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

P.T.O.

(*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 × 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*) $\frac{Y^2}{R} \cdot I_g^2$

(*x*) Incase 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.