This question paper contains **4** printed pages]

R—93—2017

FACULTY OF SCIENCE

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

MARCH/APRIL, 2017

(CBCS Pattern)

PHYSICS

Paper I (PHY-111)

(Mechanics and Properties of Matter)

(MCQ & Theory)

(Friday, 7-4-2017)   **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 answers of MCQ questions.

MCQ

1.   Attempt *all* Multiple Choice Questions :   10

    (*i*)   According to Keplar's second law the areal velocity of the planet :

       (*a*)   remains constant   (*b*)   becomes maximum

       (*c*)   becomes minimum   (*d*)   none of these

                                                                        P.T.O.

(*ii*)   Newton's law of Gravitation is :

    (*a*) $F \propto \dfrac{r^2}{m_1 m_2}$
        (*b*) $F \propto \dfrac{m_1 m_2}{r^2}$

    (*c*) $G \propto \dfrac{m_1 m_2}{r^2}$
        (*d*) $G \propto \dfrac{r^2}{m_1 m_2}$

(*iii*)   The intensity of a gravitational field at a point is :

    (*a*) $\dfrac{-dx}{dv}$
        (*b*) $\dfrac{-dx}{dt}$

    (*c*) $\dfrac{-dv}{dx}$
        (*d*) $\dfrac{-dx}{dr}$

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

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

    (*c*) $\dfrac{4T}{r}$
        (*d*) $\dfrac{3T}{r}$

(*v*)   The C.G.S. unit of surface tension is :

    (*a*)   dynes/cm
        (*b*)   Newton/cm

    (*c*)   dynes/m
        (*d*)   dynes/sec

(*vi*)   The force of attraction between molecules of different substances is called force of :

    (*a*)   Cohesion
        (*b*)   Adhesion

    (*c*)   Viscous
        (*d*)   None of these

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

    (*a*)   1
        (*b*)   −1

    (*c*)   ∞
        (*d*)   0

(*viii*) The S.I. unit of viscosity is :

(*a*) N.sec/m^2

(*b*) dyne.sec/m^2

(*c*) N/m^2

(*d*) N.m^2/sec

(*ix*) The Poiseuilles equation for coefficient of viscosity is :

(*a*) $\dfrac{\pi r^4}{8\,\text{V}l}$

(*b*) $\dfrac{\pi \text{P} r^4}{8\,\text{V}l}$

(*c*) $\dfrac{\text{P}\,r^4}{8\,\text{V}l}$

(*d*) $\dfrac{\pi \text{P}}{8\,\text{V}l}$

(*x*) The twisting couple per unit angle of twist is :

(*a*) $\text{C} = \dfrac{\pi \eta r^4}{2l}$

(*b*) $\text{C} = \dfrac{2l}{\pi \eta r^4}$

(*c*) $\text{C} = \dfrac{\pi \eta r^2}{2l}$

(*d*) $\text{C} = \dfrac{\pi \eta r^3}{2l}$

Theory

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

(*i*) What is angular momentum ? Give its S.I. unit and dimensions.

(*ii*) Define gravitational potential and intensity.

(*iii*) Explain :

(*a*) Cohesive forces

(*b*) Adhesive forces.

(*iv*) Explain critical velocity for a liquid.

(*v*) Write the relation for an excess pressure inside a air bubble kept inside the liquid.

(*vi*) Explain *three* types of modulus of elasticity.

(*vii*) Define coefficient of viscosity. State its S.I. unit and dimensions.

P.T.O.

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

   (*i*) State Newton's laws of motion.

   (*ii*) Obtain an expression for period of a torsional pendulum.

   (*iii*) Derive an expression for coefficient of viscosity of a liquid by Poiseuille's method.

   (*iv*) Explain determination of surface tension by Jaeger's method.

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

   (*i*) Obtain expression for excess pressure on a curved surface.

   (*ii*) Explain an experiment for the determination of Young's modulus of a beam supported at both the ends and loaded at the centre.