

Guess Paper – 2008
Class - XI
Subject - Physics

Time allotted: 3 hours

Maximum marks: 70

General instructions:

1. *All questions are compulsory.*
2. *Section A consists of 10 questions of 1 mark each. Section B consists of 5 questions of 2 marks each. Section C consists of 10 questions of 3 marks each. Section D consists of four questions of 5 marks each.*
3. *Use of calculators is not permitted. However, you may ask for logarithmic tables.*

Section A

1. Why is the handle of screw made wide?
2. What is the average distance of earth from sun?
3. Can a body have constant velocity but varying speed?
4. Is potential energy at surface of earth zero?
5. How is impulse related to linear momentum?
6. Round off 36.789 to four significant figures.
7. Can we get off a frictionless surface by jumping?
8. Can centre of mass of a body coincide with geometrical centre of the body?
9. What is the vertical acceleration of the projectile at its highest point?
10. Find angle between the vectors A and B where $A = i + 2j - k$ and $B = -i + j - 2k$.

Section B

11. Prove work- energy theorem.
12. A constant torque is acting on a wheel. If starting from rest, the wheel makes n rotations in t seconds, show that the angular acceleration is given by $\alpha = \frac{4\pi n}{t^2}$ rad/s.
13. Calculate the centripetal acceleration of a point on the equator of earth due to the rotation of earth about its own axis. Radius of earth = 6400km.
14. The coefficient of friction between the rubber tyres and road is 0.25. Find the maximum speed with which a car can be driven around a curve of radius 39.2m without skidding.

15. The initial and final temperatures of a liquid are measured to be $(67.7 \pm 0.2)^\circ\text{C}$ and $(76.3 \pm 0.3)^\circ\text{C}$. Calculate the rise in temperature.

Section C

16. Prove that Newton's second law is the real law of motion.
17. Two bodies of mass 50kg and 150 kg are tied by a light string and are placed on a frictionless horizontal surface. When 50kg mass is pulled by force F, acceleration of 5m/s^2 is produced in both the bodies. Calculate the value of F. What is the tension in the string 1?
18. A car traveling at 60km/h overtakes another car traveling at 42km/h. assuming each car to be 0.5 m long, find the time taken during the overtake and the total road distance used for the overtake.
19. A ball is dropped vertically from rest at a height of 12m. After striking the ground, it bounces back to a height of 9m. What percentage of K.E. does it lose on striking the ground?
20. A block of mass 2kg rests on a plane inclined at 30° with the horizontal. The coefficient of friction between the block and the surface is 0.7. What will be the frictional force acting on the block?
21. Write the dimensions of a/b in the relation $F = a\sqrt{x} + bt^2$ where F is force, x is distance and t is time.
22. Derive the relation between angular momentum and torque.
23. The distance x of a particle moving in one dimension, under the action of a constant force is related to time t by equation $t = \sqrt{x} + 3$ where x is in metres and t in seconds. Find the displacement of the particle when its velocity is (i) zero (ii) 10m/s.
24. Determine that vector which when added to the resultant of $A = 3i - 5j + 7k$ and $B = 2i + 4j - 3k$ gives unit vector along y- direction.
25. The motor of an engine is rotating about its axis with an angular velocity of 100rpm. It comes to rest in 15s, after being switched off. Assuming constant angular deceleration, calculate the number of revolutions made by it before coming to rest.

Section D

26. If the horizontal range of the projectile be a and the maximum height attained by it is b, then prove that the velocity of projection is $\left(2g \left\{ \frac{b+a^2}{16b} \right\} \right)^{1/2}$
27. Discuss the apparent weight of a man in the elevator/ lift.

28. A particle starts from origin at $t=0$ with a velocity $5\mathbf{i}$ m/s and moves in x-y plane under the action of a force which produces a constant acceleration of $(3\mathbf{i}+2\mathbf{j})$ m/s². What is the y- coordinate of the particle at the instant its x- coordinate is 84m? What is the speed of the particle at this time?
29. Discuss elastic collision in one dimension. Obtain expressions for velocities of the two bodies after such a collision.