Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20510

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Fourth Semester

Civil Engineering

CE 3401 – APPLIED HYDRAULICS ENGINEERING

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Describe Open Channel flow.
2. Describe flow based on Froude number.
3. Recall Hydraulic slope.
4. Describe GVF.
5. Recall Hydraulic Jump.
6. Describe Surges.
7. Describe Impulse turbines.
8. Recall specific speed of turbine.
9. Recall NPSH.
10. Describe negative slip.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the types and properties of open channel flow.

Or

(b) Explain velocity distribution in open channel flow.

12. (a) Explain the classification of water surface flow profile.

Or

(b) Describe the flow profile determination by Standard step method.

13. (a) Describe the types of Hydraulic jumps with a neat sketch.

Or

(b) Describe the dissipation of energy in RVF, and explain positive and negative surges.

14. (a) Explain the classification of turbines with its merits and demerits.

Or

(b) Describe the process of cavitation and explain the factors to assess performance of turbine.

15. (a) Describe the operating characteristics of a multistage pumps and its importance.

Or

(b) Describe indicator diagrams and its variations of a reciprocating pumps with a neat sketch.

PART C — (1 × 15 = 15 marks)

16. (a) Compute the flow properties of a 3.5 m wide rectangular channel having a discharge of 14 m^3/s with a flow depth of 1.15 m. (15)

Or

(b) Compute (i) the flow rate (ii) Froude number (iii) Reynolds number (iv) relative roughness (v) Darcy friction factor and (vi) mean boundary shear stress for a rectangular open channel (boundary roughness = 0.01), the uniform equilibrium flow depth equals 0.9 m. The channel is 10 m wide and the bed slope is 0.0015°. The fluid is water at 20°C. Take maximum of three iterations and proceed with any one value. (15)

———————