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AO—87—2018

FACULTY OF SCIENCE

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

MARCH/APRIL, 2018

(CBCS/CGPA)

PHYSICS

Paper I (PHY-111)

(Mechanics and Properties of Matter)

(MCQ + Theory)

(Monday, 2-4-2018)   **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 MCQ questions.

MCQs   10

1.   Attempt *all* multiple choice questions.

(1)   To every action there is an equal and opposite reaction is called Newton's .... law of motion.

(A)   Third   (B)   First

(C)   Second   (D)   Zeroth

P.T.O.

(2) According to Kepler's second law, the aerial velocity of the planet :

    (A) is directly proportional to velocity

    (B) changes as per time

    (C) remains constant

    (D) is double of aerial velocity

(3) Newton's law of Gravitation is :

    (A) $F \propto \dfrac{m_1 m_2}{r^2}$ (B) $F \propto \dfrac{r^2}{m_1 m_2}$

    (C) $G \propto \dfrac{m_1 m_2}{r^2}$ (D) $G \propto \dfrac{r^2}{m_1 m_2}$

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

    (A) $\dfrac{T}{2r}$ (B) $\dfrac{T}{r}$

    (C) $\dfrac{2T}{r}$ (D) $\dfrac{4T}{r}$

(5) In Ferguson method the surface tension of liquid is calculated by using the formula :

    (A) $T = \dfrac{2}{h r \rho g}$ (B) $T = \dfrac{h r \rho g}{2}$

    (C) $T = \dfrac{r \rho g}{2}$ (D) $T = \dfrac{r \rho g}{2h}$

(6) The critical velocity of liquid is :

    (A) Inversely proportional to radius of tube

    (B) Directly proportional to radius of tube

    (C) Directly proportional to density of liquid

    (D) Inversely proportional to coefficient of viscosity of the liquid

(7) The CGS unit of viscosity is :

(A) erg (B) poise

(C) dyne (D) none of these

(8) The expression for time period of a torsional pendulum is :

(A) $T = 2\pi\sqrt{\dfrac{C}{I}}$ (B) $T = \pi\sqrt{\dfrac{I}{C}}$

(C) $T = 2\pi\sqrt{\dfrac{I}{C}}$ (D) $T = \pi^2\sqrt{\dfrac{I}{C}}$

(9) A beam fixed horizontally at one end and loaded at free end is called :

(A) Torsional pendulum (B) Cantilever

(C) Maxwell needle (D) Static torsion

(10) The ratio of tangential stress to the shearing strain is called :

(A) Bulk modulus (B) Young's modulus

(C) Stress (D) Modulus of rigidity

Theory

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

(*a*) Define elasticity and state three types of stress.

(*b*) Define :

(*i*) Cantilever

(*ii*) Hooke's law.

(*c*) Define :

(*i*) Streamline flow

(*ii*) Viscosity.

(*d*) Define :

(*i*) Molecular range

(*ii*) Sphere of influence.

P.T.O.

(e) Define surface tension and state its S-I unit.

(f) State Newton's first law of motion.

(g) Write the relation connecting three elastic constants.

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

(a) Obtain relation connecting three elastic constants.

(b) Obtain an expression for excess pressure inside a liquid drop.

(c) Explain determination of coefficient of viscosity by Poiseuille's method.

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

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

(a) Obtain an expression for twisting couple on a cylindrical rod or wire.

(b) Describe Ferguson method to find surface tension of a liquid.