



# Physics mid term revision

Qena Student Club



## 1. Surface tension \_\_\_\_\_

1. Acts in the plane of the interface normal to any line in the surface
2. Is also known as capillarity
3. Is a function of the curvature of the interface
4. Decreases with fall in temperature

• Answer (a)

## 2. In a static fluid \_\_\_\_\_

1. Resistance to shear stress is small
2. Fluid pressure is small
3. Linear deformation is small
4. Only normal stress can exist

• Answer (d)





**3. Which of the following statements is correct about the shear stress distribution in circular pipes with laminar flow?**

- 1. It is linear with maximum value at the centre**
- 2. It is parabolic with maximum value at the centre**
- 3. It is parabolic with zero value at the centre**
- 4. It is linear with zero value at the centre**

**• Answer (b)**

**4. Which of the following statements is correct about the shear stress distribution in circular pipes with laminar flow?**

- 1. It is linear with maximum value at the centre**
- 2. It is parabolic with maximum value at the centre**
- 3. It is parabolic with zero value at the centre**
- 4. It is linear with zero value at the centre**

**Answer (b)**





**5. Which of the following are examples of free vortex motion?**

- i. Motion of air in cyclone**
- ii. Motion of liquid at the bottom of wash basin**
- iii. Motion of liquid inside impeller of pump**
- iv. Motion of eddies in rivers and canals**

- 1. i., ii., and iv.**
- 2. i., ii., and iii.**
- 3. i., iii., and iv.**
- 4. All of the above**

**Answer (a)**

**6) If a uniform body weighs 50N in air and 30 N in water, its specific gravity equals ...**

- a) 1.5**
- b) 1.67**
- c) 2.5**
- d) 3**

**Answer: B**

**Explanation :  $50 \text{ N} = m \times 9.81 \text{ m/s}^2$   $m = 5.1 \text{ kg}$**





**7)when you drink a liquid with your straw , you reduce the pressure in your mouth and let the atmosphere moves the liquid, can you use a straw to sip ip liquid on the moon**

- a) No a straw will not work as there is no atmosphere**
- b) Yes , a straw will work as a result of pressure difference**
- c) No, a straw will not work because of low gravity**
- d) Yes , a straw will work as a result of pressure difference between mouth and surrounding atmosphere**

**Answer: A**

**8)Lead has a greater density than iron, and both metals are denser than water. Is the buoyant force on a lead object..... to the buoyant force on an iron object of the same volume ?**

- a) Less than**
- b) Greater than**
- c) Equal**
- d) Double**

**Answer: C**





9) A cup of water having an ice cube floating in it is placed on the pan of a balance. What happens when ice completely melts?

- a) Weight of cup is unchanged and level of water in the cup falls.
- b) Weight of cup increases and the level of water in the cup rises up
- c) Weight of cup is unchanged and the level of water in the cup rises up.
- d) Weight of cup is unchanged and level of water in the cup remains the same.

Answer: D

10) If you put a beach ball of volume of  $14130 \text{ cm}^3$  into the water and don't push down on it. The weight of the beach ball in air is  $1.5 \text{ N}$ . Measuring the volume of the beach ball that is under water, we find it is  $153 \text{ cm}^3$ . (Knowing that  $1 \text{ cm}^3$  of water has a mass of  $1 \text{ g}$ ), what is the buoyant force of the water on the ball? ( $g = 9.8 \text{ N/Kg}$ ).

- a)  $1500 \text{ N}$
- b)  $1.5 \text{ N}$
- c)  $138.5 \text{ N}$
- d)  $1380 \text{ N}$

Answer: B





**11)The reason that a ship floats is that it displaces a lot of water. The displaced water wants to return to its original location. If a ship carries heavy cargo, it**

- a) Dips deeper into the water and the buoyancy force decreases.**
- b) Floats totally because of the increasing of buoyancy more than weight**
- c) Dips deeper into the water which creates a stronger buoyancy directly with weight**
- d) Still steady in its position because of the constancy of the buoyancy and its weight**

**Answer : C**

**12)A pipe of diameter 200 mm carries water in turbulent flow. The velocity of water at the centre of the pipe and 50 mm from the centre of the pipe are 3 m/s and 2 m/s, respectively. What is the shear stress at the wall of the pipe?**

