

No. of Printed Pages : 4 180731/170731/120731
Roll No. /030731

3rd Sem / Civil, Brick Tech, Const Mgmt, Highway Engg.
Subject:- Fluid Mechanics

Time : 3Hrs. M.M. : 100

SECTION-A

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

- Q.1 The study of liquids at rest is called (CO1)
a) Hydrostatics b) Hydrokinematics
c) Hydrodynamics d) None of the above
- Q.2 When the pressure of the fluid is below atmospheric pressure, then it is called (CO4)
a) Absolute Pressure
b) Negative Gauge Pressure
c) Gauge Pressure
d) None of the above
- Q.3 Bernoulli's theorem deal with the law of conservation (CO5)
a) Energy b) Mass
c) Momentum d) None of these
- Q.4 The S.I. unit of discharge is (CO5)
a) m/s b) m²/s
c) m³/s d) m⁴/s
- Q.5 At vena-contracta, the area of jet of liquid is (CO6)
a) Maximum b) Minimum
c) Equal d) None of the above
- Q.6 The relation between C_{cr} , C_v and C_d is (CO6)
a) $C_d = C_c \times C_v$ b) $C_c = C_d \times C_v$
c) $C_v = C_c \times C_d$ d) $C_d \times C_c \times C_v = 1$

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- Q.7 A current meter is used to measure (CO6)
a) Pressure b) Velocity
c) Viscosity d) Electric current
- Q.8 Laminar flow occurs in pipes when Reynold's Number is (CO7)
a) Less than 2000
b) Lies between 2000 to 3000
c) Lies between 3000 to 4000
d) More than 4000
- Q.9 If the Froude number in open channel flow is more than 1.0, the flow is called (CO8)
a) Streaming flow b) Shooting flow
c) Critical flow d) None of the above
- Q.10 The discharge through a trapezoidal channel is maximum when (CO8)
a) Top width = half of sloping side
b) Top width = 1.5 x sloping side
c) Half of top width = Sloping side
d) None of these

SECTION-B

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

- Q.11 Define surface tension. (CO2)
- Q.12 A piezometer tube is not suitable for measuring _____ pressure. (CO4)
- Q.13 A notch can measure _____ discharge than that of orifice. (CO6)
- Q.14 What is an Orifice Meter? (CO6)
- Q.15 Pitot tube is used for the measurement of _____. (CO6)
- Q.16 Loss of head due to sudden enlargement in a pipe = _____. (CO7)
- Q.17 Define upper critical velocity. (CO7)

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- Q.18 Give some examples of open channel. (CO8)
 Q.19 Define wetted perimeter in an open channel. (CO8)
 Q.20 Define non-uniform flow in an open channel. (CO8)

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. (CO2)
 Q.22 Find the depth of alcohol of specific gravity 0.784 which produces an intensity of pressure equal to 2.05 KN/m². Also find the pressure head in terms of water and mercury. (CO3)
 Q.23 Define pressure of a liquid and write its expression along with diagram. (CO3)
 Q.24 A simply U-tube manometer containing mercury is connected to a pipe in which a fluid of Sp. Gravity 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to atmosphere. find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40 cm and the height of fluid in the left from the centre of pipe is 15 cm below. (CO4)
 Q.25 Write a short note on "Bourden Tube pressure Gauge". (CO4)
 Q.26 Explain the continuity equation of flow. (CO5)
 Q.27 Differentiate between compressible and incompressible flows. (CO5)
 Q.28 In a pipe of 100 mm diameter, water is flowing with a mean velocity of 3m/s and a gauge pressure of 300 kN/m². Determine the total head, if the pipe is 10 m above the datum line. Neglect friction. (CO5)
 Q.29 A pitot-static tube is used to measure the velocity of water in a pipe. The stagnation pressure head is 6m and static pressure head is 4.5m. Calculate the velocity of

flow assuming the co-efficient of tube as 0.98. (CO6)

- Q.30 Write the functions of a venturimeter. (CO6)
 Q.31 Define Reynold's number and write its significance. (CO7)
 Q.32 Find the loss of head due to friction in a pipe of 400 mm diameter and having 1 Km length. The velocity of water of the pipe 1.5m/sec. Take $f=0.010$. (CO7)
 Q.33 Define the most economical channel section in an open channel flow. (CO8)
 Q.34 A rectangular channel 6m wide is having a bed slope of 1:1000. if the depth of water is 2m, find the mean velocity of flow and the discharge. Assuming Chezy's constant $C=60$. (CO8)
 Q.35 Differentiate between centrifugal and reciprocating pump. (CO9)

SECTION-D

Note: Long answer type questions. Attempt any two questions 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. (CO3)
 Q.37 The difference in water surface levels in two reservoirs is 12.5m, which are connected by three pipes in series of lengths 300m, 170 and 210m and of diameters 300mm, 200mm and 400mm, respectively. Determine the rate of flow of water (neglecting the minor losses), if co-efficient of friction are 0.005, 0.0052 and 0.0048, respectively. (CO7)
 Q.38 A trapezoidal channel 4m wide at bottom and side slope 1:1.5 has a bed slope of 1 in 500. Find the discharge through the channel if water flows 1m deep. Take $N=0.035$. (Co8)