M. TECH. CIVIL (WATER RESOURCE ENGINEERING)
M. Tech. Civil (Water Resource Engineering) Sem-II : SUMMER- 2022
SUBJECT : SEDIMENT TRANSPORT & RIVER ENGINEERING

Day : Tuesday

Date : 26-07-2022   **S-23657-2022**

Time : 10:00 AM-01:00 PM

Max. Marks : 60

N.B.:
1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable electronic **CALCULATOR** is allowed.
4) Answers to both the sections should be written in **SEPARATE** answer books.

SECTION – I

Q.1 **a)** Derive Shield's expression for critical shear stress.   **[05]**

     b) State and explain bulk properties of sediments.   **[05]**

OR

     a) Explain any two approaches with respect to incipient motion of non-uniform **[05]** sediments.

     b) The fall velocity of 0.1 mm sediment particle in clear water at 20^0C is 8 mm/s. **[05]** If the particle is to fall in water having sediment concentration of 3% by volume. What would be the fall velocity of this particle?

Q.2 **a)** Differentiate between ripples and dunes.   **[05]**

     b) Explain any one criteria for prediction of regimes of flow.   **[05]**

OR

     a) Differentiate between dunes and anti-dunes.   **[05]**

     b) Explain the significance of regimes of flow with respect to rate of sediment **[05]** transport.

Q.3 **a)** Explain various approaches and concepts used for estimation of bed load.   **[05]**

     b) Explain Einstein's bed load equation.   **[05]**

OR

     a) Explain the terms bed load, suspended load and saltation load.   **[05]**

     b) Explain any two approaches of mechanism of suspension of sediments.   **[05]**

P.T.O.

SECTION – II

Q.4 a) Explain Kennedy's method of design of stable channels. State the limitations **[05]** of this method.

b) A stable channel has to be designed to carry a discharge of 40 m³/s. If it passes **[05]** through a sandy material of 0.3 mm diameter, obtain channel dimensions and slope. Use Lacey's method.

OR

a) State and explain various equations given by Lacey for design of stable **[04]** channels.

b) Explain critical tractive stress approach for design of stable channels. **[06]**

Q.5 a) Explain the indirect method of bed load measurement. **[05]**

b) State and explain various methods of removal of sediments from reservoirs. **[05]**

OR

a) Explain the various factors that affect local scour around bridge piers. **[05]**

b) Explain any two practical situations where aggradation occurs. **[05]**

Q.6 a) State objectives of river training. **[05]**

b) State hydraulic design parameters of embankments. **[05]**

OR

a) Explain river training works for flood control. **[05]**

b) Explain design of spurs with respect to length and spacing. **[05]**

*   *   *   *