

F.Y.B.Sc. SEM – I (CBCS 2018 COURSE) : SUMMER - 2019

SUBJECT : MECHANICS AND PROPERTIES OF MATTER

Day : Friday
Date : 12/04/2019

Time 03.00 PM TO 06.00 PM
Max. Marks : 60

S-2019-0769

N.B.

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

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- Q 1.** Attempt any **Two** of the following. (12)
- (a) State and prove work-energy theorem.
 - (b) Derive an expression for bending of beam.
 - (c) Explain the elastic constants Young's modulus, bulk modulus and modulus of rigidity.
- Q 2.** Attempt any **Two** of the following. (12)
- (a) Derive an expression for work done during constant force.
 - (b) Describe with diagram the Jaeger's method to determine surface tension of liquid.
 - (c) Explain various types of forces in nature.
- Q 3.** Attempt any **Two** of the following. (12)
- (a) Define Potential energy. State and explain conservation of mechanical energy.
 - (b) Explain the working of venturimeter with diagram.
 - (c) Define the terms stress and strain and explain the Hooke's law with diagram.
- Q 4.** Attempt any **Three** of the following. (12)
- (a) Explain the term angle of contact with diagram.
 - (b) Explain the difference between plasticity and elasticity with diagram.
 - (c) Find the work done in moving particle along a vector $\mathbf{r} = 3\mathbf{i} - \mathbf{j} + 6\mathbf{k}$ meter. If the applied force is $\mathbf{F} = 3\mathbf{i} + 2\mathbf{j} + 2\mathbf{k}$ newton.
 - (d) Derive the relation between surface tension and surface energy.
- Q 5.** Attempt any **Four** of the following. (12)
- (a) Distinguish between inertial & non-inertial frame of reference.
 - (b) Write down the applications of surface tension.
 - (c) Explain the Kepler's laws of planetary motion.
 - (d) A metal wire of 10 m length extends through 1 cm, when a force 45 N is applied to it. What force is required to elongate the wire to 1.2 cm?
 - (e) Explain the streamline flow and turbulent flow.
 - (f) Write the relation between mass of particle and its equivalent energy with the meaning of notations used.

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