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SIS - N 056 B-16

B.Sc. Ist Semester Degree Examination

Physics

(Mechanics and properties of matter)

Paper -I

(New)

Time : 3 Hours   Maximum Marks : 80

Instructions to candidates :

Answer all the questions from **Section-A**,. Answer any Five questions from **Section-B**. Answer any Four from **Section-C**.

Section - A

I.   Answer all questions.   (15×1=15)

1)   Define centre of mass frame of reference.

2)   What is Coriolis force?

3)   What are transformation equations.

4)   Define angular displacement.

5)   What is an elastic collision?

6)   Write the expression for centripetal acceleration.

7)   What is escape velocity?

8)   Define angle of contact.

9)   Define stream line flow?

10)   What is terminal velocity?

11)   What is satellite?

12)   Calculate the linear velocity of a particle moving in circular path of radius 300cm, the angular velocity of the particle is 15 rad/sec.

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13) What is tensile stress?

14) What is meant by elastic limit?

15) Write the relation between three elastic moduli.

Section - B

II. Answer any **Five** of the following questions: (5×5=25)

16) Distinguish between Inertial and Non-Inertial frame of reference.

17) What is angle of banking ? Explain mention the factors on which the angle of banking depends.

18) State the law of conservation of angular momentum and show that it conserved.

19) Write a note on centre of mass.

20) Define surface tension and surface energy. Explain the factors affecting surface tension.

21) Explain the effect of temperature on viscosity of fluids.

22) Mention different types of elastic moduli and Explain them.

Section - C

III. Answer any four questions   (4×10=40)

23) Derive the expression for radial and transverse component of velocity and acceleration.

                    (10)

24) a) Obtain the Galilean transformation equations. When the two frames S & S¹ are moving with uniform relative velocity.

    b) Show that the distance is invariant under Galilean transformations.   (5+5)

25) a) State and prove work - energy principle

    b) Write a note on Nuclear fission and Nuclear fussion.   (4+6)

26) a) Derive an expression for excess pressure inside the liquid drop

    b) Calculate the pressure inside a drop of mercury of radius 2.5×10^{-3}m at room temperature. What is the excess pressure inside the drop, given surface tension of mercury is 4.72×10^{-3} N/m and atm. Pressure 1.01×10^{-5}N/m². (5+5)

27) a) State and prove stoke's law.

    b) Describe the determination of coefficient viscosity by poiseulle's method.(5+5)

28) a) What is torsional pendulum? Obtain the expression for the period of a torsional pendulum.

   b) Calculate the Young's modulus of the material of a wire of 4m long and 1mm radius when the force of 800 Newton increases its length 6mm. **(6+4)**

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