

COUNCIL OF CBSE AFFILIATED SCHOOL IN THE GULF
GULF SAHODAYA (SAUDI CHAPTER) EXAMINATION - 2008

CLASS – XI

PHYSICS

Time Allowed : 3 hours

Maximum Marks : 70

SET-‘A’

General Instruction:

- (i) All questions are compulsory.
 - (ii) There is no over all choice. However an internal choice has been provided in one question of two marks, one question of three marks, all three questions of five marks.
 - (iii) Question number 1 to 8 marks are very short answer type questions, carrying one mark each.
 - (iv) Question number 9 to 18 short answer type questions, carrying two marks each.
 - (v) Question number 19 to 27 are short type questions, carrying three marks each.
 - (vi) Question number 28 to 30 are long type question, carrying five marks each.
 - (v) Use of calculator is not permitted. However you may use log table if necessary.
1. How many significant figures are there in the following of quantities?
(i) 2.927×10^8 m/s (ii) 0.0006032 m²
 2. Give the magnitude and direction of the net force acting on
(a) a drop of rain falling down with constant speed.
(b) a cork of mass 10g floating on water.
 3. If the string of a rotating stone breaks, in which direction will the stone move?
 4. What is 1 kg-wt? How many Newtons makes 1 kg-wt?
 5. If earth be at one half of its present distance from the sun, how many days will there be in a year?
 6. Is it possible to heat a gas without providing heat energy? How?
 7. How much will the internal energy change in (i) Isothermal process
(ii) Adiabatic process?
 8. Oxygen and hydrogen are at the same temperature T. What is the ratio of kinetic energies of oxygen molecule and hydrogen molecule when oxygen is 16 times heavier than hydrogen?

9. What is law of equipartition of energy. Using this law, show that the molar specific heat of a monoatomic gas at constant volume is $(3/2)R$, where R is gas constant.
10. The density of the material of a cylindrical rod was determined by the formula $d = m/\pi r^2 l$. The percentage errors in m , r and l are 2%, 1.5% and 0.8% respectively. Calculate the maximum possible percentage error in the determination of density.

OR

If Energy, Velocity and Time are fundamental units, what will be the dimension of surface tension?

11. A body covers half of its journey with a speed of 40 m/s and other half with a speed of 60 m/s. what is the average speed during the whole journey.
12. What is impulse? Why is it dangerous to jump on hard surface than on soft surface?
13. Write the expressions of P.E., K.E., and total energy of a body in S.H.M. represented by $x = A \sin(\omega t)$.
14. Prove that the total mechanical energy remains constant for a mass m dropped from a tower of height h .
15. What is an elastic collision? What will happen, when
(i) a heavy body collides elastically on a light mass at rest.
(ii) a light body collides elastically on a heavy mass at rest.
16. What are conservative and non conservative forces? Explain with example.
17. A steel wire of length 4.8 m and cross-sectional area $3.0 \times 10^{-5} \text{ m}^2$ stretches by the same amount as a copper wire of length 3.6 m and cross-sectional area of $4.0 \times 10^{-5} \text{ m}^2$ under a given load. What is the ratio of the Young's modulus of steel to that of copper?
18. What is an ideal gas? Under what conditions do real gases behave like an ideal gas(up to good approximation)?
19. Define a uniform circular motion. For uniform circular motion, show that linear velocity = rw , where r is the radius and w is the angular speed. Justify that this motion is an accelerated motion.
20. State law of conservation of momentum and prove it by using Newton's third law of motion

21. A batsman deflects a ball by an angle of 60° without changing its initial speed which is 54 km/hr. What is the impulse imparted to the ball? Mass of the ball is 0.15 kg. If the ball remains in contact with the ball for 0.1 second then find the force exerted by the bat on the ball in Newton.
22. What is angular momentum of a body? Show that the rate of change of angular momentum of a particle is equal to the torque acting on it.
23. Obtain an expression for kinetic energy of a rolling body in terms of its mass, speed of its centre of mass, radius and radius of gyration.

OR

If the earth shrinks to half of its radius, then what will be the duration of day? Present duration of day is 24 hrs.

24. A body weighs 90 kg-wt. on the surface of earth. How much will it weigh on the surface of a planet whose mass is $1/9$ and radius $1/2$ that of earth?
25. What is capillary rise? Derive an expression for the height to which a liquid rises in a capillary tube of radius r .
26. Write Kelvin-Planck and Clausius statements of second law of thermodynamics. Obtain an expression for the coefficient of performance of a refrigerator.
27. Show that in S.H.M., the acceleration is directly proportional to its displacement at the given instant. Also find the expression for the Time period of a body in S.H.M..
28. Draw velocity-time graph of uniformly accelerated motion. By using this graph deduce all three equations of motion.

A body is thrown vertically upward with a speed 20 m/s from ground. After some time it returned back to the ground. Draw speed-time graph for the whole journey with proper scale.

OR

State parallelogram law of vector addition. Obtain expressions for the magnitude and direction of the resultant of two vectors a and b with θ is angle between them.

Show by diagram only, that $\vec{a} + \vec{b} \neq \vec{a} - \vec{b}$.

29. What is meant by the term coefficient of viscosity? State Stoke's law.

Define terminal velocity and find an expression for the terminal velocity in case of a spherical body falling in a viscous liquid.

OR

Why is the pressure on the concave side of a liquid drop or bubble more than that on its convex side?

Show that $p_i - p_o = 2T/R$, where p_i & p_o are inside and outside pressures of liquid drop, T is the surface tension and R is the radius of the drop

30. What are stationary waves? Obtain expression for the frequency of the fundamental mode of the stationary wave on a stretched string.

A wave pulse is travelling on a string of linear mass density 1.0 g/cm under a Tension of 10 N . Calculate time taken by the pulse to travel a distance of 50cm on the string

OR

Explain Doppler effect in sound. Derive an expression for the apparent frequency when a source is moving towards stationary observer.

A whistling train passed across a stationary person. What is the apparent change in the frequency of the whistle that the person observes, if the actual frequency of the whistle is ν , speed of the train is ν_s and that of sound wave in air is ν .
