

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

SUBJECT : MECHANICS AND PROPERTIES OF MATTER

Day : Friday
Date : 12/10/2018

W-2018-0666

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

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) Describe Poiseuille's experimental set up to determine the coefficient of viscosity.
- (b) Define surface tension. Derive the relation between surface tension and surface energy.
- (c) Explain the Kepler's laws of planetary motion.

Q 2. Attempt any **Two** of the following. (12)

- (a) Explain the terms Young's modulus, bulk modulus and modulus of rigidity.
- (b) Prove that work energy theorem, $w = k_f - k_i$.
- (c) Discuss the working of venturimeter with suitable diagram.

Q 3. Attempt any **Two** of the following. (12)

- (a) Obtain an expression for work done during variable force.
- (b) Explain the Jeager's method & Derive the formula of surface tension.
- (c) Derive an equation for Cantilever.

Q 4. Attempt any **Three** of the following. (12)

- (a) A metal wire of 10 m length extends through 1 cm when a force 40 N is applied to it. What force is required to elongate the wire to 1.4 cm ?
- (b) Explain the different types of forces in nature.
- (c) What factors are affecting the surface tension? Explain.
- (d) Derive an expression for Torsional oscillation.

Q 5. Attempt any **Four** of the following. (12)

- (a) A coolie lifts a load of 30 kg from the platform and puts it on his head 2.0 m. above the surface of platform. Calculate the work done by collie on a load.
- (b) If for a given substance, $Y = 2 \times 10^{11} \text{ N/m}^2$, and $\eta = 4.9 \times 10^{11} \text{ N/m}^2$. Calculate the bulk modulus k .
- (c) Explain the equivalence of mass & energy of the particle.
- (d) State & Explain the Hooke's law.
- (e) Explain the terms streamline flow & turbulent flow of liquid.
- (f) What is pseudo force? Explain.

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