- a) 785 N/m<sup>2</sup>**
- b) 334 N/m<sup>2</sup>**
- c) 528 N/m<sup>2</sup>**
- d) 614 N/m<sup>2</sup>**

**• Answer (b)**





**15)The reason that a ship floats is that it displaces a lot of water . The displaced water wants to return to its original location . If a ship carries heavy cargo, it .....**

- a) Dips deeper into the water and the buoyancy force decreases .**
- b) Floats totally because of the increasing of buoyancy more than weight**
- c) Digs deeper into the water which creates a stronger buoyancy directly with weight .**
- d) Still steady in its position because of the constancy of the buoyancy and its weight.**

**Answer: C**

**16)The apparent weight of an object changes in an elevator while accelerating upward. A fruit seller sells his fruits using a beam balance in an elevator. Will he gain more if the elevator is accelerating up?**

- A) Yes because weight of fruits increases.**
- B) No because weight of fruits decreases.**
- C) Yes because the loads weight on the other balance increases.**
- D) No because weights on both sides of the balance will gain equally.**

**Answer: D**







**17)When a fast-moving train rushes past the train platform, the person ,who is standing very close to the edge of the train platform, can be harmed as**

- A) The behind arca pressure becomes greater than that of the front area.**
- B) The behind arca pressure becomes smaller than that of the front arca.**
- C) The left area pressure becomes greater than that of the right area.**
- D) The left area pressure becomes smaller than that of the right area.**

**Answer: A**

**18)Fundamental equation that relates pressure to fluid's speed, pressure and height is known**

- a) Speed equation**
- b) Gravitational law**
- C) Bernoulli's equation**
- D) Equation of continuil)**

**Answer:C**





**19) Which one of the following is the characteristic of a fully developed laminar flow?**

- a) The pressure drop in the flow direction is zero**
- b) The velocity profile changes uniformly in the flow direction**
- c) The velocity profile does not change in the flow direction**
- d) The velocity profile changes uniformly in opposite direction to the flow direction**

**Answer: C**

**20) A barometer is constructed using a liquid (density =  $760 \text{ kg/m}^3$ ). What would be the height of the liquid column, when a mercury barometer reads 76 cm? (density of mercury =  $13600 \text{ kg/m}^3$ )**

- 1. 1.36 m**
- 2. 13.6 m**
- 3. 136 m**
- 4. 0.76 m**

**Answer: B**





21) The approximate depth of an ocean is 2700 m. The compressibility of water is  $45.4 \times 10^{-11} \text{ Pa}^{-1}$  and density of water is  $103 \text{ kg/m}^3$ . What fractional compression of water will be obtained at the bottom of the ocean?

1.  $0.8 \times 10^{-2}$
2.  $1.0 \times 10^{-2}$
3.  $1.2 \times 10^{-2}$
4.  $1.4 \times 10^{-2}$

Answer: C

22) Two copper vessels A and B have the same base area but are of different shapes. A takes twice the volume of water as that B requires to fill up to a particular common height. Then the correct statement among the following is:

1. pressure on the base area of vessels A and B is same.
2. pressure on the base area of vessels A and B is not same.
3. both vessels A and B weigh the same.
4. vessel B weighs twice that of A.

Answer: A



23) A tank with a square base of an area of  $1.0 \text{ m}^2$  is divided by a vertical partition in the middle. The bottom of the partition has a small-hinged door of area  $20 \text{ cm}^2$ . The tank is filled with water in one compartment, and an acid (of relative density 1.7) in the other, both to a height of  $4.0 \text{ m}$ . What is the force necessary to keep the door close?

- (1)  $54.88 \text{ N}$
- (2)  $56.0 \text{ N}$
- (3)  $60.0 \text{ N}$
- (4)  $45.5 \text{ N}$

Answer: A

24) A U-tube contains water and methylated spirit separated by mercury. The mercury columns in the two arms are in level with  $10.0 \text{ cm}$  of water in one arm and  $12.5 \text{ cm}$  of spirit in the other. What is the specific gravity of the spirit?

