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B.Sc. I Semester (NEP) Degree Examination, March/April - 2022
PHYSICS (DSC1)
Paper No. 01 - Mechanics and properties of matter

Time : 3 Hours   Maximum Marks : 60

Instruction :   *Answer **all** the Sections.*

SECTION - A

1. Answer the following sub-questions each sub-question carries **one** mark.   **10x1=10**

    (a)   Define Non-Inertial Frame of Reference.

    (b)   What is Fitzerald contraction ?

    (c)   What is Inelastic Collision.

    (d)   Mention one example for Law of Conservation of Energy.

    (e)   Mention S.I unit of moment of Inertia.

    (f)   Define Radius of Gyration.

    (g)   State Hook's Law.

    (h)   Justify why steel is more Elastic than Rubber.

    (i)   Define Terminal Velocity.

    (j)   Define co-efficient of Viscosity of a liquid.

SECTION - B

Answer **any four** of the following questions, each carry **five** marks.   **4x5=20**

2. Show that velocity is variant under Galilian Transformation Equations.

3. Derive the relation between Momentum and Torque.

4. State and prove perpendicular axis theorem.

5. Distinguish between streamline flow and turbulant flow.

6. Derive workdone in Twisting a wire.

7. Give the Necessary Theory of Flywheel.

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SECTION - C

Answer **any three** of the following questions, each question carries **ten** marks.

3x10=30

8.   (a)   Derive Einstein's Energy mass relation.   **7+3**

     (b)   Find the rest energy of an electron in Joule and in eV.

9.   Derive loss of K.E of collision of two particles stick together.   **10**

10. (a)   Deduce expression for moment of inertia of circular disc about an axis passing **7+3**
           through its centre.

     (b)   A flywheel of Mass 500 kg and diameter 2 m takes 600 revolutions per minute.
           Find the moment of inertia of a Flywheel.

11. (a)   Derive relation between Young's modulus, Bulk modulus and Rigidity modulus **7+3**
           of Elasticity.

     (b)   A metalic rod of length 0.5 m, breadth 0.03 m and thickness 3 mm is clamped
           at one end and loaded at other end with 4 kg. Find Young's modulus if it
           depresses through 0.06m and g$=9.8$ m/s^2.

12. Derive expression for co-efficient of viscosity of a Liquid by Poiseuile's method.   **10**

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