Roll No. | | | | | | | | | | | | |  Total No. of Pages : 01

Total No. of Questions : 08

M.Tech (Civil Engg) (2016 Batch) (Sem.–1)

# HYDROLOGICAL PROCESSES

Subject Code : MTCE-202

M.Code : 74238

Time : 3 Hrs. Max. Marks : 100

**INSTRUCTIONS TO CANDIDATES :**

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

Q1. Explain various conceptual models to develop IUH.

Q2. Distinguish between :

(a) Hydraulic and Hydrologic method of flood routing.

(b) Hydrologic storage and Hydrologic channel routing.

Q3. Explain briefly the basic principles involved in the development of IUH by :

(a) Clark's method

(b) Nash's model.

Q4. Give the uses and limitations of Unit hydrograph. The IUH of a catchment is a triangle with a base of 36 h and a peak of 20 $m^3/s$ at 8h from the start. Derive a 2-h unit hydrograph for this catchment.

Q5. Derive the basic differential equation governing unsteady groundwater flow in a homogenous isotropic confined aquifer. State clearly the assumptions involved.

Q6. A confined horizontal aquifer of thickness 15m and permeability K= 20m/day, connects two reservoirs M and N situated 1.5 km apart. The elevations of the water surface in reservoirs M and N measured from the top of the aquifer, are 30.00 m and 10.00 m respectively. If the reservoir M is polluted by a contaminant suddenly, how long will it take the contaminant to reach the reservoir N? Assume the porosity of the aquifer n = 0.30

Q7. A 45 cm well penetrates an unconfined aquifer of saturated thickness 30m completely. Under a steady pumping rate for a long time the drawdown at two observation wells 15 and 30m from the well are 5.0 and 4.2m respectively. If the permeability of the aquifer is 20m/day, determine the discharge and the drawdown at the pumping well.

Q8. What are the various methods of groundwater recharge? How is groundwater recharge estimated?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**