DR. M.K.K ARYA MODEL SCHOOL, MODEL TOWN, PANIPAT

MID- TERM EXAMINATION, SEPTEMBER-2021

Class – 11 **Time: 40 minutes**

Subject- Physics **MM: 20**

PART-A

1. If the percentage error in a, b, c, d is given by 2%, 4%, 1%, 3% respectively and $Z = a^2b/cd$, then percentage error in Z is given by-
   a. 21% b. 20 % c. 10 % d. 12 %
2. If the % error in the measurement of a side of the cube is 2%, then percentage errors respectively in its volume and area are
   a. 6%, 4% b. 4%, 6.5% c. 3%, 2% d. 9%, 2%

3. A particle starts from rest and has an acceleration of $2ms^{-2}$ for 10 s. After that it travels for 30 s with constant speed and then undergoes a retardation of $4ms^{-2}$ and comes back to rest. The total distance covered by the particle is:
   a. 650 m b. 700 m c. 750 m d. 800 m

4. A particle covers 150 m in 8th second when starts from rest, its acceleration is
   a. 5 m s^{-2} b. 10 m s^{-2} c. 15 m s^{-2} d. 20 m s^{-2}

5. An object is moving on a circular path with constant speed on a circular path, then which of the following statement is false.
   (a) It is an accelerated motion (b) Velocity of the object is constant
   (c) Velocity of the object changes (d) None of the above

6. The relation between linear velocity and angular velocity is:
   a. $v = \omega r$ b. $\omega = vr$ c. $v = \omega/r$ d. $\omega = v^2/r$
7. Which force is responsible for the circular path of an object
   (a) Friction force (b) mechanical force (c) centripetal force (d) gravitational force
8. The maximum safe speed of a vehicle on a horizontal curve road is independent of
   (a) Mass of vehicle (b) Coefficient of friction between road surface and tyre of vehicle
   (c) Radius of curve (d) Acceleration due to gravity
9. The ratio of angular speed of second hand to that of the minute hand of a clock is
   (a) 60:1 (b) 1:60 (c) 1:1 (d) 1:6

10. When a disc rotates with uniform angular velocity, which of thefollowing is not true?
    (a)The sense of rotation remains same.
    (b)The orientation of the axis of rotation remains same.
    (c)The speed of rotation is non-zero and remains same.
    (d)The angular acceleration is non-zero and remains same

11. Two bodies of unequal masses have same linear momentum, which body have greater kinetic energy ?
    (a) heavy body (b) light body (c) same for both (d) none of these

12. For which of the following does the centre of mass lie outside thebody ?
    (a) A pencil (b)A shotput (c)A dice (d)A bangle
13. A machine has an efficiency of 50%. If input of machine is 1.5 kW, then its output is:
    a. 1500 W b. 1000W c. 750 W d. 250 W

14. The force constant of a spring is k. And that of another springs of the same material is 2 k. If both the springs are stretched through the same distance, then ratio between the works done by the springs is
(a) 1 : 1 (b) 2 : 1 (c) 1 : 2 (d) 1 : 4

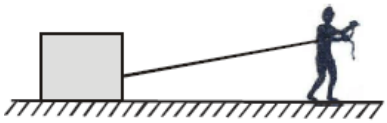
15. A body whose mass is 12g has a velocity **v = (2i + 5j)** m/s at a certain instant. Its kinetic energy is:
a. 1.75J b. 2.75 J c. 3.75 J d. 4.75 J

Select the most appropriate answer from the options given below:
(i) Both A and R are true and R is the correct explanation of A
(ii) Both A and R are true but R is not the correct explanation of A.
(iii)A is true but R is false.
(iv) A is false and R is also false.
(v) A is false but R is true.

16. **Assertion**: Horizontal range is same for angle of projection □□and (90 – □).
Reason: Horizontal range is independent of angle of projection

17. **Assertion**: A person walking on a horizontal road with a load on his head does no work.
Reason: No work is said to be done, if directions of force and displacement of load are perpendicular to each other.

18. **Assertion**: A bullet is fired from a rifle. If the rifle recoils freely, the kinetic energy of rifle is more than that of the bullet.
Reason: In the case of rifle bullet system the law of conservation of momentum violates.
19. **Assertion:** A man and a block rest on smooth horizontal surface. The man holds a rope which is connected to block. The man cannot move on the horizontal surface.



Reason: A man standing at rest on smooth horizontal surface cannot start walking due to absence of friction (The man is only in contact with floor as shown).

