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**B—116—2019**

**FACULTY OF SCIENCE**

**B.Sc. (First Year) (First Semester) EXAMINATION**

**MARCH/APRIL 2019**

**PHYSICS**

**Paper I (PHY-111)**

**(Mechanics and Properties of Matter)**

**(MCQ & Theory)**

**(Tuesday, 2-4-2019)**

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

**Time—2 Hours**

**Maximum Marks—40**

- N.B. :—**
- (i) Attempt *All* questions.
  - (ii) Question No. 1 is MCQ type. Answer MCQ question on OMR sheet only
  - (iii) Question No. 2, Question No. 3 and Question No. 4 are descriptive type questions.
  - (iv) Use OMR sheet for MCQ type questions and separate answer sheet for descriptive type questions.
  - (v) Negative marking system is applicable to MCQ questions.

**MCQs**

1. Attempt *all* multiple choice questions. : 10

(i) Momentum is the product of :

- (a) Mass and volume
- (b) Pressure and velocity
- (c) Mass and pressure
- (d) Mass and velocity

(ii) The gravitational potential at distance  $r$  from mass  $m$  is given by :

- (a)  $-\frac{GM}{r}$
- (b)  $\frac{GM}{r}$
- (c)  $-\frac{GM^2}{r^2}$
- (d)  $\frac{GM^2}{r^2}$

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- (iii) The potential energy at infinity is considered to be :
- (a) One (b) Maximum  
(c) Zero (d) None of the above
- (iv) The SI unit of surface tension is :
- (a) N/cm (b) N/m  
(c) dynes/m (d) dynes/sec
- (v) The force of attraction between molecules of different substances is called force of :
- (a) Adhesion (b) Cohesion  
(c) Viscous (d) None of these
- (vi) As temperature of the liquid increases its velocity :
- (a) Decreases (b) Increases  
(c) Remains constant (d) None of these
- (vii) The tangential force that tends to destroy to relative motion is called as .....
- (a) Gravitational force (b) Surface tension  
(c) Acceleration due to gravity (d) Viscous force
- (viii) Elasticity is defined as the ratio of :
- (a)  $\frac{\text{strain}}{\text{stress}}$  (b) strain  $\times$  stress  
(c)  $\frac{\text{stress}}{\text{strain}}$  (d)  $\frac{\text{stress}}{(\text{strain})^2}$
- (ix) The bending moment of the beam is given by :
- (a)  $\frac{Y^2}{R} \cdot I_g$  (b)  $\frac{Y}{R} \cdot I_g$   
(c)  $\frac{Y}{R^2} \cdot I_g$  (d)  $\frac{Y^2}{R} \cdot I_g^2$

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(x) In case of bending beam the strain is :

(a)  $Z/R$ (b)  $Z^2/R$ (c)  $R/Z$ (d)  $Z^2/R^2$ 

## Theory

2. Attempt any five of the following questions. 10

(a) Define the terms :

(1) Frame of reference

(2) Inertial frame of reference

(b) State the energy conservation law.

(c) Define angle of contact in the case of a liquid.

(d) Explain

(1) Cohesive forces

(2) Adhesive forces

(e) Define critical velocity. State its dimension.

(f) Define Young's Modulus. State SI unit.

(g) Write the relation connecting three elastic constants.

3. Attempt any two of the following questions. 10

(1) Explain Newton's laws of motion in detail.

(2) Obtain an expression for excess pressure inside a spherical soap bubble.

(3) State and prove Bernoulli's theorem.

(4) Describe an experiment to determine  $Y$  by bending of a beam.

4. Attempt any one of the following questions : 10

(1) State and prove Kepler's laws of planetary motion.

(2) Explain in detail twisting couple on a cylinder or wire.

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