FIRST YEAR HIGHER SECONDARY SECOND TERMINAL EXAMINATION, DECEMBER 2023
Part – III
PHYSICS
Maximum : 60 Scores

Time : 2 Hours
Cool-off Time : 15 Minutes

General Instructions to Candidates :

- *There is a 'Cool off time' of 15 minutes in addition to the writing time.*
- *Use 'cool off time' to get familiar with questions and to plan your answers.*
- *Read questions carefully before answering.*
- *Calculations, figures and graphs should be shown in the answer sheet itself.*
- *Malayalam version of the questions is also provided.*
- *Give equations wherever necessary.*
- *Electronic devices except non programmable calculators are not allowed in the Examination Hall.*

വിദ്യാർത്ഥികൾക്കുള്ള പൊതുനിർദ്ദേശങ്ങൾ:

- നിർദ്ദിഷ്ട സമയത്തിന് പുറമെ 15 മിനിട്ട് 'കൂൾ ഓഫ് ടൈം' ഉണ്ടായിരിക്കും.
- 'കൂൾ ഓഫ് ടൈം' ചോദ്യങ്ങൾ പരിചയപ്പെടാനും ഉത്തരങ്ങൾ ആസൂത്രണം ചെയ്യാനും ഉപയോഗിക്കുക.
- ഉത്തരങ്ങൾ എഴുതുന്നതിന് മുമ്പ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- കണക്ക് കൂട്ടലുകൾ, ചിത്രങ്ങൾ, ഗ്രാഫുകൾ, എന്നിവ ഉത്തരപേപ്പറിൽ തന്നെ ഉണ്ടായിരിക്കണം.
- ചോദ്യങ്ങൾ മലയാളത്തിലും നൽകിയിട്ടുണ്ട്.
- ആവശ്യമുള്ള സ്ഥലത്ത് സമവാക്യങ്ങൾ കൊടുക്കണം.
- പ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരീക്ഷാഹാളിൽ ഉപയോഗിക്കുവാൻ പാടില്ല.

Answer any 5 questions from 1 to 7. Each carries one score.

1. The number of significant figures in 12300 cm is

   a) 5

   b) 4

   c) 3

   d) 2

2. "For a straight line motion distance and displacement are equal". The statement is True/False.

3. For equilibrium of a body the net force is

   a) Zero

   b) Half the applied force

   c) Applied force

   d) Twice the applied force

4. Dimension of power is

   a) MLT^{-1}

   b) MLT^{-2}

   c) $ML^{-1}T^{-2}$

   d) ML^2T^{-3}

5. A rolling body has

   a) Only translational motion

   b) Only rotational motion

   c) Both translational and rotational motion

   d) Precessional motion

6. The excess pressure inside a drop of liquid

    a) Zero

    b) $\dfrac{2S}{r}$

    c) $\dfrac{3S}{r}$

    d) $\dfrac{4S}{r}$

7. During the phase change of a substance, its temperature is _____

Answer any 5 questions from 8 to 14. Each carries 2 scores.   (5×2=10)

**8.** Define acceleration, give its unit and dimension.

9. State triangle law of vector addition.

10. What is momentum, is it a vector or scalar quantity ?

11. Write the expression for kinetic energy and potential energy and mention each terms.

12. Define Newton's law of gravitation.

13. State Hooke's law in elasticity.

14. What is an isothermal process ? Give its equation.

Answer any 6 questions from 15 to 21. Each carries 3 scores.   (6×3=18)

15. What are the uses of dimensional analysis ? Explain.

16. A cricket ball is thrown at a speed of 28 ms^{-1} in a direction 30° from the horizontal. Calculate the maximum height attained by the ball.

17. Define angular velocity and derive the expression connecting linear velocity and angular velocity.

18. State and explain the law of conservation of angular momentum.

19. Draw the stress-strain diagram of an elastic body and mention important points.

20. State the law behind the picture and find F_2.
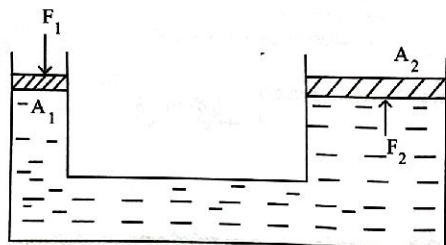
**21.** What is thermal conductivity ? Give its unit and dimension.

Answer any 3 questions from 22 to 25. Each carries 4 scores.

22. a) State Newton's laws of motion. **(2)**

    b) Show that F = ma using the above law. **(2)**

23. a) How will you calculate work ? Explain various kinds of work. **(2)**

    b) State and explain work-energy theorem. **(2)**

24. a) Distinguish between streamline and turbulent flow. **(2)**

    b) Explain equation of continuity. **(2)**

25. a) State and explain first law of thermodynamics. **(2)**

    b) Identify the graph and name the process AB, BC, CD and DA. **(2)**
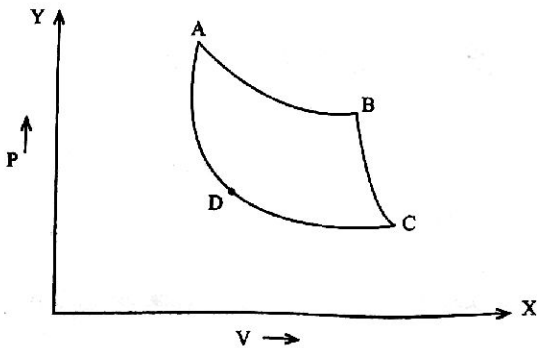
Answer any 3 questions from 26 to 29. Each carries 5 scores.

26. a) Draw V-t graph for uniform acceleration. **(2)**

    b) Derive the relation $s = ut + \frac{1}{2}at^2$ from the above graph. **(3)**

27. a) What is friction ? Explain its different types. **(2)**

    b) Obtain the expression for maximum speed of a car in a circular level road. **(3)**

28. a) Define acceleration due to gravity. **(1)**

    b) Explain the variation of acceleration due to gravity at depth and at height from the surface. **(2+2)**

29. a) Bernoulli's principle is an example of _____ **(1)**

    b) State Bernoulli's principle. **(2)**

    c) State and explain Torricelli's law. **(2)**