1131

Code : 15CE41T

Register Number | | | | | | | |

IV Semester Diploma Examination, April/May-2018

HYDRAULICS

Time : 3 Hours] **[Max. Marks : 100**

Instructions : (i) Answer any **six** questions from Part – **A**. Each question carries **5** marks.

(ii) Answer any **seven** questions from Part – **B**. Each question carries **10** marks.

(iii) Assume missing data suitably.

PART – A

1. What is manometer ? Mention types of manometer. **5**

2. Explain with a neat sketch Bourdon's pressure gauge. **5**

3. What are the limitations of the Bernoulli's theorem ? **5**

4. Explain with neat sketch of venturimeter. **5**

5. Define hydraulic co-efficients and give the relation between them. **5**

6. Give the Darcy's and Chezy's formula for loss of head due to friction. **5**

7. Explain the surge tank with sketch. **5**

8. State the conditions of the most economical sections of a rectangular and trapezoidal section. **5**

9. Explain the term open channel and list the classification of open channel. **5**

PART – B

10. (a) Define total pressure and centre of pressure. 5

(b) A differential manometer connected at the two points A and B at the same level in a pipe containing an oil of specific gravity 0.85, shows a difference in mercury level as 150 mm. Determine the difference in pressure at the two points, the level of mercury in the left limb is lower than that in the right limb. 5

11. Determine the total pressure and position of centre of pressure on an isosceles triangular plate of base 4 m and altitude 4 m is immersed vertically in oil. The base of plate coincides with the free oil surface. Take specific gravity of oil is 0.9. 10

12. (a) State the equation for continuity of flow. 4

(b) A 300 mm diameter pipe carries 80 lits/sec of water. At points P and Q the measurements of pressure and elevation are 361 kN/m^2 and 288 kN/m^2 and 30.5 m and 33.5 m respectively. Assuming steady flow, find the head lost between the two points. 6

13. A venturimeter is to be fitted to a 250 mm diameter pipe, in which the maximum flow is 7200 lit/minute and the pressure head is 6 m of water. What is the minimum diameter of throat so that there is no negative head in it ? 10

14. (a) Define Vena Contracta. 4

(b) A 60 mm diameter orifice is discharging water under a head of 9 m. Calculate the actual velocity of the jet in m/sec. at vena contracta. If C_d = 0.6 and $C_v = 0.98$ 6

15. (a) Define Notch and list the different types of Notches. 4

(b) Find the discharge through a trapezoidal notch which is 1.4 m wide at the top and 0.6 m at the bottom and is 0.5 m in height. The head of water on the notch is 0.4 m. Assume C_d for the rectangular notch to be 0.62 and for triangular notch to be 0.6. 6

16. (a) Explain end contraction. 4

(b) A weir 2 m long has 0.6 m head of water over its crest. Using Francis formula find the discharge over the weir if the channel approaching the weir is 6 m and 1.2 m deep. Also determine the new discharge considering the velocity of approach. 6

17. The population of city is 8,00,000 and it is to be supplied with water from a reservoir 6.4 km away. Water is to be supplied at the rate of 140 litres per head per day and half the supply is to be delivered in 8 hours. The full supply level of the reservoir is RL 180.00 and its lowest water level is RL 105.00. The delivery end of the main is at RL 22.50 and the head required there is 12 m. Find the diameter of the pipe. Take $f = 0.04$. 10

18. A brick lined channel has side slopes of 1.5 horizontal to 1 vertical. If it is required to carry 15 m^3/sec. If the average velocity of flow is not to exceed 1 m/sec. find 10

(a) Wetted perimeter for minimum lining.

(b) Bed slope N = 0.03

19. (a) Explain the working principle of a centrifugal pump. 5

(b) Write any five differences between impulse turbine and reaction turbine. 5