Roll No. | | | | | | | | | | | | | **Total No. of Pages :02**

Total No. of Questions : 08

M.Tech (Civil Engg) (Sem.–1)

HYDROLOGICAL PROCESSES

Subject Code : MTCE-202

M.Code : 74238

Date of Examination : 18-01-2023

Time : 3 Hrs. **Max. Marks : 100**

INSTRUCTIONS TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWENTY marks.**

1. Explain various conceptual models to develop IUH.

2. Derive the basic differential equation governing unsteady ground water flow in a homogeneous isotropic confined aquifer. What are the limitations of this equation?

3. Discuss in brief Energy and Momentum principles with reference to hydrological processes.

4. Find the half-hour unit hydrograph using data of excess rainfall hyetograph and direct runoff hydrograph given under:

Time (1/2 hour)	Excess rainfall (in)	Direct runoff (cfs)
1	1.26	467
2	1.98	1967
3	1.54	5278
4		9145
5		10956
6		7867
7	__	3967
8		1978
9		1445
10		843
11		343

5. "*Well hydraulics consists in evaluating aquifer properties, defining boundaries and predicting yield and future effects of pumping*". Explain critically this statement covering each component of well hydraulics.

6. What are the various methods of ground water recharge? How is ground water recharge estimated?

7. Explain the following :

a) Flow duration curves

b) Clark's method

c) Stream flow routing 6+7+7

8. A 18 m wide rectangular channel has a bed slope of one percent. A hydrologist estimates that the design flow is 5555 cfs and the roughness n= 0.039. If the coefficients of variation of the flow estimate and the roughness estimate are 5 = % and 15% respectively, what is the standard error of estimate of the flow depth y? If houses are built next to this channel with floor elevation 0.46 m above the water surface elevation calculated for the design event, estimate the chance (in terms of standard normal distribution function) that these houses will be flooded during the design event due to uncertainties involved in calculating the water level.