

**M. TECH.-II (CIVIL-HYDRAULIC ENGINEERING) (CBCS –  
2015 COURSE) : SUMMER - 2018**

**SUBJECT: SEDIMENT TRANSPORT AND RIVER ENGINEERING**

**Day: Monday**  
**Date: 11/06/2018**

**S-2018-2994**

**Time: 11.00 AM TO 02.00 PM**  
**Max. Marks: 60**

**N.B:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Use of electronic non- programmable **CALCULATOR** is allowed.
- 5) Assume suitable data if necessary.

**SECTION-I**

**Q.1** Explain the nature of sediment problem with respect to reservoir sedimentation and Hydropower structures. (10)

**OR**

**Q.1** Explain Shield's analysis for incipient motion of uniform sediments. Discuss the modifications suggested by Yalin and Karahan. (10)

**Q.2** Compare the characteristics of Dunes with antidunes. What is the significance of flow regimes with respect to resistance to flow? (10)

**OR**

**Q.2** Explain the formation of ripples and dunes and their characteristics. What is the significance of flow regimes with respect to stage discharge relationship? (10)

**Q.3** Explain various approaches and concepts used for estimation of bed load. Explain Du Boy's equation in detail. (10)

**OR**

**Q.3** Derive the expression for suspended sediment distribution. (10)

$$\frac{c}{c_a} = \left\{ \frac{D-y}{y} \frac{a}{D-a} \right\}^z$$

List the assumptions made in derivation.

**SECTION-II**

**Q.4** Define and explain the concept of "Channel in regime". Discuss the differences in the design of stable channel using tractive force theory and regime theory. (10)

**OR**

**Q.4** Data: Canal Discharge 15 cum/s; Bed material size 0.15 mm; Assuming rectangular channel, estimate the channel width, depth, average velocity of flow, using Lacey's equations. Make suitable assumptions, if required. (10)

**P.T.O.**

**Q.5** What is “Local Scour” around bridge piers? Draw a sketch of the flow phenomena around circular bridge pier and name them. **(10)**

**OR**

**Q.5** Discuss and compare the Depth integration, Point integration and bulk sampling methods in sediment sampling, clearly indicating the merits, demerits and conditions under which these are normally followed. **(10)**

**Q.6** Discuss the likely river channel changes on long and short term basis (In plan and elevation) due to the following conditions: **(10)**

- i) Sudden increase in the longitudinal slope
- ii) Removal of sediment at a location but not water.

**OR**

**Q.6** List out the different classifications of river training works. Draw sketches of typical spur in plan and elevation and name its components. **(10)**

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