

CEM52 Hydraulics

584

REG. NO

OCTOBER 2021

Time: Three hours

Maximum Marks: 75

- Note:
1. Answer ALL the questions in PART-A (1 mark each)
 2. Answer any ONE question from each unit in PART-B (3 marks each)
 3. Answer any ONE question from each unit in PART-C (10 marks each)
 4. The question paper contains TWO Pages

PART-A (1x10=10)

1. Define the term relative density.
2. What is meant by total pressure?
3. State Bernoulli's theorem.
4. Define the term venacontracta.
5. State the Darcy's formula for the head loss due to friction in a pipe line.
6. Define notch.
7. What is meant by cippoletti weir?
8. Define pump.
9. What is meant by tapping of ground water?
10. Define hydraulic mean depth.

PART-B (3x5=15)

UNIT-I

11. The weight of 5.6m^3 of oil is 46,800N. Calculate specific weight of oil.
12. List out the different types of manometer.

UNIT-II

13. Differentiate uniform flow from non-uniform flow.
14. How are orifices classified?

UNIT-III

15. Mention the various minor losses of head of water.
16. Compare V notch and rectangular notch.

UNIT-IV

17. What is meant by velocity of approach?
18. What are the precautions to be taken while operating a centrifugal pump?

UNIT-V

19. List out the various types of well construction.
20. List the methods of measurement of velocity in channels.

UNIT-I

21. A simple manometer is used to measure the pressure of oil of relative density 0.75 flowing in a pipeline. Its right limb is open to the atmosphere and the left limb is connected to the pipe. The centre of pipe is 0.1m below the level of mercury in the right limb. If the difference of mercury level in the two limbs is 0.20m, determine the absolute pressure of the oil in the pipe in Pascal.
22. A circular plate of 2m diameter is immersed in an oil of relative density 0.8. Its maximum and minimum depths are 2m and 1m respectively from free surface. Determine (i) total pressure on one side of the plate and (ii) depth of centre of pressure.

UNIT-II

23. A 300m long pipe has a slope of 1 in 100. It tapers from 1000mm diameter at the high end to 500mm diameter at the low end. The discharge is 600lps pressure at the high end is 68.67×10^3 pa. Find (i) velocity of flow at low end (ii) velocity of flow at high end and (iii) pressure at low end.
24. A 60mm diameter orifice is discharging water under a head of 9m. The coefficient of discharge is 0.6. The coefficient of velocity is 0.9. Calculate (i) theoretical velocity of jet (ii) actual velocity of jet (iii) theoretical discharge in lps and (iv) actual discharge in lps.

UNIT-III

25. A pipe of 0.09m^2 area suddenly enlarges to 0.36m^2 . The discharge in the pipe is $0.283\text{m}^3/\text{sec}$. The pressure at the smaller end of the pipe is 84.4×10^3 pa. Determine
 - (i) velocity at smaller part
 - (ii) velocity at larger part
 - (iii) loss of head due to sudden enlargement and
 - (iv) pressure at the larger part.
26. A trapezoidal notch is 1.2m wide at the top and 0.45 at the bed. The height is 0.3m. Determine the discharge through the notch when the head of water is 0.225m. Take C_d as 0.6

UNIT-IV

27. A submerged weir is 3m long. The heads of water on the upstream and downstream sides of the weir are 0.50m and 0.25m respectively. If $C_d = 0.60$, Estimate the discharge over the weir.
28. A double acting reciprocating pump has a piston area of 0.10m^2 . Its stroke length is 0.30m. It is discharging 2.40m^3 of water per minute at 45rpm through a total height of 10m, Find
 - (i) percentage slip
 - (ii) Coefficient of discharge
 - (iii) Theoretical power and
 - (iv) Efficiency of the pump

UNIT-V

29. What are the precautions to be taken for the sanitary protection of well?
30. An economical rectangular channel discharges 15 cumecs with a velocity of 1.6m/sec. Taking Chezy's constant as 60, Find
 - (i) Depth of flow
 - (ii) bed width and
 - (iii) bed fall.
