Reg. No.: ………………………………………………….

Name: …………………………………………………..

FIRST YEAR HIGHER SECONDARY EXAMINATION SAMPLE QUESTION PAPER

<div align="center">

Part III   **Time: 2 Hours**

PHYSICS   **Cool-off time: 15 Minutes**

Maximum : 60 Scores

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General Instructions to Candidates.

- There is a 'Cool off time' of 15 minutes in addition to the writing time.
- Use the 'Cool of time' to get familiar with questions and to plan your answers
- Read questions carefully before answering.
- Read the instructions carefully.
- 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 പൊതു നിർദ്ദേശങ്ങൾ

- നിർദ്ദിഷ്ട സമയത്തിന് പുറമെ 15 മിനിട്ടു 'കൂൾ ഓഫ് ടൈം' ഉണ്ടായിരിക്കും
- 'കൂൾ ഓഫ് ടൈം' ചോദ്യങ്ങൾ പരിചയപ്പെടാനും ഉത്തരങ്ങൾ ആസൂത്രണം ചെയ്യാനും ഉപയോഗിക്കുക
- ഉത്തരങ്ങൾ എഴുതുന്നതിനു മുമ്പ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം
- നിർദ്ദേശങ്ങൾ മുഴുവനും ശ്രദ്ധാപൂർവ്വം വായിക്കണം
- കണക്കു കൂട്ടലുകൾ, ചിത്രങ്ങൾ , ഗ്രാഫുകൾ എന്നിവ ഉത്തരക്കടലാസിൽ തന്നെ ഉണ്ടായിരിക്കണം
- ചോദ്യങ്ങൾ മലയാളത്തിലും നൽകിയിട്ടുണ്ട്
- ആവശ്യമുള്ള സ്ഥലത്തു സമവാക്യങ്ങൾ കൊടുക്കണം
- പ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരീക്ഷ ഹാളിൽ ഉപയോഗിക്കുവാൻ പാടുള്ളതല്ല

FIRST YEAR HIGHER SECONDARY EXAMINATION
MODEL QUESTION PAPER – PHYSICS

(From Q1 to Q7, answer any 5. Each question carries 1 Score)

1. Pick the odd one out from the following

    a. Impulse

    b. Momentum

    c. Mass

    d. Torque

2. The displacement – time graph of two bodies A and B is given below. Select the correct option

    a. $V_A > V_B$

    b. $V_A = V_B$

    c. $\dfrac{V_B}{V_A} = 1$

    d. $V_B > V_A$
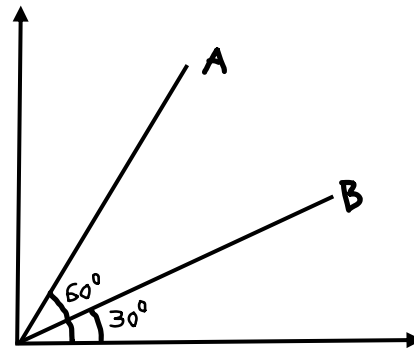
3. The significance of 1st law of motion _____ (Inertia/Momentum)

4. Work done by frictional force is _____ (Positive/Negative)

5. Escape velocity of earth is _____

6. Venturi meter : Bernoulli's Theorem :: Hydraulic lift : _____

7. A student plucks at the center of a stretched string and observes the wave pattern produced. What type of wave is produced in the string.

(From Q8 to Q14, answer any 5. Each question carries 2 Score)

8. State the impulse – momentum principle

9. State and prove work energy theorem for a constant force

10. Obtain the relation between torque and angular momentum

11. State Keplar's law of periods

12. Which is better, washing of cloth in cool water or warm water. Why?

13. A thermodynamic process is one in which the thermodynamic variables P,V and T change.

a. Name the thermodynamic process in which $PV^\gamma = a\ constant$ (1)

b. State and explain 1st law of thermodynamics (1)

14. According to the kinetic theory of gases, gas molecules are always in random motion. State the law of equipartition of energy. (2)

(From Q15 to Q21, answer any 6. Each question carries 3 score)

15. A car travelling at a speed of 72 km/hr is brought to rest in 90 seconds. Find the distance travelled by the car before coming to rest.

16. $\vec{A}$ and $\vec{B}$ are two non-zero vectors originating from a common point with an angle. Derive an equation for the magnitude of the resultant.

17. A body of mass 'm' moving under the influence of gravity. Show that the total mechanical energy of the body is constant throughout the motion.

18. Write the rotational analogue of mass and also state the principle of moments.

19. When a wire is stretched with a very large force, it breaks

a. Represent the variation of extension with load on a graph (1)

b. Discuss the behavior of the wire at various stages. (2)

20. A heat engine is a device which converts heat energy into work. Draw the Carnot cycle and explain its working

21. While conducting a resonance column experiment in laboratory you can hear the maximum sound at a certain height. Show that in a closed pipe at one end, the frequencies of the first three harmonics are in a ratio $v_1 : v_2 : v_3 = 1 : 3 : 5$

(From Q22 to Q25, answer any 3. Each question carries 4 score)

22. The centripetal force experienced by a body depends on the mass of the body (m), its velocity(v) and radius of the path (r).

a. Name and state the principle which helps to find the equation for centripetal force experienced (1)

b. Derive the equation for centripetal force on the basis of dimensional analysis (3)

23. Derive the given kinematic equations of motions for a uniformly accelerated motion

    a. $S = ut + \frac{1}{2}at^2$ (2)

    b. $v^2 - u^2 = 2aS$ (2)

    (S - displacement, u - initial velocity, v - final velocity, a - acceleration)

24. Linear expansion is change in length of an object with temperature.

    a. Write the equation for coefficient of linear expansion (1)

    b. Show that the coefficient of volume expansion is thrice its coefficient of linear expansion (2)

    c. The absolute zero is _____ (0^0C / 0 K) (1)

25. Oscillation of a simple pendulum is an example for simple harmonic motion. Derive an expression for the period of oscillation of a simple pendulum.

(From Q26 to Q29, answer any 3. Each question carries 5 score)

26. A body is projected with an initial velocity Vo making an angle θ with the horizontal

    a. What is the shape of the path followed by the body (1)

    b. Obtain an expression for the horizontal range of a projectile (3)

    c. What is the angle of projection for maximum horizontal range (1)

27. A circular race track of radius 300m is banked at an angle of 15^0. If the coefficient of friction between the wheels of a race car and the road is 0.2,

    a. What is the Optimum speed of the race car to avoid wear and tear on its tires (2)

    b. Derive the maximum permissible speed to avoid slipping (3)

28. The acceleration due to gravity (g) on the surface of earth is $9.8 m/s^2$.

    a. Derive an expression for the variation of 'g' with height 'h' above the surface of earth (3)

    b. At what height above the earth's surface the value of 'g' is same as that in a mine 80 km deep (2)

29. The raise of liquid through fine tubes against gravity is called capillary rise. Derive an expression for the capillary rise.

Prepared by Batch 2 Physics SKMJHSS Kalpetta

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