SAMPLE PAPER, TERM I EXAMINATION
SESSION 2019-20
CLASS XI
SUBJECT – PHYSICS

TIME: 3 HOURS   **Max Marks : 70**

General Instructions:
a) All the questions are compulsory
b) The Question paper consists of 37 Questions,divided into four sections A,B,Cand D.
c) Section A comprises of 20 questions of 1 mark each.
d) Section B comprises of 7 questions of 2 marks each.
e) Section C comprises of 7 questions of 3 marks each
f) Section D consists of 3 questions of 5 marks each.
g) There is no overall choice.However,an internal choice is given in 2 questions of
section B,2 Questions of section C and 3 questions of section D.

SECTION A

1 marks questions

1. If the error in radius is 3%, what is error in volume of sphere?
   (a) 3 %   (c) 9 %
   (b) 6 %   (d) 27 %

2. A car travels from A to B at a speed of 20km/hr and returns at a speed of 30km/hr. The average speed of the car for whole journey is

(a) 5 km/h   (c) 24 km/h

(b) 25 km/h   (d) 50 km/h

3. A displacement vector is a

(a) change in position   (c) velocity

 (b) scalar   (d) distance without direction.

4. A particle is projected at an angle 45°. The relation between range and maximum height attained by the particle is

(a) R=4H   (c) 4R=H

(b) 2H=R   (d) none of these.

5. When a bull pulls a cart, the force that helps the bull to move forward is the force exerted by
(a) the ground on the bull   (c) the bull on the ground
 (b) the cart on the bull   (d) the ground on the cart

6. Two masses are in the ratio 1:5. What is ratio of their inertia?

(a) 1:5   (b) 5:1   (c) 1:25   (d) 25:1

7. A bread gives a boy of mass 40kg an energy of 21KJ. If the efficiency is 28% then the height can be climbed by him using this energy is
(a) 22.5 m   (c) 15m
(b) 10m   (d) 5m

8. A body of mass 10 kg and velocity 10m/s collides with a stationary body of mass 5kg. After collision both bodies stick to each other, velocity of the bodies after collision will be:

(a) (3/10) m/s   (c) (18/3) m/s

(b) (9/20) m/s   (d) (20/3) m/s

9. Moment of inertia of a disc about an axis which is tangent and parallel to its plane is I, then the moment of inertia of disc about a tangent, but perpendicular to its plane will be

a) $\dfrac{3I}{4}$ (c) $\dfrac{5I}{6}$

(b) $\dfrac{3I}{2}$ (d) $\dfrac{6I}{5}$

10. For increasing the angular velocity of a object by 10%, the kinetic energy has to be increased by

(a)   40%   (c)   20%

(b)   10%   (d)   21%

11. Two particles in an isolated system under go head on collision. What is the acceleration of the centre of mass of the system?

12. Write S.I unit of luminous intensity and temperature?

13.Name the force that provides the centripetal force to a car taking a turn on a level road?

14.Name the force which plays key role in the formation and evolution of stars and galaxies.

15. Suggest a situation in which an object is accelerated and have constant speed.

16. A train is moving on a straight track with acceleration a. A passenger drops a stone. What is the acceleration of stone with respect to passenger?

17. What is the angular velocity of the hour hand of a clock?

18. Calculate the impulse necessary to stop a 1500 kg car moving at a speed of 25m/s.

19. The outer edge of a curved road is generally raised over the inner edge. Why?

20. The momentum of an object is doubled. How does it's. K.E change?

SECTION – B
2 MARKS QUESTIONS

21. Show that the centre of mass of a uniform rod of mass M and length L lies at the middle point of the rod.

22. Two trains each of length 100m are running on parallel track. One overtake the other in 20 sec and one crosses the other in 10 sec. Calculate the speed of each train.

23. Three forces F_1, F_2 and F_3 are acting on the particle of mass m which is stationary. F_2 is perpendicular to F_3, if F_1 is removed, what will be the acceleration of particle?

24. If velocity, time and force were chosen the basic quantities, find the dimensionsof mass?

25. A ball is dropped from the height h_1 and if rebounces to a height h_2. Find the valueof coefficient of restitution?
OR
A body of mass 3kg makes an elastic collision with another body at rest and continues to move in the original direction with a speed equal to one – third of its original speed. Find the mass of the second body.

