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(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2020-21 ONLY)

SUBJECT CODE 20UPS507

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : DECEMBER – 2022

B.Sc. – PHYSICS **MAXIMUM MARKS: 70**

V SEMESTER **TIME : 3 HOURS**

PART - III
MECHANICS
SECTION - A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.
MULTIPLE CHOICE QUESTIONS. (K1)

1. The path traced by a projectile in space is ……
   (a) orbit (b) trajectory (c) coral (d) track
2. What is the unit of radius of gyration?
   (a) m (b) m^2 (c) m^4 (d) cm
3. A thing moving in space has ……degrees of freedom
   (a) 1 (b) 2 (c) 3 (d) 4
4. Limiting force of friction is the……..
   (a) Tangent of angle between normal reaction and the resultant of normal reaction and limiting friction
   (b) Ratio of limiting friction and normal reaction
   (c) The friction force acting when the body is just about to move
   (d) The friction force acting when the body is in motion
5. As there are three generalised coordinates, then Hamilton's canonical equation will be ------ in number/
   (a) 3 (b) 4 (c) 5 (d) 6

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)

6. Define radius of gyration.
7. What is linear momentum?
8. What is a constrained motion?
9. What is principle of virtual work?
10. Define phase space.

(Contd…2)

SECTION – B (5 X 4 = 20 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K3)

11. a) Derive an expression for the range of a projectile on an inclined plane.

(OR)

b) State the laws of friction.

12. a) Obtain the equation of continuity for an incompressible fluid in streamline flow.

(OR)

b) Define moment of inertia and explain its physical significance.

13. a) Explain the types of constraints with example.

(OR)

b) Discuss the limitations of Newton's law.

14. a) Express D'Alembert's principle in integral form.

(OR)

b) Obtain the Lagrange's equation of motion for a linear harmonic oscillator.

15. a) Discuss the physical significance of Hamiltonian H.

(OR)

b) Write a note on cyclic coordinates.

SECTION – C (4 X 10 = 40 MARKS)

ANSWER ANY FOUR OUT OF SIX QUESTIONS

(16^{th} QUESTION IS COMPULSORY AND ANSWER ANY THREE QUESTIONS

(K4 (Or) K5)

16. State and prove Bernoulli's theorem.

17. Derive an expression for the loss of kinetic energy due to direct impact of two smooth spheres.

18. Derive an expression for the moment of inertia of a fly wheel.

19. Discuss the generalized coordinates.

20. Obtain the Lagrange's equation from Hamilton's principle.

21. Explain the applications of Hamilton's equation for a compound pendulum.

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