

This question paper contains 4 printed pages]

BF—93—2016

FACULTY OF SCIENCE

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

OCTOBER/NOVEMBER, 2016

(CBCS Pattern)

PHYSICS

Paper I (Phy-111)

(Mechanics and Properties of Matter)

(MCQ + Theory)

(Monday, 24-10-2016)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—10+30=40

N.B. :—(i) Attempt All questions.

(ii) Question No. 1 is MCQ type. Answer MCQ questions on OMR sheet only.

(iii) Question No. 2, Question No. 3 and Question No. 4 are descriptive type.

(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.

MCQ

1. Attempt *all* Multiple Choice Questions : 10

(1) The value of Universal gravitational constant 'G' is in CGS unit :

- (a) 6.669×10^{-8} dynes cm^2/gm^2
- (b) 6.129×10^{-8} dynes cm^2/gm^2
- (c) 6.669×10^{-10} dynes cm^2/gm^2
- (d) 6.129×10^{-10} dynes cm^2/gm^2

(2) Momentum is the product of

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

P.T.O.

(3) The Kepler's third law of planetary motion is :

(a) $T^2 \propto \frac{1}{a^3}$

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

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

(d) $T^2 \propto a$

(4) The excess pressure inside a soap bubble is :

(a) $\frac{T}{r}$

(b) $\frac{T}{2r}$

(c) $\frac{4T}{r}$

(d) $\frac{2T}{r}$

(5) The dimensional formula for surface tension is :

(a) $[M^1 L^0 T^{-2}]$

(b) $[M L T]$

(c) $[M^0 L^1 T^2]$

(d) $[M L^{-1} T]$

(6) The Poiseuille's equation for coefficient of viscosity is :

(a) $\eta = \frac{\pi P r^4}{8 l V}$

(b) $\eta = \frac{\pi P r^4}{8 l V}$

(c) $\eta = \frac{\pi P r^3}{4 l V}$

(d) $\eta = \frac{\pi P r^2}{8 l V}$

(7) The critical velocity of a liquid is Inversely proportional to

(a) Volume of the liquid

(b) Coefficient of viscosity

(c) Mass of the tube

(d) Density of the liquid

(8) The ratio of longitudinal stress to linear strain within elastic limit is called :

(a) Bulk modulus

(b) Modulus of rigidity

(c) Young's modulus

(d) None of these

- (9) The expression for time period of a Torsional pendulum is :

$$(a) \quad T = 2\pi\sqrt{\frac{I}{C}}$$

$$(b) \quad T = \frac{1}{2\pi}\sqrt{\frac{I}{C}}$$

$$(c) \quad T = \pi\sqrt{\frac{I}{C}}$$

$$(d) \quad T = \pi^2\sqrt{\frac{I}{C}}$$

- (10) The expression for depression of a beam supported at its ends and loaded in the middle :

$$(a) \quad \frac{wl^2}{48yI}$$

$$(b) \quad \frac{wl^3}{48yI}$$

$$(c) \quad \frac{wl}{46yI}$$

$$(d) \quad \frac{wl^2}{46yI}$$

Theory

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

10

- (i) State Newton's first law of motion.
- (ii) Define torque. Give its S.I. unit and dimensions.
- (iii) Explain gravitational potential energy.
- (iv) Define modulus of rigidity. State S.I. unit and dimensions of it.
- (v) What are cohesive and adhesive forces ? Give their examples.
- (vi) Explain the terms :
 - (a) critical velocity
 - (b) viscosity.
- (vii) State *three* types of elastic stresses and strains.

P.T.O.

3. Attempt any *two* of the following questions : 10
- (i) State and explain Kepler's laws of planetary motion.
 - (ii) Obtain an expression for excess pressure inside a liquid drop.
 - (iii) Derive poiseuille's equation for the flow of liquid through a tube.
 - (iv) Obtain relation connecting *three* elastic constants.
4. Attempt any *one* of the following questions : 10
- (i) Explain Kepler's deduction from Newton's laws of gravitation.
 - (ii) Explain Jaeger's method for determination of surface tension of liquid.