W—101—2018

FACULTY OF SCIENCE

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

OCTOBER/NOVEMBER, 2018

(CBCS/CGPA Pattern)

PHYSICS

Paper I (Phy-111)

(Mechanics and Properties of Matter)

(MCQ & Theory)

(Tuesday, 23-10-2018) | **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 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 wrong answer of MCQ questions.

MCQ

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 Kepler's third law of motion is :

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

(*c*) $T^2 \propto a$ (*d*) $T^3 \propto a^3$

P.T.O.

(*iii*) The gravitational potential at a distance '*r*' from mass 'M' is given by :

(*a*) $\dfrac{GM}{r^2}$ (*b*) $-\dfrac{GM}{r^3}$

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

(*iv*) The excess pressure inside a liquid drop is :

(*a*) $\dfrac{T}{r}$ (*b*) $\dfrac{2T}{r}$

(*c*) $\dfrac{2T}{r^2}$ (*d*) $\dfrac{2T}{r^4}$

(*v*) The surface tension of water is 73 dynes/cm. The radius of water drop is 0.1 cm. Then the excess pressure inside the liquid drop is :

(*a*) 1460 dynes/cm^2 (*b*) 1560 dynes/cm^2

(*c*) 1660 dynes/cm^2 (*d*) 1860 dynes/cm^2

(*vi*) The dimensional formula for viscosity is :

(*a*) $[ML^{-1}T^{-1}]$ (*b*) $[ML^{-2}T^{-2}]$

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

(*vii*) The velocity of liquid layer in contact with the solid surface of the glass tube is practically :

(*a*) 1   (*b*) 0

(*c*) −1   (*d*) ∞

(*viii*) The ratio of uniform and normal stress on the surface of a body to the volumetric strain is called :

(*a*) Strain   (*b*) Bulk modulus

(*c*) Stress   (*d*) Young modulus

(*ix*) The expression for depression of a beam supported at its ends and loaded in the middle is :

(*a*) $\dfrac{W l^2}{48\,y}$

(*b*) $\dfrac{W l^3}{48 I}$

(*c*) $\dfrac{W l^3}{48\,y I}$

(*d*) $-\dfrac{W l^2}{48\,y}$

(*x*) The Bending moment of the beam is :

(*a*) $\dfrac{Y}{R}$

(*b*) $\dfrac{R}{Y}$

(*c*) $\dfrac{R}{YI}$

(*d*) $\dfrac{YI}{R}$

Theory

2. Attempt any *five* of the following questions : 10

(*a*) State frames of reference.

(*b*) State Newton's third law of motion.

(*c*) Distinguish between Adhesive force and Cohesive force.

(*d*) Define surface tension and give its S.I. unit.

(*e*) Define coefficient of viscosity.

(*f*) Explain the following terms :

(*i*) Stress

(*ii*) Strain.

(*g*) Define :

(*i*) Bulk Modulus

(*ii*) Modulus of Rigidity.

P.T.O.

3. Attempt any *two* of the following questions : 10

   (*a*) Obtain an expression for Gravitational potential and Intensity at a point outside the uniform solid sphere.

   (*b*) State and explain Kepler's laws of planetary motion.

   (*c*) Obtain an expression for excess pressure inside a soap bubble.

   (*d*) Explain Searle's viscometer for determination of viscosity of a liquid.

4. Attempt any *one* of the following questions : 10

   (*a*) Explain Jaeger's method to find surface tension of liquid.

   (*b*) Obtain an expression for torsional pendulum in terms of modulus of rigidity of wire.