## R—94—2017

### FACULTY OF SCIENCE
### B.Sc. (First Semester) EXAMINATION
### MARCH/APRIL, 2017
### (CGPA 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) *All* questions are compulsory.

    (ii) First 30 minutes are for Question No. **1** (MCQ) and remaining time for other questions.

    (iii) Figures to the right indicate full marks.

    (iv) Use black ball point pen to darken the circle of correct choice in OMR answer-sheet.

    (v) Negative marking system is applicable for wrong answer of MCQs.

### (MCQs)

1. Attempt *all* Multiple Choice Questions :          10

    (i) As per Kepler's first law of planetory motion planets move round the sun ..............

        (a) In circular orbit     (b) In an elliptical orbit

        (c) Straight orbit     (d) Zigzag orbit

    (ii) As per Newton's law of gravitation force of attraction between any *two* masses $m_1$ and $m_2$ is given by :

        (a) $F = \dfrac{Gm_1m_2}{R^2}$     (b) $F = \dfrac{gm_1m_2}{R^2}$

        (c) $F = \dfrac{GR^2}{m_1 + m_2}$     (d) $F = \dfrac{G(m_1m_2)}{R^2}$

P.T.O.

(*iii*) The relation between intensity of gravitational field (E) and gravitational potential is ..........

    (*a*)    $V = \dfrac{-d\text{E}}{d\text{V}}$            (*b*)    $E = \dfrac{-d\text{V}}{dx}$

    (*c*)    $E = \dfrac{-dx}{d\text{V}}$            (*d*)    $E = \dfrac{-du}{d\text{E}}$

(*iv*) The excess pressure inside the liquid drop is ............

    (*a*)    $p = \dfrac{3\text{T}}{r}$            (*b*)    $p = \dfrac{2\text{T}}{r}$

    (*c*)    $p = \dfrac{6\text{T}}{r}$            (*d*)    $p = \dfrac{r}{2\text{T}}$

(*v*) The dimensional formula for surface tension is ...............

    (*a*)    $[\text{M}'\text{L}'\text{T}']$            (*b*)    $[\text{MLT}]$

    (*c*)    $[\text{M}'\text{L}^0\text{T}^{-2}]$            (*d*)    $[\text{M}'\text{L}'\text{T}^{-1}]$

(*vi*) The property of liquid by virtue of which, it opposes relative motion between its different layers is knwon as ............

    (*a*)    Viscosity            (*b*)    Surface tension

    (*c*)    Diffusion            (*d*)    Elasticity

(*vii*) The critical velocity of liquid is given by the formula ............

    (*a*)    $V_C = \dfrac{k}{\rho.r}$            (*b*)    $V_C = \dfrac{k.\eta}{\rho.r}$

    (*c*)    $V_C = \dfrac{\eta}{\rho}$            (*d*)    $V_C = \dfrac{\rho.k}{r}$

(*viii*) According to deformation of cube the formula for Bulk modulus is :

    (*a*)    $k = \dfrac{1}{2(\alpha - 2\beta)}$            (*b*)    $k = \dfrac{1}{3(\alpha - 2\beta)}$

    (*c*)    $k = \dfrac{1}{3(\beta - 2\alpha)}$            (*d*)    $k = \dfrac{1}{(\alpha - 2\beta)}$

(*ix*)  In torsional pendulum the time period is given by :

(*a*)  $T = 2\pi\sqrt{\dfrac{I}{C}}$  (*b*)  $T = 2\pi\sqrt{IC}$

(*c*)  $T = \pi\left(\sqrt{\dfrac{I}{C}}\right)$  (*d*)  $T = \dfrac{1}{2\pi}\sqrt{\dfrac{I}{C}}$

(*x*)  *y* by bending of beam is given by :

(*a*)  $y = \dfrac{WL^2}{4\,ybd^3}$  (*b*)  $y = \dfrac{WL}{4bd^3}$

(*c*)  $y = \dfrac{WL^3}{4\,ybd^3}$  (*d*)  None of these

## (Theory)

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

(*i*)  Define Kepeler's law of elliptical orbit and law of equal area.

(*ii*)  Define and explain gravitational potential energy.

(*iii*)  Define surface tension and give its C.G.S. unit.

(*iv*)  Explain stream line and turbulent flow.

(*v*)  Explain the term :

(*a*)  Coefficient of viscosity

(*b*)  Critical velocity.

(*vi*)  Define stress and strain.

(*vii*)  Write down the relation connecting three elastic constant.

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

(*i*)  Explain ferguson method to determine the surface tension of liquid.

(*ii*)  Explain bending of beam.

P.T.O.

(*iii*) State and explain the intensity of gravitational field.

(*iv*) Write notes on :

    (*a*) Bernoulli's theorem

    (*b*) Bulk modulus.

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

(*i*) Explain Jaegers method for the determination of surface tension of liquid.

(*ii*) Explain deformation of cube and obtain expression for modulus of rigidity.