FALCON PU COLLEGE

I PUC –PHYSICS

PREPARATORY EXAMINATION

Date: 09-01-2023 **Max Marks: 70**

Duration: 3:15 hrs

General Instructions:-

1. All parts are compulsory.
2. Part – A questions have to be answered in the first two pages of the answer-booklet.
   For Part – A questions, first written-answer will be considered for awarding marks.
3. Answers without relevant diagram / figure / circuit wherever necessary will not carry any marks.
4. Direct answers to the numerical problems without detailed solutions will not carry any marks**.**

PART A

I. Pick the correct option among the four given options for ALL of the following Questions : 15 x 1 = 15

1. Which one of the following is not a unit of time?
   a) Lunar Month b) Leap Year c) Light Year d) Solar Day
2. The numeral value of the ratio of displacement to distance is
   a) Always less than one b) Always equal to one
   c) Always more than one d) Equal to or less than one
3. Two equal vectors have a resultant equal to either of them. The angle between them is
   a) 60^0 b) 90^0 c) 30^0 d) 120^0
4. Passenger standing in a bus are thrown outwards when the nus takes a sudden turn. This happens because of
   a) Outwards pull on them b) Inertia
   c) Change in momentum d) Change in acceleration
5. Vehicles are Streamlined to reduce
   a) Static friction b) Kinetic friction c) Fluid friction d) Sliding friction
6. Work done by the conservative force on a system is equal to
   a) The change in kinetic energy of the system
   b) The change in potential energy of the system
   c) The change in total mechanical energy of the system
   d) None of the above
7. The center of mass of a body is ?
   a) Lies always at the geometric center b) Lies always inside the body
   c) Lies always outside the body d) May lie within or outside the body
8. Kepler's second law is based on
   a) Newton's first law b) Newton's second law
   c) Conservation of energy d) Conservation of angular momentum
9. The breaking stress of a wire depends upon
   a) Length of the wire b) Radius of wire
   c) Material of wire d) Shape of the cross section
10. Surface tension mainly arises due to
    a) Gravitational forces b) Electrostatic force
    c) Cohesive molecular forces d) Adhesive molecular force

11. According to Newton's law of cooling the rate of cooling of a body is proportional to the
    a) Fourth power of the temperature of a body
    b) Temperature of the surrounding
    c) Temperature of the body
    d) Difference of the temperature of the body and the surroundings
12. For an isochoric thermodynamic transformation
    a) $\Delta Q = \Delta W$ b) $\Delta Q = \Delta U$ c) $\Delta U = \Delta W$ d) ΔU = o
13. Molar specific heat at constant volume cv for a monoatomic gas is
    a) $\frac{3}{2}R$ b) $\frac{5}{2}R$ c) $\frac{6}{2}R$ d) $\frac{4}{2}R$
14. Which one of the following quantities is at maximum, when an object in SHM is at its maximum displacement?
    a) Velocity b) Acceleration c) Kinetic energy d) Frequency
15. When a turning fork vibrates waves produced in the stem ate
    a) Constitutional b) transverse
    c) Sometime constitutional sometime transverse d) neither constitutional

II Fill in the blanks. 5 x 1 = 5

16. All _____ digits are significant.

17. 1kwh = _____ Joule

18. The ratio of the lateral strain to the constitutional strain in a stretched wire

is called _____

19. Real gases approach ideal gas behavior at low pressure and _____

20. _____ is a change in the observed frequency of a wave when the source or observes or both moves relative to medium.

PART B

III Answer any FIVE of the following questions. 5 x 2 = 10

21. Name any 2 fundamental forces in nature.

22. Draw the position time graph of an object:

    a) Moving with positive velocity

    b) Moving with negative velocity

23. Define time of flight and maximum height in case of projective motion.

24. What is moment of inertia? Mention its unit.

25. Desire relation between g 4 G

26. Distinguish between streamline and turbulent flow of liquid ?

27. State and explain first law of thermodynamics?

28. What is periodic motion? Give an example.

29. State and explain superposition principle of waves.

. **PART C**

IV Answer any FIVE of the following questions. 5 x 3 = 15

30. Check the correctness of an equation $\frac{1}{2}mv^2$ = mph by the method of dimensions.

31. State and explain triangular law of vector addition.

32. A batsman hits back a ball straight in the direction of bowler without changing its initial Speed of 12m5^1, if the mass of the ball is 0.15 kg. Determine the impulse.

33. Distinguish between elastic collision and inelastic collision.

34. State and explain parallel aris theorem.

35. Define three types of module of elasticity.

36. State and explain Berroull's Principle ?

37. Define (1) Co-efficient of linear expansion

(2) Co- efficient areal expansion

38. Give three assumption of kinetic theory of gases.

PART D

V Answer any THREE of the following questions. 3 x 5 = 15

39. What is v-t graph? Desire s = vat + $\frac{1}{2}$a + 2 by graphical method.

40. State and prove the law of conservation of linear momentum from Newton's third law of motion.

41. Define torque. Show that torque is equal to the rate of change of angular momentum of a particle.

42. Desire an expression for acceleration due to gravity at a point above the surface of the earth.

43. Explain different stages of Carnot's cycle with p-v diagram.

44. Deduce an expression for frequency and time period of oscillation bob of a simple pendulum.

VI Answer any TWO of the following questions. 2 x 5 = 10

45. The ceiling of a long hall is 25m high. What is the maximum horizontal distance that a ball thrown with a speed of 40m5 can go without hitting the ceiling of the hall.

46. A pump on the ground floor of a building pumps water to fill a tank of volume $30m^3$ in 15 minutes. If the tank is 40m above the ground and efficiency of the pump is 30%, how much electrical power is consumed by the pump? (Given g = $9.8\text{m}5^2$ and water = 10^3kg $\text{m}-^3$)

47. A cubical ice box of thermocol has each side 30cm and thickness of 5cm.4kg of ice is put into the box .If outside temperature is 40^0 c and k = 0.01 in SI units, then calculate the mass of ice left after 6 hours. (Given l of ice = 3.35×10^5J kg^{-1})

48. A progressive wave is given by y = 0.5 2π $(\frac{t}{0.02} - \frac{x}{0.5})$ where x and y are in meter and t in second. Find the amplitude, frequency , wavelength and velocity of the wave.