

Reg.No. _____



Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : 14CE2003
Sub. Name : Mechanics of Fluids

Semester : 2016-17 ODD
Duration : 3hrs
Max. marks : 100

Q. No.	Questions	Course outcome	Marks
PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)			
1.	Unit for discharge	CO1	
	a. m^3 b. m^2/s c. m/s^3 d. m^3/s		(1)
2.	A vessel of 4 m^3 contains an oil which weighs 30 kN. The specific weight of the oil is	CO1	
	a. $7.5 \text{ kN}/\text{m}^3$ b. $6.5 \text{ kN}/\text{m}^3$ c. $5.5 \text{ kN}/\text{m}^3$ d. $4.5 \text{ kN}/\text{m}^3$		(1)
3.	The ratio of specific weight of a liquid to the specific weight of pure water at a standard temperature is called	CO1	
	a. specific gravity of liquid b. surface tension of liquid c. compressibility of liquid d. density of liquid		(1)
4.	The viscosity of liquids with decreases in temperature	CO1	
	a. decreases b. first increases and then decreases c. increases d. first decreases and then increases		(1)
5.	Which of the following assumptions is not considered in Bernoulli's equation	CO1	
	a. Fluid is ideal b. flow is rotational c. flow is incompressible D flow is steady		(1)
6.	A grid obtained by drawing a series of equipotential lines and streamlines is called	CO1	
	a. path line b. stream function c. velocity net d. flow net		(1)
7.	"The intensity of pressure at any point in a liquid at rest is same in all directions" – the above statement is known as	CO1	
	a. hydrostatic law b. Pascal's law c. Kirchhoff's law d. none of the above		(1)
8.	What are the forces not considered in Reynold's equation of motion	CO1	
	a. Gravity force b. Pressure force c. Compressibility force d. Turbulent force		(1)
9.	Which of the following condition represents the incompressible flow	CO1	
	a. $\rho = \text{constant}$ b. $\rho \neq \text{constant}$ c. both A & B d. nooneof the above		(1)
10.	As the diameter of the tube increases the capillary rise	CO1	
	a. will not increase b. neither increase nor decrease c. increase d. decrease		(1)
11.	A differential manometer is used to measure	CO2	
	a. difference of pressures between two points in a pipe b. atmospheric pressure c. pressure in pipes and channels d. pressure in venturimeter		(1)

12.	One cubic metre of water is_____ litres				CO1	
	a. 1000	b.100	c.999	d.10		(1)
13.	The point at which the resultant pressure on an immersed surface acts, is known as				CO1	
	a. centre of pressure	b. centre of gravity	c. centre of depth	d. centre of immersed surface		(1)
14. possesses no definite volume and is compressible.				CO1	
	a. solid	b. gas	c. liquid	d. vapour		(1)
15.	In Bernoulli's equation the datum head is				CO1	
	a. $V^2/2g$	b. V_1A_1	c. V_2A_2	d. Z		(1)
16.	Venturimeter is based on				CO2	
	a. Bernoulli's equation	b. Newton's law of motion	c. Law of conservation of mass	d. Pascal's law		(1)
17.	A flow of 6000 litres per minute of water is equal to _____ m ³ /sec				CO2	
	a. 0.1	b.0.01	c. 0.0001	d.1		(1)
18.	Local acceleration is defined as the rate of increase of _____ with respect to time				CO1	
	a. Density	b. Velocity	c. pressure	d. Specific gravity		(1)
19.	Energy loss due to the sudden expansion of pipe comes under				CO3	
	a. Minor energy loss	b. Potential energy loss	c. Kinetic energy loss	d. Pressure energy		(1)
20.	The phenomenon of formation of vapour bubbles at low pressure area of pipe and the collapsing of these vapour bubbles at high pressure area is called				CO1	
	a. Vapour pressure	b. Cavitation	c. water pressure	d. all of the above		(1)
21.	Calculate the head lost due to friction in a pipe of 600mm in diameter and 1.5km long. The velocity of flow of water is 2.5 m/s and the friction factor is 0.02				CO3	
	a.15.93m	b. 11.58 m	c. 13.39m	d.14.52m		(1)
22.	If V = Volume, D = Density and M = Mass of an object, then which one of the following relationships is correct?				CO1	
	a. $M = D \times V$	b. $V = M \times D$	c. $M = D \div V$	d. $D = M \times V$		(1)
23.	Fluids which do not follow the linear relationship between shear stress and rate of deformation are termed as				CO1	
	a. Newtonian	b. Non-newtonian	c. dialent	d. ideal		(1)
24.	Determine the size of pipe line which discharge 200 liters/min of water with a velocity of 0.4 m/s				CO3	
	a.103mm	b.203 mm	c.106mm	d.101mm		(1)
25.	Calculate the head lost due to friction in a pipe of 600mm in diameter and 1.5km long. The velocity of flow of water is 2.5 m/s and the friction factor is 0.02				CO3	
	a. 15.93 m	b.10.12 m	c. 20.32 m	d. 18.95m		(1)
26.	The pressure of a liquid on a horizontal surface will always act to the surface				CO1	
	a. 45°	b. normal	c. 60°	d. parallel		(1)
27.	Kinetic head in Bernoulli's equation is				CO1	
	a. $V/2g$	b. $V^3/2g$	c. $V^2/2g$	d. $2g/V$		(1)
28.	The ratio of the actual discharge and theoretical discharge is called				CO1	
	a. Co efficient of discharge	a. Co efficient of viscosity	c. Co efficient of young's modulus	d. Co efficient of friction		(1)

