

**First Semester B.Sc. Examination, November/December 2017
(CBCS) (New)**

PHYSICS

Paper – I : Mechanics and Properties of Matter

Time : 3 Hours

Max. Marks : 70

Instruction : Write answers to Section A questions in the **first two** pages only.

SECTION – A

Answer the following :

(15×1=15)

1. What is non-inertial frame of reference ?
2. Define oblique collision.
3. Give the relation between torque and angular velocity.
4. What is centre of mass frame of reference ?
5. Define Moment of inertia. Give its dimensions.
6. What is escape velocity ?
7. What is rotatory frame of reference ?
8. State parallel axes theorem.
9. State Hooke's law.
10. What is bending moment ?
11. What is Poisson's ratio ?
12. What is geostationary satellite ?
13. Define coefficient of viscosity.
14. What is jet propulsion ?
15. What is an simple harmonic oscillator ?

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SECTION – B

Answer **any five** of the following :

(5×5=25)

16. Write a note on centre of mass frame of reference.
17. Obtain an expression for final velocity in case of inelastic collision.
18. Write a note on Single Stage Rocket.
19. State and prove perpendicular axis theorem.
20. Write a note on I – Section girder.
21. Discuss the theory of satellite motion.
22. Define coefficient of viscosity and discuss the effect of temperature on viscosity of liquids.

SECTION – C

Answer **any three** of the following :

(3×10=30)

23. What is Corioli's force. Derive an expression for it and discuss the effects of Corioli's force. (2+6+2=10)
24. a) Discuss the theory of Single Stage Rocket and obtain an expression for its velocity.
b) State and prove the law of conservation of angular momentum in case of a skater. (6+4=10)
25. a) Define moment of inertia and radius of gyration.
b) Obtain an expression for MI of hollow cylinder about its axis.
c) What is the moment of inertia of a rectangular bar of mass 2 kg, length 0.5 m and breadth 0.025 m about an axis passing through its centre and perpendicular to its length. (2+6+2=10)
26. a) Define Moduli of elasticity.
b) Obtain a relation between them. (3+7=10)
27. Deduce Newtons law of gravitation from Kepler's laws of planetary motion. 10