20. **Assertion:** There is a stage when frictional force is not needed at all to provide the necessary centripetal force on a banked road.
Reason: On a banked road, due to its inclination the vehicle tends to remain inwards without any chances of skidding.

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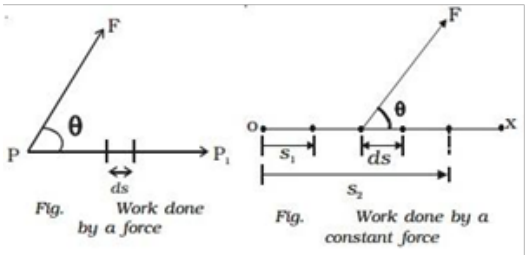
MID- TERM EXAMINATION, SEPTEMBER-2021

Class – 11 **Time: 40 minutes**

Subject- Physics **MM: 15**

PART-B

CASE STUDY



Read the following paragraph and answers the questions:

In everyday life, the term work is used to refer to any form of activity that requires the exertion of mental or muscular efforts. In physics, work is said to be done by a force or against the direction of the force, when the point of application of the force moves towards or against the direction of the force. If no displacement takes place, no work is said to be done.

21. A box is pushed through 4.0 m across a floor offering 100 N resistance. How much work is done by the applied force?
    a. 100J b. 200 J c. 300 J d. 400 J
22. What is work done in holding a 15 kg suitcase while waiting for 15 minutes?
    a. 22.5 J b. 225 J c. zero d. 150 J
23. Frictional forces are:
    a. conservative forces b. non- conservative forces c. buoyant force d. none of these
24. When the body moves in circular motion, net 'work' done is:
    a. positive b.Negative c. zero d. none of these

****

25. Give example of a motion where x> 0, v < 0, a> 0 at a particular instant. (1)

    OR

    Draw the position- time graph for (a) uniform motion. (b) uniformly accelerated motion

26. A ball is dropped from a building of height 45 m. Simultaneously another ball is thrown up with a speed 40 m/s. Calculate the relative speed of the balls as a function of time. (2)

    OR

    A door is hinged at one end and is free to rotate about a vertical axis. Does its weight cause any torque about this axis? Give reason for your answer

27. If **A** =2 and **B** =4,then match therelations in column I with the angle between **A** and **B** in column II. (2)

Column I	Column II
(a) **A.B** = 0	(i) $\theta = 0$
(b) **A.B** = +8	(ii) $\theta = 90°$
(c) **A.B** = 4	(iii) $\theta = 180°$
(d) **A.B** = –8	(iv) $\theta = 60°$

OR

The vector sum of a system of non-collinear forces acting on a rigidbody is given to be non-zero. If the vector sum of all the torques dueto the system of forces about a certain point is found to be zero,does this mean that it is necessarily zero about any arbitrary point.

28. (A) A ball is thrown at an angle of 45° w.r.t the horizontal. It hits the ground a few seconds later. At what point during its motion, does the ball have greatest speed and greatest acceleration? (1)

(B) Derive the expression of maximum height and horizontal range for a projectile thrown with initial speed 'u' and at an angle θ w.r.t horizontal (2)

OR

Derive the following equations of motion for a uniformly accelerated motion graphically:

(a) Distance – time relation

(b) Velocity- displacement relation

29. There are three forces F1, F2 and F3 acting on a body, all acting on a point P on the body. The body is found to move with uniform speed.

(a) Show that the forces are coplanar.

(b) Show that the torque acting on the body about any point due to these three forces is zero. (3)

OR

(A) Why are mountain roads generally made winding upwards rather than going straight up? (1)

(B) A block placed on a rough horizontal surface is pulled by a horizontal force F. Let f be the force applied by the rough surface on the block. Plot a graph of f versus F. (1)

(C) A person of mass 50 kg stands on a weighing scale on a lift. If the lift is descending with a downward acceleration of 9 m s^{-2}, what would be the reading of the weighing scale? (g = 10 m s^{-2}) (1)

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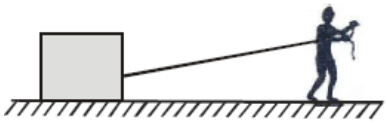

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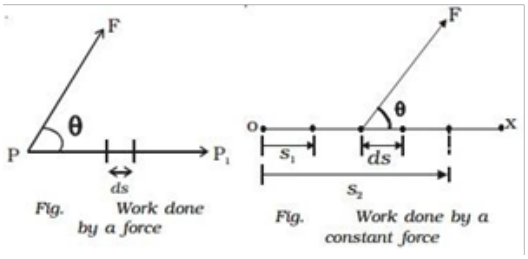

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