29.	Ψ denotes				CO1	
	a. stream line	b. stream function	c. velocity potential function	d. streak line		(1)
30.	Stream function is defined only for				CO1	
	a. Three dimensional flow	b. Two dimensional flow	c. Both A & B	d. none of the above		(1)
31.	One stoke is equal to				CO1	
	a. $10^4 \text{m}^2/\text{s}$	b. $10^{-4} \text{m}^2/\text{s}$	c. $10^{-4} \text{m}^3/\text{s}$	d. 10^{-4}m^2		(1)
32.	If Reynolds number is less than 2000, then the flow will be?				CO1	
	a. Turbulent	b. Laminar	c. Transient	d. none of the above		(1)
33.	A real fluid possesses which of the following?				CO1	
	a. surface tension	b. viscosity	c. compressibility	d. all of the above		(1)
34.	Piezometric head of a fluid is defined as				CO1	
	a. pressure head + datum head	b. pressure head - datum head	c. Kinetic head + datum head	d. Kinetic head - datum head		(1)
35.	Atmospheric pressure value of 101.3kN/m^2 shall be also denoted as				CO1	
	a. 760 mm of mercury	b. 760 mm of water	c. 76 mm of mercury	d. 76mm of water		(1)
36.	Which of the following is not a factor that affects viscosity?				CO1	
	a. the amount of attraction between the particles	b. the container in which the particles are held in	c. the shape and size of the particles	d. the kinetic energy of the particles		(1)
37.	Formula to find out the rate of flow is				CO1	
	a. Velocity / Area	b. Velocity x Area	c. Velocity ² x Area	d. Velocity x Area ²		(1)
38.	Surface tension is expressed in				CO1	
	a. N/m	b. N/m^2	c. N/m^3	d. N^2/m		(1)
39.	Loss of head at the entrance of a pipe is given by				CO3	
	a. $0.5V^2/2g$	b. $0.5V/2g$	c. $V/2g$	d. $V^2/2g$		(1)
40.	Head loss due to bend in pipe depends on				CO3	
	a. Angle of bend	b. Surface tension of the liquid	c. Viscosity of the liquid	d. Viscosity of the liquid		(1)

PART B(8 X 5 = 40 MARKS) (ANSWER ANY EIGHT)

41.	Calculate the dynamic viscosity of oil, which is used for lubrication between a square plate of size 0.8m x 0.8m and an inclined plane with angle of inclination 30° . The weight of the square plate is 300N and it slides down the inclined plane with a uniform velocity of 0.3 m/s. the thickness of oil film is 1.5mm.	CO 1	(5)
43.	A simple U- tube manometer containing mercury is connected to a pipe in which a fluid of specific 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 40cm and the height of fluid in the left from the center of pipe is 15 cm below. Sketch the arrangements.	CO 2	(5)
44.	Define Newton's law of viscosity. Classify fluids as per Newton's Law of viscosity.	CO 2	(5)
45.	State Bernoulli's equation. Explain application of Bernoulli's equation for calculation of discharge in a venturimeter.	CO 2	(5)
46.	Mention the types of flow. And explain any two in detail.	CO 3	(5)
47.	Water is flowing through a pipe of 5cm diameter under a pressure of 29.43 N/cm^2	CO 3	(5)

	and with mean velocity of 2 m/s. Find the total energy per unit weight of the water at a cross section, which is 5m above the datum line.		
48.	The diameters of a pipe at the sections 1 and 2 are 10cm and 15cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is 5 m/s. Determine also the velocity at section 2.	CO 3	(5)
49.	The velocity potential is given by $5(x^2 - y^2)$. Calculate the velocity components at the point (4,5).	CO 3	(5)
50.	An oil of specific gravity is flowing through a pipe of diameter 300mm at the rate of 500 litres/sec. Find the head lost due to friction for a length of 1000m pipe. Take $\nu = 0.29$ stokes.	CO 3	(5)
PART C(2 X 10 = 20 MARKS) (ANSWER ANY TWO)			
51.	A rectangular plane surface 2m wide and 3m deep lies in water in such a way that its plane of angle of 30° with the free surface of water. Determine the total pressure and the position of center of pressure when the upper edge is 1.5m below the free water surface.	CO 1	(10)
52.	The water is flowing through a taper pipe of length 100m having diameter 600 mm at the upper end and 300 mm at the lower end, at the rate of 50 liters/second . the pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62 N/cm^2 .	CO 2	(10)
53.	Determine the difference in the elevation between the water surfaces in the two tanks which are connected by a horizontal pipe of diameter 300mm and length 400m. the rate of flow of water through the pipe is 300 litres/sec. Consider all the losses and take the value of $f=0.008$.	CO 3	(10)

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