

F.Y.B.SC. SEM – I (CBCS - 2016 Course) : WINTER - 2018
SUBJECT: PHYSICS: MECHANICS AND PROPERTIES OF MATTER

Day : Monday
Date : 15/10/2018

Time : 11.00 A.M TO 02.00 PM
Max. Marks: 60.

W-2018-0681

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the **RIGHT** indicate full marks.
- 3) Draw neat labeled diagrams **WHEREVER** necessary.

- Q.1** A) Select the correct alternative options and rewrite the sentence. **(06)**
- 1) If the particle moves under the action of a force such that the total work done during a round trip Journey is equal to -----
(a) one (b) zero (c) constant (d) -2
 - 2) Mass-energy equivalence is given by -----
(a) $E = \frac{1}{2} mc^2$ (b) $E = mc^2$ (c) $E = \frac{1}{2} mv^2$ (d) $E = \text{const}$
 - 3) Angle of contact for concave surface is -----
(a) $\theta > 90^\circ$ (b) $\theta < 90^\circ$ (c) $\theta = 90^\circ$ (d) $\theta = 180^\circ$
 - 4) If the work done by the force on a particle that moves between two points depends on the path followed by a particle between these points, then the force is called as -----
(a) Conservative force (b) Non-conservative
(c) Electrostatic (d) Magnetic
 - 5) The equation of continuity is -----
(a) $\vec{\Delta} \cdot \delta \vec{V} + \frac{\partial \rho}{\partial t} = 0$ (b) $\frac{\vec{\Delta} \cdot \delta \vec{V}}{\partial \rho} = 0$
(c) $\vec{\Delta} \cdot \delta \vec{V} - \frac{\partial \rho}{\partial t} = 0$ (d) $\vec{\Delta} \cdot \delta \vec{V} = dt \cdot \vec{V}$
 - 6) The ratio of volume stress to volume strain is -----
(a) Young's modulus (b) Bulk modulus
(c) Modulus of rigidity (d) elasticity
- B) Answer the following in one sentence. **(06)**
- 1) What is wettability of the substance?
 - 2) Define the term bending of beam.
 - 3) State Young's modulus.
 - 4) Write the statement for work-energy theorem.
 - 5) What is viscosity?
 - 6) State Newton's 3rd law of motion.
- Q.2** Attempt any **THREE** of the following: **(12)**
- a) Explain the work-energy theorem in detail.
 - b) What are the elastic constants? Explain in brief.
 - c) Derive an expression for Bernoulli's theorem.
 - d) State and explain the Kepler's laws of Planetary motion.
 - e)
- Q.3** Attempt any **THREE** of the following: **(12)**
- a) Derive an expression for the work-done by at constant force.
 - b) In the pitat tube experiment the height difference in two vertical tubes is 3 cm. If the diameter of horizontal tube is 2 cm. What is the rate of flow of liquid?
 - c) Write a short note on Reynolds's number?
 - d) What is the bending of beams? Write expression for it.

P.T.O.

- Q.4** Attempt any **THREE** of the following: (12)
- a) Explain the fundamental nature of forces.
 - b) Derive an expression for Torsional oscillation.
 - c) Explain the brief Newton's 1st law of motion.
 - d) State and explain Hooke's law.

- Q.5** Attempt any **TWO** of the following: (12)
- a) Explain the relation between surface tension, excess pressure and curvature.
 - b) Explain the application for surface tension.
 - c) Explain Jaeger's method with suitable diagram.

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