Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III(New) • EXAMINATION – WINTER 2016

Subject Code:2130602 Date:06/01/2017

Subject Name:Fluid Mechanics

Time:10:30 AM to 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

MARKS

Q.1 Short Questions **14**

1. _____ cannot retain any unsupported shape and volume.
   (a) Liquid, (b) gas, (c) fluid, (d) solid.
2. The cohesive forces are more in case of
   (a) Liquid fluid, (b) gaseous fluid, (c) equal in both, (d) none of the above.
3. The value of normal atmospheric pressure is
   (a) 1.01325 bar, (b) 10.33 m of water, (c) 760 mm of mercury,
   (d) All the above.
4. The numerical value of 1 bar = _____ in terms of Pa.
   (a) 1 Pa, (b) 1.1352 Pa, (c) 10^5 Pa, (d) 100 Pa.
5. Which of the following is a cause/s of dam failure
   (a) due to overturning, (c) due to sliding,
   (b) due to tension/compression, (d) All of the above.
6. For _____ flow, path line, streamline and streak line are identical.
   (a) Steady, (b) uniform, (c) laminar, (d) one dimensional.
7. The equation of continuity holds good when the flow
   (a) is steady, (c) velocity is uniform at all the cross sections,
   (b) is one dimensional, (d) all of the above.
8. The rate of change of linear momentum equals
   (a) Force, (b) torque, (c) energy, (d) work done.

9.The length of divergent portion of venturimeter in comparison to convergent portion is
   (a)More, (b) same, (c) less, (d) less or more.

10.Total energy line is obtained by adding _____ head to hydraulic gradient
   (a) Pressure head, (c) datum head,
   (b) Kinetic head, (d) friction head.

11.For pipes, laminar flow occurs when Reynold's number is
   (a) Less than 2000, (c) more than 4000
   (b) Between 2000 and 4000, (d) less than 4000.

12.Which of the following is dimensionless?
   (a) Force, (b) power, (c) efficiency, (d) torque.

13.A fluid flow taking place continuously round a curved path about a fix axis of rotation , is known as
   (a) Rotational flow,(b) vortex flow, (c) radial flow, (d) circular flow.

14._____ is the ability of fluid to change its volume under pressure

(a) Vapour pressure, (c) compressibility,

(b) Surface tension, (d) capillary.

Q.2	**(a)** Explain Compressibility and Bulk modulus.	**3**
	(b) Obtain an expression for Capillary rise of liquid.	**4**
	(c) State the Pascal's law and prove it.	**7**

OR

	(c) Write a short note on (i) U-tube Manometer, (ii) Diaphragm pressure gauge.	**7**

Q.3	**(a)** Define the terms metacentre, metacentric height and absolute pressure.	**3**
	(b) Derive the expression for total pressure for a vertical plate submerged in the Liquid.	**4**
	(c) A solid cylinder of diameter 4 m has a height of 4 m. Find the metacentric height of the cylinder if the specific gravity of the material of cylinder is 0.7 and it is floating in water with its axis vertical. State whether the equilibrium is stable or unstable.	**7**

OR

Q.3	**(a)** Explain Buoyancy and Centre of Buoyancy.	**3**
	(b) Explain equilibrium in floating bodies.	**4**
	(c) Derive an equation for time period of oscillation of floating body.	**7**

Q.4	**(a)** Define following terms i) Path line, ii) streamline, iii) streak line	**3**
	(b) Explain Reynold's experiment with neat sketch.	**4**
	(c) Derive Euler's equation of motion along streamline.	**7**

OR

Q.4	**(a)** How volumetric flow rate can be measured by pitot tube?	**3**
	(b) Write a short note on the hydraulic co-efficient.	**4**
	(c) Derive an expression for the discharge through a venturimeter.	**7**

Q.5	**(a)** Explain characteristics of laminar flow and turbulent flow.	**3**
	(b) Explain hydraulic gradient and total energy line.	**4**
	(c) Derive Darcy-Weisbach formula for head loss due to friction in pipe flow.	**7**

OR

Q.5	**(a)** Classify various types of notches.	**3**
	(b) Briefly discuss about drag force and lift force.	**4**
	(c) Define Mach number. Give classification and explanation of the type flow based on Mach number.	**7**

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