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**Y—116—2019**

**FACULTY OF SCIENCE**

**B.Sc. (First Year) (First Semester) (Backlog) EXAMINATION  
NOVEMBER/DECEMBER, 2019**

**PHYSICS**

**Paper I (PHY-111)**

**(Mechanics and Properties of Matter)**

**(MCQ + Theory)**

**(Saturday, 21-12-2019)**

**Time : 10.00 a.m. to 12.00 noon**

*Time—Two Hours*

*Maximum Marks—40*

*N.B. :— Attempt All questions.*

**MCQ**

**10**

1. Attempt all multiple choice questions :

(1) Kepler's third law is :

(A)  $T^2 \propto a^2$

(B)  $T^2 \propto a^3$

(C)  $T^3 \propto a^3$

(D)  $T^2 \propto a^4$

(2) The gravitational potential at a distance ' $r$ ' from mass ' $m$ ' is :

(A)  $\frac{GM}{r}$

(B)  $-\frac{GM}{r}$

(C)  $\frac{GM}{r^2}$

(D)  $-\frac{GM}{r^2}$

(3) The S.I. unit of surface tension is :

(A) dyne/cm

(B) Newton/m

(C) Newton/m<sup>2</sup>

(D) dyne/cm<sup>2</sup>

(4) The viscosity of liquid decreases with :

(A) Decrease in temperature of liquid

(B) Increase in temperature of liquid

(C) Decrease in pressure of liquid

(D) Increase in pressure of liquid

**P.T.O.**

- (5) The coefficient of viscosity of liquid is :
- (A)  $n = \frac{A}{dv/dx}$  (B)  $n = \frac{F}{dv/dx}$
- (C)  $n = \frac{F}{A \cdot \frac{dv}{dx}}$  (D)  $n = \frac{F \cdot A}{\frac{dv}{dx}}$
- (6) The tangential force that tends to destroy the relative motion is called :
- (A) Viscous force (B) Gravitational force
- (C) Newton force (D) All of these
- (7) If the two layers of liquid are separated by distance ' $dx$ ' and moving with velocity ' $dv$ ' the quantity  $\left(\frac{dv}{dx}\right)$  is called :
- (A) Velocity gradient (B) Temperature gradient
- (C) Scalar gradient (D) All of these
- (8) A beam fixed horizontally at one end and loaded at other free end is called :
- (A) Torsional pendulum (B) Static torsion
- (C) Cantilever (D) Maxwell needle
- (9) The force of attraction between molecules of different substances is :
- (A) Cohesion (B) Adhesion
- (C) Viscous (D) None of these
- (10) To every action there is equal and opposite reaction is called Newton's ..... law of motion.
- (A) Third (B) First
- (C) Zeroth (D) Second

### Theory

2. Attempt any *five* of the following questions :

10

- (i) Define and explain gravitational potential.
- (ii) State Newton's law of gravitation.
- (iii) Write an expression for excess pressure inside a soap bubble.

- (iv) State the Bernoulli's theorem.
- (v) Define :
- (a) Critical velocity
  - (b) Velocity gradient.
- (vi) Define :
- (a) Bulk modulus
  - (a) Modulus of rigidity.
- (vii) Draw a diagram of torsional pendulum.
3. Attempt any *two* of the following questions : 10
- (i) State and explain Newton's laws of motion.
  - (ii) Derive an expression for coefficient of viscosity of a liquid by Poiseuille's method.
  - (iii) Describe Ferguson method to find surface tension of a liquid.
  - (iv) Obtain an expression for twisting couple on a cylindrical wire or rod.
4. Attempt any *one* of the following questions : 10
- (a) Describe Jaeger's method for the determination of surface tension of a liquid.
  - (b) Explain cantilever when weight of the beam is ineffective.