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Semester: 3rd / Civil Engg./Brick Tech. /Constr.Mgmt./Highway Engg.

Subject : Fluid Mechanics

Time : 3 Hrs. M.M. : 100

SECTION-A

Note: Multiple choice Questions. All questions are compulsory (10x1=10)

(Course Outcome/CO)

Q.1 Fluid statics deals with (CO-1)
- a) Viscous and gravity
- b) Gravity and pressure forces
- c) Viscous and pressure forces
- d) Surface tension and gravity forces

Q.2 Stoke is the unit of (CO-2)
- a) Viscosity b) Surface tension
- c) Kinematic viscosity d) None of these

Q.3 The hydrostatic law states rate of increase of pressure in a vertical direction is equal to (CO-3)
- a) Weight of fluid b) Density of fluid
- c) Specific weight of fluid
- d) None of these

Q.4 Atmospheric pressure held in terms of water column is
- a) 10:30 m b) 9:81 m (CO-4)
- c) 8:50 m d) 7:50 m

Q.5 Continuity equation can take the form (CO-5)
- a) $A_1V_1=A_2V_2$ b) $\rho A_1V_1=A_2V_2$
- c) $\rho_1 A_1V_1=\rho_2 A_2 V_2$ d) $A_1 V_1=A_2V_2\rho_1/\rho_2$

Q.6 Continuity equation deals with the law of conversation of (CO-5)
- a) Momentum b) Energy
- c) Mass d) None of these

Q.7 Pitot tube is used for measurement of (CO-7)
- a) Velocity at appoint b) Pressure
- c) Flow d) None of these

Q.8 Notch is device used for measuring (CO-8)
- a) Rate of flow through a small channel
- b) Rate of flow through pipes
- c) Velocity through a pipe
- d) Velocity through a small channel

Q.9 If the Froude number in open channel flow is more than 1.0, the flow is called (CO-8)
- a) Streaming flow b) Shooting flow
- c) Critical flow d) None of these

Q.10 A pump is defined as a device which converts (CO-9)
- a) Kinetic energy into mechanical energy
- b) Mechanical energy into hydraulic energy
- c) Hydraulic energy into mechanical energy
- d) None of these

SECTION-B

Note: Objective type questions. All questions are compulsory. (10x1=10)

Q.11 The study of incompressible fluids under static conditions is called_____ (CO-1)

Q.12 The point where the resultant pressure is called _____ (CO-3)

Q.13 A piezometer tube is not suitable for measuring-_____ pressure. (CO-4)

Q.14 A fluid which possesses_____is known as real fluid. (CO-1)

Q.15 Laminar flow is also called_____ (CO-5)

Q.16 A notch can measure_____discharge than that of orifice. (CO-6)

Q.17 In a turbulent flow, Reynold's number is _____ (CO-7)

Q.18 Mass density is the ratio of mass of a fluid to its_____ (CO-2)

Q.19 In case of open channels, the water itself is the_____ (CO-8)

Q.20 The devices used to increase the pressure energy of a fluid are called_____ (CO-9)

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

Q.21 What is capillarity? Derive expression for height of capillary rise. (CO-2)

Q.22 Define pressure of a liquid and write the expression of it along with diagram. (CO-3)

Q.23 A differential manometer connected at the two points A and B in a pipe containing an oil of specific gravity 0.80, shows a difference in mercury levels as 20 mm. Determine the difference in pressure at the two points in terms of head of water (CO-4)

Q.24 State Bernoulli's theorem, write the expression and assumption of the Bernoulli's equation. (CO-5)

Q.25 The diameter of a pipe at the section 1-1 and 2-2 are 400mm and 200mm respectively. If the velocity of water flowing through the pipe at section 1-1 is 5m/sec. Fine the velocity of water at section. (CO-5)

Q.26 Discharge is measured by a rectangular notch of crest width equal to 0.3 m of a rectangular channel. If the depth of water above crest is 0.12 m and C_d=0.62, find the discharge. (CO-6)

Q.27 Write the differences between notches and weir. (CO-6)

Q.28 Define loss of energy in pipes and write the different minor energy losses. (CO-7)

Q.29 Define water hammer and derive the expression for circumferential hoop stress in the material of the pipe. (CO-7)

Q.30 Differentiate between pipe flow and channel flow. (CO-8)

Q.31 Find the discharge through a rectangular channel of width 4.2 m having a bed slope of 3 in 6300. The depth of flow is 2.1 m and take the value of N in Manning's formula is 0.012 (CO-8)

Q.32 Write the working process of a centrifugal pump. (CO-8)

Q.33 Enumerate the various types of differential manometers and explain any one of the. (CO-4)

Q.34 A pitot tube is used to measure the velocity of water in a pipe. The stagnation pressure head is 5.95 m and static pressure head is 4.65 m. Calculate the velocity of flow assuming the co-efficient of tube equal to 0.97. (CO-6)

Q.35 A rectangular plate 5 m long and 3 m wide is immersed vertically in water in such a way that its 5 m side parallel to the water surface and is 1.6 m below it. Determine the total pressure on the plate. (CO-3)

SECTION-D

Note: Long answer type questions. Attempt any two out of three questions. (2x10=20)

Q.36 Prove that the centre of pressure is always below its centre of gravity for an immersed plane surface. (CO-3)

Q.37 Three pipes of 300 mm, 200 mm, and 400mm and lengths 600mm, 400mm and 800 mm respectively are connected in series. The difference in water surface levels in two tanks is 20 m. Determine the rate of water, neglecting the minor losses, if co- efficient of friction for these pipes is same and equal to 0.007. (CO-7)

Q.38 Write the properties of the most economical trapezoidal channel section along with diagram. (CO-8)

(**Note:** Course outcome/CO is for office use only)