University of Mumbai

Examination 2020 – Sample Question Paper

Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2016/2012

Examination: Third Year Semester - IV

Course Code: MEC402 Course Name: Fluid Mechanics

Time: 1-hour Max. Marks: 50

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Note to the students: - All the Questions are compulsory and carry equal marks.

Q. No.	Question
1	Two fluids 1 and 2 have mass densities of p1 and p2 respectively. If p1 > p2, which one of the following expressions will represent the relation between their specific volumes v1 and v2?
Option A:	a) v1 > v2
Option B:	b) v1 < v2
Option C:	c) v1 = v2
Option D:	d) Cannot be determined due to insufficient information.
2	If 200m3 of fluid has a weight of 1060N measured on the planet having acceleration due to gravity 6.625m/s2, what will be it's specific volume?
Option A:	a) 0.8
Option B:	b) 0.7
Option C:	c) 0.9
Option D:	d) 0.5
3	The shear stress at a point in a liquid is found to be 0.03 N/m2. The velocity gradient at the point is 0.15 s-1. What will be it's viscosity (in Poise)?
Option A:	a) 20
Option B:	b) 2
Option C:	c) 0.2
Option D:	d) 0.5
4	If the pressure at a point is 1m of water, what will be it's value in terms of m of oil? (Take, the specific gravity of oil to be 0.8)
Option A:	a) 0.8
Option B:	b) 1
Option C:	c) 1.25
Option D:	d) 2.5

5	A circular plate 5.0 m diameter is immersed in such a way that its greatest and least depth below the free surface are 3 m and 1 m respectively. determine the position of the centre of pressure.
Option A:	a) 2.5 m
Option B:	b) 5 m
Option C:	c) 4.5 m
Option D:	d) 6 m
6	In case of spherical bodies with uniform mass distribution, what is the position of center of pressure relative to centre of gravity.
Option A:	a) Above
Option B:	b) Below
Option C:	c) Coincides
Option D:	d) None of the mentioned
7	Three flows named as 1,2 and 3 are observed. The Reynold's number for the three are 100, 1000 and 10000. Which of the flows will be laminar? Assume flow is through pipe.
Option A:	a) only 1
Option B:	b) only 1 and 2
Option C:	c) 1, 2 and 3
Option D:	d) only 3
8	In a two dimensional flow, the component of the velocity along the X-axis and the Y-axis are u = ax + by and v = ax – by. For what condition will the flow field be continuous?
Option A:	a) impossible
Option B:	b) possible if a = b
Option C:	c) possible if a = 2b
Option D:	d) possible for all values of a and b
9	If a liquid enters a pipe of diameter d with a velocity v, what will it's velocity at the exit if the diameter reduces to 0.5d?
Option A:	a) v
Option B:	b) 0.5v
Option C:	c) 2v
Option D:	d) 4v
10	The Bernoulli's equation in fluid dynamics is valid for _____
Option A:	a) Compressible flows
Option B:	b) Transient flows
Option C:	c) Continuous flows
Option D:	d) Viscous flows

11	The velocity profile of the Couette flow is _____
Option A:	a) Quadratic
Option B:	b) Constant
Option C:	c) Linear
Option D:	d) Zero
12	Which is the cheapest device for measuring flow / discharge rate.
Option A:	a) Venturimeter
Option B:	b) Pitot tube
Option C:	c) Orificemeter
Option D:	d) Nozzle meter
13	Which among the following does not depend on the friction factor?
Option A:	a) Pipe diameter
Option B:	b) Fluid density
Option C:	c) Viscosity
Option D:	d) Weight
14	What are the reasons for minor head loses in a pipe?
Option A:	a) Friction
Option B:	b) density
Option C:	c) Valves and bends
Option D:	d) length of pipe
15	What is the total loss developed in a series of pipes?
Option A:	a) Sum of losses in each pipe only
Option B:	b) Sum of local losses only
Option C:	c) Sum of local losses plus the losses in each pipe
Option D:	d) Zero
16	Navier- Stokes equation describes the motion of _____
Option A:	a) Solid substance
Option B:	b) Non-viscous fluid
Option C:	c) Viscous fluid
Option D:	d) Gas
17	Drag force is affected by_____
Option A:	a) Cross sectional area and smoothness
Option B:	b) Rigidity and density
Option C:	c) Pressure and temperature
Option D:	d) Mass

18	The lift force acts in _____ to the flow velocity.
Option A:	a) Perpendicular direction
Option B:	b) Same direction
Option C:	c) Opposite direction
Option D:	d) Different directions
19	The flow separation occurs when the fluid travels away from the _____
Option A:	a) Surface
Option B:	b) Fluid body
Option C:	c) Adverse pressure gradient
Option D:	d) Inter-molecular spaces
20	Eddy viscosity is a turbulent transfer of_____
Option A:	a) Fluid
Option B:	b) Heat
Option C:	c) Momentum
Option D:	d) Pressure
21	The laminar boundary layer is a _____
Option A:	a) Smooth flow
Option B:	b) Rough flow
Option C:	c) Uniform flow
Option D:	d) Random flow
22	For an isentropic flow _____
Option A:	a) Enthalpy = 0
Option B:	b) Entropy = 0
Option C:	c) Pressure = 0
Option D:	d) Temperature = 0
23	A shock wave carries _____
Option A:	a) Heat
Option B:	b) Pressure
Option C:	c) Energy
Option D:	d) Temperature
24	Shock waves that deviate from the arbitrary angle are called_____
Option A:	a) Oblique shock
Option B:	b) Bow shock
Option C:	c) Normal shock

Option D:	d) Detonation
25	Stagnation point is the point in fluid mechanics where the velocity of the fluid at that point is _____
Option A:	a) zero
Option B:	b) infinite
Option C:	c) constant
Option D:	d) unity