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GIET UNIVERSITY, GUNUPUR – 765022
B. Tech (Fourth Semester – Regular) Examinations, June – 2021
BPCCE4020 – FLUID MECHANICS
(Civil Engineering)

Time: 2 hrs   Maximum: 50 Marks

Answer ALL Questions
The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)   (1 x 10 = 10 Marks)

Q.1. Answer *ALL* questions   [CO#]   [PO#]

a. Fluid is a substance that   1   1
   (i) cannot be subjected to shear forces.   (ii) Always expands until it fills any container.
   (iii) Has the same shear stress.at a point regardless of its motion.   (iv) Cannot remain at rest under action of any shear force.

b. Specific weight of water in S.I. units is equal to   1   1
   (i) 1000 N/m^3 (ii) 10000 N/m^3
   (iii) 9.81 x10^3 N/m^3 (iv) 9.81 x10^6 N/m^3

c. Manometer is a device used for measuring   1   1
   (i) Velocity at a point in a fluid.   (ii) Pressure at a point in a fluid.
   (iii) Discharge of a fluid.   (iv) None of the above.

d. The centre of pressure of a liquid on a plane surface immersed vertically in a static body   2   2
   of liquid, always lies below the centroid of the surface area, because:
   (i) In liquids the pressure resting is same in all directions.   (ii) There are no shear stress liquids at rest.
   (iii) the liquid pressure is constant over depth.   (iv) The liquid pressure increases linearly with depth.

e. Location of centre of pressure is such that it is almost always   2   1
   (i) Below the centroid of plane surface.   (ii) Above the centroid of plane surface.
   (iii) At the centre of buoyancy.   (iv) Below the metacentre.

f. The resultant upward pressure of the fluid on an immersed body is called   2   1
   (i) upthrust   (ii) buoyancy
   (iii) center of pressure   (iv) all the above are correct

g. The flow in which conditions do not change with time at any point, is known as   3   1
   (i) one dimensional flow   (ii) uniform flow
   (iii) steady flow   (iv) turbulent flow

h. Bernoulli equation deals with the law of conservation of   3   1
   (i)(a) mass.   (ii) momentum
   (iii) work   (iv) energy

i. What is the correct formula for loss at the exit of a pipe?   4   1
   (i) $h_L = (V^2 / 2g)$ (ii) $h_L = 0.5 (V^2 / 2g)$
   (iii) $h_L = (2 V^2 / g)$ (iv) $h_L = (4 V^2 / g)$

j. Open channel flow is the one in which   4   1
   (i) a closed conduit id full of flowing liquid   (ii) a covered channel flows full under pressure.
   (iii) The liquid flowing in a closed conduit has a free surface.   (iv) none of the above.

PART – B: (Short Answer Questions)   **(2 x 5 = 10 Marks)**

Q.2. Answer *ALL* questions

		[CO#]	[PO#]
a.	Define density	1	1
b.	State the Pascal's law.	1	1
c.	State the hydro static law.	2	1
d.	List the types of flow	3	1
e.	Write the classifications of orifices	4	1

PART – C: (Long Answer Questions)   **(6 x 5 = 30 Marks)**

Answer *ANY FIVE* questions

		Marks	[CO#]	[PO#]
3.	If 5 m³ of certain oil weighs 40 kN, calculate the specific weight, mass density, specific volume and relative density of the oil.	(6)	1	1,2
4.	Describe the different types pressure measurement gauges	(6)	1	1,2
5.	A square surface 3 m X 3 m lies in a vertical plane. Determine the position of centre of pressure and total pressure on the square, when its upper edge is (a) in water surface and (b) 15 metres below the water surface.	(6)	2	2
6.	A block of wood 5 m long x 2 m wide x 1 m thick is floating horizontally in water. The density of wood is 650 kg/ m³.find the volume of water displaced and position of centre of buoyancy.	(6)	2	2
7.	A pipe line 60 cm diameter bifurcates at a Y- junction into two branches 40 cm and 30 cm in diameter. If the rate floe in the main pipe is 1.5 m³/s and the mean velocity of flow in the 30 cm pipe is 7.5 m/s. Determines the rate of flow and velocity in the 40 cm pipe.	(6)	3	1,2
8.	A steel pipe of 15 cm diameter carries water at the rate of 30 litres/second from a point A to B, the point B being 20 m higher than point A and 600 m apart along the pipe. If the pressure at B is to be 2.8 kg/cm². What pressure must be maintained at A, if friction factor for the pipe is 0.024?	(6)	3	1,2
9.	At a sudden enlargement of water line from a diameter of 240 mm to 280 mm, the hydraulic grade line rises by 10 mm. Estimate the quantity of flowing in the line.	(6)	4	1,2
10.	A rough timber flume(n = 0.012) in the form of an equilateral triangle(apex down) of 1.2 metres ide is laid on slope of 0.01.calculate the uniform flow rate which occurs at a depth of 90 cm	(6)	4	1,2

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