INDIAN SCHOOL DARSAIT
ANNUAL EXAMINATION
SAMPLE PAPER - PHYSICS (042)

Class: XI
Date:

Max. Marks: 70
Time: 3 hrs

General Instructions:

- *All questions are compulsory.*
- *There is no overall choice. However , Internal choice has been provided in some questions. You are to attempt only one options in such questions.*
- *Questions 1to 5 carry 1 mark each.*
- *Questions 6to 10 carry 2 marks each.*
- *Questions 11to 22 carry 3 marks each.*
- *Questions 23caries 4 marks.*
- *Questions 24to 27 carry 5 Marks.*
- *Use log tables for calculations*.

1. What is the work done by earth's gravitational force in keeping the moon in its orbit in a complete revolution? 1

2. Two astronauts on the surface of moon cannot talk to each other. Why? 1

3. How will the period of a simple pendulum change when its length is doubled? 1

4. A wire is replaced by another wire of same length and material but of twice diameter. What will be the effect on the increase in its length under the given load? 1

5. Find the number of significant figures in the product 4.286 x 0.23 x 32.6 . 1

6. What do you mean by mechanical advantage? What is its significance? 2

7. State Hooke's law. Represent graphically the variation of extension with load in an elastic body. On the graph mark i) Elastic limit (ii) Breaking point. 2

8. Check the following equations are dimensionally correct or not 2
   i)$F.d=1/2mv^2$
   ii)$P=\rho gh$ where the terms have their usual meanings.

9. Read each statement below carefully and state with reasons, if it is true or false: 2
   i) The net acceleration of a particle in circular motion is always along the radius of circle towards the centre.
   ii) The acceleration vector of a particle in uniform circular motion over one cycle is a null vector.

10. Plot the position time graph of two objects moving in the same direction with unequal velocities. 2

or

Draw velocity-time graph for uniformly accelerated motion. Write any two significances of the same.

11. Using law of equipartition of energy, derive the ratio of C_p and C_v for mono atomic and Diatomic gases. 3

12. Find the average frictional force that would stop a car weighing 500kg in a distance of 25m, if its initial speed is 72Km/h. 3

13. i) Explain the wave pattern produced in closed organ pipes. 3
ii) From a radio station, a wave is transmitted with a frequency15 MHz. Calculate its wavelength if its velocity is$3x10^8$m/s.

(or)

i) What is Doppler effect?
ii) Find the velocity of source of sound, when frequency appears to be double the original frequency of stationary listener.

14. Define co-efficient of friction and angle of friction and hence derive a relation between them. 3

15. Prove that the path of a projectile is parabola. 3

16. i)Calculate the work done using the following data. 3
$\vec{F}$= 2i+3j– 6k and $\vec{d}$=3i – xj+6k.
ii) Write any two properties of scalar product.

17. Establish the relation between torque and angular acceleration of a rigid body. Define torque in terms of it. 3

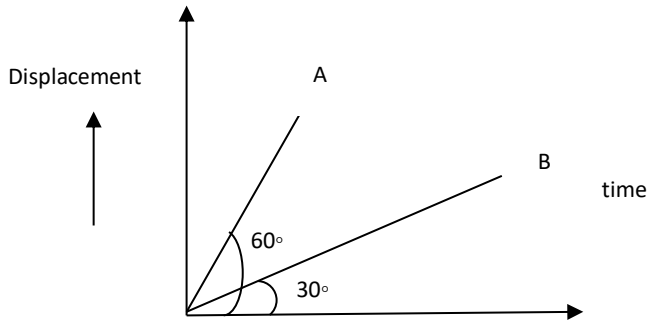
18. State and explain the Keplers' laws of planetary motion. 3

19. i) Differentiate isothermal and adiabatic process. 3
ii)Write the equations of the above processes.
iii)Draw the P-V diagram for isothermal process.

20. Derive an expression for terminal velocity of a solid sphere falling through a viscous medium. 3

21. i) Explain briefly the working of refrigerator with the help of heat flow diagram. 3
ii) What is the coefficient of performance of a refrigerator working between 30^OC and 0^o C?

22. Two straight lines OA and OB on the same displacement- time graph make angles 30◦ and 60◦ with time axis respectively are shown in the figure. 3
    i) Which line represents more velocity?
    ii) What is the ratio of velocities represented by OA and OB?



23. Suraj went to Big Bazaar to purchase certain goods .There he has noticed an old lady struggling with her shopping. Immediately he showed her the lift and explained to her how it carries the load from one floor to the next. Even then the old lady was not convinced.. Then Suraj took her in the lift and showed her how to operate it. That old lady was very happy. 4

(a)What values does Suraj possess?

(b)An elevator can carry a maximum load of 1800 kg is moving up with a constant speed of 2 m/s , The frictional force opposing the motion is 4000 N. Determine the minimum powe delivered by the motor to the elevator .

24. a)State and prove Bernoulli's theorem. 5

b) Water is with a speed of 2m/s in a horizontal pipe with cross-sectional area decreasing from $2x10^{-2}$ m^2 to $0.01m^2$ at pressure $4x10^4$ Pa. what will be the pressure at the smaller cross-section

OR

a)What is capillary rise? Derive an expression for the height to which a liquid rises in a capillary tube of radius 'r'?

b) Water flows through a horizontal pipe of radius 1cm at a speed of 2m/s. What should be the diameter of its nozzle if the water is to come out at a speed of 10m/s?

25. i) What is simple harmonic motion? Prove that total mechanical energy of a harmonic oscillator is independent of time. 5

ii) Draw a graph to show variation of potential energy, kinetic energy and total energy with displacement of an oscillator.

OR

i) Find the expression for time period and frequency in the oscillation of simple pendulum.

ii) The bob of vibrating simple pendulum is made of ice. How will the period of swing change when the ice starts melting?

26. Derive the relation between orbital velocity and escape velocity. Obtain the value of both with respect to earth. 5

OR

i) Deduce the expression for g with height 'H'.

ii) The acceleration due to gravity at the moon surface is $1.67m/s^2$. If the radius of the moon is $1.74x10^6$ m .Calculate the mass of the moon. $G=6.67x10^{-11}$ Nm^2/kg^2.