

BACHELOR OF SCIENCE (CBCS-2018 COURSE)
F. Y. B. Sc. Sem-I : WINTER :- 2021
SUBJECT: PHYSICS : MECHANICS & PROPERTIES OF MATTER

Day : Monday
Date 17-01-2022

W-18292-2021

Time : 10:00 AM-01:00 PM
Max. Marks: 60

N.B.

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

Q 1. Attempt any **Two** of the following. **(12)**

- (a) Derive the elastic constants Y , K and η . What is the relation between them?
- (b) Derive the Poiseuille's equation for the rate of flow of a liquid through a capillary tube.
- (c) With neat suitable diagram, Obtain the expression for cantilever.

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

- (a) Obtain an expression for work done during varying force.
- (b) With neat suitable diagram, explain Ferguson's method for determination of surface tension.
- (c) Derive an expression for the mechanical energy.

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

- (a) Obtain an expression for twisting couple per unit twist of a wire by using torsional oscillation.
- (b) Derive an expression for surface tension as surface energy.
- (c) With neat suitable diagram, explain Venturimeter.

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

- (a) Explain the change of plane of motion of a spinning ball.
- (b) Write down the difference between elasticity and plasticity.
- (c) Explain the factors affecting the surface tension.
- (d) Explain the mass energy equivalence.

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

- (a) Write a short note on frame of reference.
- (b) What are the types of forces in nature? Explain.
- (c) Write a short note on capillary action.
- (d) Define stress, strain and Poisson's ratio
- (e) A metal cube having each side equal to 0.2 m undergoes a shearing strain equal to 0.0025, when a force of 5×10^5 N is applied. What is the modulus of rigidity of the cube?
- (f) Write a short note on angle of contact.

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