- (1)  $0.8$
- (2)  $0.3$
- (3)  $0.5$
- (4)  $0.7$

Answer: A



25) If pressure at half the depth of a lake is equal to  $\frac{2}{3}$ rd the pressure at the bottom of the lake, then the depth of the lake is:

1. 10m
2. 20m
3. 60m
4. 30m

Answer: B

26) The height of a mercury barometer is 75 cm at sea level and 50 cm at the top of a hill. The ratio of density of mercury to that of air is 104. The height of the hill is:

1. 250 m
2. 2.5 km
3. 1.25 km
4. 750 m

Answer: B





27) A hemispherical bowl just floats without sinking in a liquid of density  $1.2 \times 10^3 \text{ kg/m}^3$

If the outer diameter and the density of the material of the bowl are 1 m

and  $2 \times 10^4 \text{ kg/m}^3$

respectively, then the inner diameter of the bowl will be:

1. 0.94 m

2. 0.97 m

3. 0.98 m

4. 0.99 m

Answer: C

28) A square plate of .1m side moves parallel to a second plate with a velocity of .1m/s, both plates being immersed in water. If the viscous force is .002 N and the coefficient of viscosity is .01 poise, then the distance between the plates in m is :

a. .1

b. .05

c. .005

d. .0005

ANS: c





**29) A spiner fires a rifle bullet into a gasoline tank making a hole 53.0 m below the surface of gasoline. The tank was sealed at 3.10 atm . The stored gasoline has a density of 660 Kgm-3  
The velocity with which gasoline begins to shoot out of the hole is :**

- a. 27.8**
- b. 41**
- c. 9.6**
- d. 19.7**

**ANS: B**

**30) With an increase in temperature , the viscosity of liquid and gas , respectively will:**

- a. increase, increase**
- b. increase, decrease**
- c. decrease, increase**
- d. decrease, decrease**

**ANS: C**





31) A pipe of diameter 200 mm carries water in turbulent flow. The velocity of water at the centre of the pipe and 50 mm from the centre of the pipe are 3 m/s and 2 m/s, respectively. What is the shear stress at the wall of the pipe?

- a. 785 N/m<sup>2</sup>
- b. 334 N/m<sup>2</sup>
- c. 528 N/m<sup>2</sup>
- d. 614 N/m<sup>2</sup>

Answer (b)

32) The shear stress at a point in oil is 0.230 N/m<sup>2</sup> and velocity gradient at this point is 0.20 s<sup>-1</sup>. If the density of oil is 1240 kg/m<sup>3</sup>, kinematic viscosity of oil would be

- a. 0.93 stokes
- b. 92.7 cm<sup>2</sup>/s
- c. 9.3 stokes
- d. 0.093 stokes

Answer (c)







**33) A liquid compressed in a cylinder has a volume of  $0.04 \text{ m}^3$  at  $50 \text{ N/cm}^2$  and a volume of  $0.039 \text{ m}^3$  at  $150 \text{ N/cm}^2$ . The bulk modulus of elasticity of liquid is**

- a.  $400 \text{ N/cm}^2$**
- b.  $4000 \text{ N/cm}^2$**
- c.  $40000 \text{ N/m}^2$**
- d.  $40 \text{ N/cm}^2$**

**Answer (b)**

**34) A hydrometer is used to determine**

- a. Relative humidity**
- b. Surface tension of liquids**
- c. Specific gravity of liquids**
- d. Viscosity of liquids**

**Answer (c)**





**35) A horizontal pipeline carries water in a streamline flow. At a point along the pipe where cross-sectional area is  $10 \text{ cm}^2$ , the velocity of water is  $1 \text{ m/s}$  and pressure is  $2000 \text{ Pa}$ . The pressure of water at another point where cross-sectional area is  $5 \text{ cm}^2$ , is:**

**(Density of water =  $1000 \text{ kg/m}^3$ )**

- 1.  $250 \text{ Pa}$**
- 2.  $500 \text{ Pa}$**
- 3.  $1000 \text{ Pa}$**
- 4.  $2000 \text{ Pa}$**

**Answer: B**

**36) Several cans of different sizes and shapes are all filled with the same liquid to the same depth. Then:**

- A. the weight of the liquid is the same for all cans**
- B. the force of the liquid on the bottom of each can is the same**
- C. the least pressure is at the bottom of the can with the largest bottom area**
- D. the greatest pressure is at the bottom of the can with the largest bottom area**
- E. the pressure on the bottom of each can is the same**

**ANS: E**





# Thanks

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