

Ex/SC/GEOG/PG/CORE/TH/C102T/2025

MASTER OF SCIENCE EXAMINATION, 2025

(1st Year, 1st Semester)

GEOGRAPHY

PAPER : SC/GEOG/PG/CORE/TH/02

Hydrology and Oceanography (GEOG-C102T)

Time : Two Hours

Full Marks : 50

Answer **one** question from each unit

Unit-I

(Hydrological Systems)

10×1=10

1. State the factors of evapotranspiration. What is semi-confined aquifer system? Differentiate infiltration from percolation. 6+2+2
2. State the factors of infiltration. Define interception in a hydrological system. Differentiate between piezometric surface and water table. 6+2+2

(2)

Unit-II

(Models and Theories in Hydrology)

10×1=10

3. Calculate the hydraulic gradient of an aquifer system if the velocity of the water is 2m/hr and the hydraulic conductivity of the aquifer is 2m/day. Also, find out the difference of hydraulic head(dh) if distance travel (dL) = 3m. Explain the variations of skewness and kurtosis of hydrographs in a river basin resulting from different storm directions using suitable graphical representations.
2+2+6
4. Differentiate between uniform and non-uniform flow. State Darcy's law. Calculate the total amount of recharge of groundwater of 'X' having an area of 210 km² where the mean pre-monsoon SWL is 15 mbgl and the mean post-monsoon SWL is 7 mbgl. The lithology of that area has a mean thickness of clay of 10m from the surface and then the sand layer continues upto 54 mbgl. Given : the specific yield of clay is 12% and the specific yield of sand is 30%.
3+3+4

Unit-III

(Physical Oceanography)

10×1=10

5. Describe the structural and morphological features found in deep ocean basins. Briefly explain wave shoaling. What is a standing wave?
4+3+3=10

(3)

6. Diagrammatically explain tide-generating forces according to the Equilibrium Theory. Define amphidromic point. What is eustatic sea level change?
5+2+3=10

Unit-IV

(Dynamic Oceanography)

10×1=10

7. What is air-sea CO₂ flux? What are the factors regulating partial pressure of CO₂ in seawater? How can we measure air-sea CO₂ flux?
2+3+5=10
8. Write short notes on
5×2=10
- (a) Ekman spiral
- (b) Epipelagic ecosystems

Internal Assessement

10

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