26.A stone tied to the end of a string 80 cm long is whirled in a horizontal circle with a constant speed. If the stone makes 14 revolutions in 25 seconds, what is the magnitude and directionof acceleration of the stone?

27.A ball is released from the top of a tower of height h metres. It takes T seconds to reach the ground. What is the position of the ball in T/3 seconds?

SECTION – C
3 MARKS QUESTIONS

28. Convert:
  (i) Gravitational constant (G) = 6.67 x 10^{-11} Nm^2 kg^{-2} to cm^3 g^{-1} s^{-2} (ii) The escape velocity v of a body depends on the acceleration due to gravity 'g' of the planet and the radius R of the planet. Establish dimensionally the relation for the escape velocity.

29. (i) If the momentum of the body increases by 20% what will be the increase in the K.E. of the body?
  (ii) A particle moves along the x – axis from x = 0 to x = 5m under influence of force given by F= 7 – 2x + $3x^2$. Calculate the work done in doing so.

30. A person travelling eastward with a speed of 3 km/h finds that the wind seems to blow from north. On doubling his speed, the wind appears to flow from north-east. Find the magnitude of the actual velocity of the wind.
OR
  Two vectors A and B are inclined to each other at an angle using triangle law of vector addition, find the magnitude and direction of their resultant.

31. (i) Four particles of mass 1kg, 2kg, 3kg and 4kg are placed at the four vertices A, B, C and D respectively of square of side 1m. Find the position of centre of mass of the particle.

(ii) What is the position of centre of mass of a rectangular lamina?

32.(a) State which of the following are dimensionally correct
        (i) Pressure = Energy per unit volume
        (ii) Pressure = Momentum x volume x time
  (b) The density of cylindrical rod was measured by the formula:-P = $4m/\Pi d^2 l$.
        The percentage in m, D and l are 1%, 1.5% and 0.5%. Calculate the % error in the calculated value of density?

33.A body of mass 2kg initially at rest moves under the action of an applied force of 7Non a table with coefficient of kinetic friction = 0.1. Calculate the
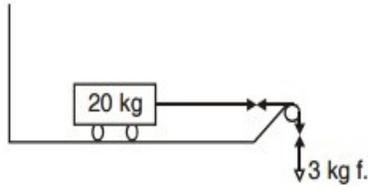 (i) Work done by the applied force in 10s
  (ii) Work done by the friction in 10s
  (iii) Work done by the net force on the body in 10s.

34. What is the acceleration of the block and trolly system as in fig., if the coefficient of kinetic friction between the trolly and the surface is 0.04?Also calculate tension in the string.
Take g = 10 ms^{-2}, mass of string is negligible.

20 kg

↓3 kg f.

SECTION – D
5 MARKS QUESTIONS

35. (i) Derive the relation for the potential energy stored in a spring when it is elongated by X. Draw the graphs to show the variation of P.E. and distance X with elongation.

(ii) What are conservative and non-conservative forces? Explain using examples.

OR

(i) For an object projected upward with a velocity Vo, which comes back to the same point after some time, draw velocity- time graph.

(ii) A ball is thrown upward with an initial velocity of 100 m/s. After how much time will it

return? Draw velocity-time graph for the ball.

36. (a) A projectile is fired at an angle θ with horizontal with a velocity u. Obtain an expression
for its trajectory and velocity at any instant.

(b)A bullet fired at an angle of 30° with the horizontal hits the ground 3 km away. By adjusting the angle of projection, can one hope to hit the target 5 km away? Assume that the muzzle speed to be fixed and neglect air resistance.

OR

(i)   Derive the relation
$S_{nth} = u + \dfrac{[a(2n-1)]}{2}$ where Snth = distance travelled in nth second
a = Uniform acceleration
u = Initial speed

(ii) For a body moving with uniform acceleration, the distance travelled in the 7th and 5th second are in the ratio 13 : 9. Find the initial velocity.

37. Obtain an expression for minimum velocity of projection of a body at the lowest point for looping a vertical loop.

OR

Define the principle of conservation of linear momentum. Deduce the law of conservation of linear momentum from Newton's third law of motion.