	Utech
Name:	
Roll No.:	A Dear of Executing and Executing
Invigilator's Signature :	

WATER RESOURCES ENGINEERING - I

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

- 1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$
 - i) Which one of the following does not fit in with the rest?
 - a) Rain

b) Snow

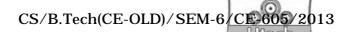
c) Frost

- d) Silt.
- ii) Run-off can be estimated by
 - a) infiltration method
- b) unit hydrograph
- c) rational method
- d) any of these.

6422 (O) [Turn over



- iii) C.V.R. is a short form of
 - a) current velocity ratio
 - b) Chezy's velocity ratio
 - c) constant volume ratio
 - d) critical velocity ratio.
- iv) A plot of rainfall intensity versus time is known as
 - a) hyetograph
- b) mass flow curve
- c) duration curve
- d) unit hydrograph.
- v) Chezy's equation gives velocity of flow. Chezy's constant is given by
 - a) Manning's formula
 - b) Kutter's formula
 - c) Bazin's formula
 - d) Lacey's regime perimeter formula.



- vi) The base period for a particular crop is 100 days. The duty of the canal is 1000 hectares/cumec. The depth of water will be
 - a) 0.864 cm
- b) 8.64 cm
- c) 86.4 cm
- d) 864 cm.
- vii) A canal section is called most economical when
 - a) depth of cutting is least
 - b) depth of filling is highest
 - c) depth of cutting is such that excavated soil is sufficient to construct banks
 - d) none of these.
- viii) As per Lacey's theory, the silt factor is
 - a) directly proportional to average particle size
 - b) inversely proportional to average particle size
 - c) directly proportional to squre root of average particle size
 - d) not related to average particle size.

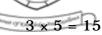


- ix) Lacey's regime scour depth is given by
 - a) $1.35 (q/f)^{1/3}$
 - b) $1.35 (q/f)^{1/6}$
 - c) $1.35 (q^2/f)^{1/3}$
 - d) none of these.
- x) Isohyets are
 - a) contours of equal precipitation
 - b) elevation of areas mean sea level
 - c) depth of ground water level below ground surface
 - d) none of these.
- xi) Delta of a crop means
 - a) areas under the crop
 - b) crop period
 - c) depth of water required by the crop
 - d) crop production.

GROUP - B

(Short Answer Type Questions)

Answer any three of the following.



- 2. What are the factors effecting evaporation losses? Draw the mass curve of a rainfall.
- 3. Define Duty & Delta of a crop and express the relation between them.
- 4. Determine the discharge at the head of the distributory for fulfilling maximum crop requirement

Assume: Kor period 4 weeks for Rabi (wheat) & 2.5 weeks for Kharif (rice).

Kor depth 13.5 cm for Rabi (wheat) and 19 cm for Kharif (rice); [Area to be irrigated in Rabi season 2400 hectares & Kharif season 1200 hectares].

- 5. A 12 hour storm rainfall had the following depth in cm for each hour occurring over a basin :
 - 1.8, 2.6, 7.8, 3.9, 10.6, 5.4, 7.8, 9.2, 6.5, 4.4, 1.8, 1.6. The surface run-off resulting from the above storms is found to be 24.4 cm depth over the basin. Determine the average infiltration index for the basin.
- 6. Explain the objectives of canal lining and types of materials used for canal lining.

GROUP - C (Long Answer Type Questions)

Answer any *three* of the following.

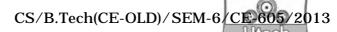


7. a) The ordinates of a 3 hour unit hydrograph are given below:

Time in hour	0	03	06	09	12	15	18	21	24	27	30
Ordinate m ³ /sec i.e. cumec	0	10	25	20	16	12	09	07	08	03	00

Find the ordinates of a 6 hour unit hydrograph for the same.

- b) How will you prepare a unit hydograph for an isolated storm?
- 8. a) What are the precaution to be taken for controlling water-logging?
 - b) What are the causes of water-logging?
 - c) What are the differences between using Kennedy's theory and Lacey's theory?
- 9. An irrigation channel is to carry full supply discharge of $30 \text{ m}^3/\text{sec}$ at a velocity of 1.75 m/sec. The side slopes are to be 1 horizontal : 1 vertical. The ratio of full supply depth to bed width is to be 1 : 6. Assuming Manning's n is 0.018, calculate the full supply depth, bed width and bed slope of the channel.



- 10. a) What do you understand by Mass-inflow curve 2
 - b) How would you determine the safe-yield, if the massinflow curve and the reservoir capacity are given?
 - c) Write short notes on the following:
 - i) Reservoir silting or reservoir sedimentation
 - ii) Useful life of a reservoir.

6422 (O) 7 [Turn over