate dimensions
  - c) Are means of controlling floods
  - d) Are never provided free boards
- (iv) In India, rainfall is generally recorded at
  - a) 8 A.M
  - b) 12 Noon
  - c) 4 P.M.
  - d) 8 P.M
- (v) A divide wall is provided
  - a) At right angles to the axis of weir
  - b) Parallel to the axis of weir and upstream of it
  - c) Parallel to the axis of weir and downstream of it
  - d) At an inclination to the axis of weir

2. The question consists of **Five** multiple choice questions. **Each** MCQ carries **Two** marks. Choose **Only One** appropriate choice. (5Qx2M=10 Marks)

- (i) An agricultural land of 437 ha is to be irrigated for a particular crop. The base period of the crop is 90 days and the total depth of water required by the crop is 105 cm. If a rainfall of 15 cm occurs during the base period, the duty of irrigation water is
  - a) 437 ha/cumec
  - b) 486 ha/cumec
  - c) 741 ha/cumec
  - d) 864 ha/cumec
- (ii) The delta for the crop with duty 864 hectare/cumec on the field and base period of 120 days is
  - a) 120 cm
  - b) 150 cm
  - c) 140 cm
  - d) 110 cm
- (iii) The total rainfall in a catchment of area 1200 km<sup>2</sup> during a 6-h storm is 16 cm while the surface runoff due to the storm is 1.2x10<sup>8</sup> m<sup>3</sup>. The  $\Phi$ -index is
  - a) 0.1 cm/h
  - b) 1.0 cm/h
  - c) 0.2 cm/h
  - d) Cannot be estimated by the given data.
- (iv) A hydraulic structure with a life of 30 years is designed for a 30-year flood. The risk of failure of the structure during its life is
  - a) 0.033
  - b) 0.638
  - c) 0.362
  - d) 1.00
- (v) A triangular DRH due to a storm has a time base of 80 hrs and a peak flow of 50 m<sup>3</sup>/s occurring at 20 hours from the start. If the catchment area is 144 km<sup>2</sup>, the rainfall excess in the storm was
  - a) 20 cm
  - b) 7.2 cm
  - c) 5 cm
  - d) None of these

3. Match the following- (5 Marks)

**Group – I**

**Group -II**

- A) Symon's rain gauge
- B) Hyetograph
- C) Lysimeter
- D) Base flow
- E) Cyclonic precipitation

- P) Pressure difference
- Q) Transpiration
- R) Delayed groundwater flow
- S) Non Recording type
- T) Natural topographic barriers
- U) Rainfall intensity vs time

**Part B**

Answer **All** the Questions. **Each** question carries **ten** marks. (4Qx10M=40M)

- 4. What is canal alignment? What are its considerations?
- 5. What is Duty? What are the factors affecting duty of water? Explain.
- 6. Define the following:
  - a) Field capacity
  - b) Available moisture
  - c) Water logging
  - d) Canal lining
  - e) Consumptive use
- 7. What is balancing depth? Determine the balancing depth for a channel section having a bed width equal to 18 m and side slopes of 1:1 in cutting and 2:1 in filling. The bank embankments are kept 3.0 m higher than the ground level and crest width of banks is kept as 2 m.

**Part C**

Answer **Both** the Question. **Each** question carries **ten** marks. (2Qx10M=20M)

- 8. The gross commanded area for a distributary is 6000 hectares, 80% of which is culturable. The intensity of irrigation for Rabi season is 50% and that for Kharif season is 25%. If the average duty at the head of the distributary is 2000 hectares/cumec for rabi season and 900 hectares/cumec for Kharif season, find out the discharge required at the head of the distributary from average demand considerations.
- 9. Briefly explain the classification of canal based on discharge and its relative importance in the network of a canal.