

CLASS – XI(SECTION-A)

- The force that appears between elementary particles in a nuclear process is:  
(a) Gravitational force (b) Weak nuclear force  
(c) Electromagnetic force (d) Strong nuclear force
- Find the sum of masses 436.32 g, 227.2 g and 0.301 g in correct significant figures.  
(a) 663.821 g (b) 663.82 g  
(c) 663.8 g (d) 663g
- Out of the following, which is not a vector quantity?  
(a) Pressure (b) Linear momentum  
(c) Force (d) Torque
- A gravitational force acts between two objects placed some distance apart. If the distance between them is reduced to half, then the new force will become:  
(a) two times (b) four times  
(c) one-half (d) one-fourth
- A coolie moves 10 m on a straight horizontal road with a load of 80 kg on his head. The work done by the gravitational force is:  
(a) positive (b) negative  
(c) zero (d) none of the above
- The dimensional formula of  $\omega$  in the relation  $x = A \sin \omega t$  is:  
(a)  $[M^{\circ}L^{\circ}T]$  (b)  $[M^{\circ}L^{\circ}T^{-1}]$   
(c)  $[M^{\circ}LT^{-1}]$  (d)  $[M^{\circ}LT]$
- The number of significant in  $0.006302 \text{ m}^2$  is :  
(a) 3 (b) 4 (c) 6 (d) 7
- A physical quantity P is related to four observables a, b, c and d as follows:  
(a) 10% (b) 13% (c) 5% (d) 6%
- A bullet of mass 0.04 kg moving with a speed of 90 m/s enters a heavy wooden block and is stopped after a distance of 60 cm. What is the average



16. A man weights 63 N on the surface of earth. What is the gravitational force on it due to the earth at a height equal to half the radius of the earth?  
(a) 56 N      (b) 42 N      (c) 28 N      (d) 14 N
17. The displacement of particle moving in straight line is given by  $x = 2t^2 + 2t + 5$ , where  $x$  is expressed in meters and  $t$  in seconds. The acceleration at  $t = 2s$  is :  
(a)  $4 \text{ m/s}^2$                       (b)  $8 \text{ m/s}^2$   
(c)  $10 \text{ m/s}^2$                       (d)  $12 \text{ m/s}^2$
18. Two bodies have their moments of inertia 1 and 41 respectively about their axis of rotation. If their kinetic energies of rotation are equal, their angular velocities will be in the ratio:  
(a) 1:2      (b) 1:4      (c) 2:1      (d) 4:1

**(Section-B)**

19. A car travels first half of the distance two places with a speed of 40 km/h And the remaining half with a speed of 60 km/h. The average speed of the car is:  
(a) 50 km/h                      (b) 48 km/h  
(c) 45 km/h                      (d) 55 km/h
20. A flywheel of mass 1000 kg and radius 1 m is rotating at the rate of 420 rpm. The wheel stops in 14 revolutions, find the angular acceleration, assuming mass to be concentrated at the rim of the wheel.  
(a)  $11 \text{ rad/s}^2$                       (b)  $22 \text{ rad/s}^2$   
(c)  $-11 \text{ rad/s}^2$                       (d)  $-22 \text{ rad/s}^2$
21. If a constant torque of 500 Nm turns a wheel of moment of inertia  $100 \text{ kg m}^2$  about an axis through its centre, find the gain in angular velocity in 3 s.  
(a) 15 rad/s                      (b) 30 rad/s  
(c) 10 rad/s                      (d) 45 rad/s
22. The escape velocity from earth is about 11.2 km/s. The escape velocity for another planet, whose mass is 1000 times that of the earth and diameter is 10 times that of the earth, will be:

- (a) 1.12 km/s  
(c) 112 km/s

- (b) 11.2 km/s  
(d) 1120 km/s

23. The radii of circular orbits of two satellites A and B of the earth are  $4R$  and  $R$ , respectively. If the speed of satellite A is  $v$ , then the speed of satellite B will be:  
(a)  $v$             (b)  $2v$             (c)  $v/2$             (d)  $\sqrt{2}v$
24. In a ballistic demonstration a police officer fires a bullet of mass 50 g with speed 200 m/s on soft plywood of thickness 2 cm. The bullet emerges with only 10% of its initial kinetic energy, what is the emergent kinetic energy of the bullet from the plywood?  
(a) 100 J            (b) 1000 J  
(c) 2000 J            (d) 200 J
25. The square of resultant of two forces equal in magnitude is three times the product of their magnitudes. The angle between the force is:  
(a)  $180^\circ$             (b)  $90^\circ$   
(c)  $45^\circ$             (d)  $60^\circ$
26. Two bullets are fired simultaneously, horizontally and with different speeds from the same height. Which bullet will hit the ground first?  
(a) The faster one  
(b) The slower one  
(c) Depends on their masses  
(d) Both will reach simultaneously
27. Calculate the impulse necessary to stop a 1000kg car travelling at 90 km/h.  
(a) 250000 Ns            (b) 90000 Ns  
(c) -25000 Ns            (d) -90000 Ns
28. **Assertion (A):** If the ice on the polar caps of the earth melts, then length of the day will increase.  
**Reason (R):** Moment of inertia of the earth increases, as ice on polar caps melts.
29. **Assertion (A):** An astronaut experiences weightlessness in a space satellite.  
**Reason (R):** When a body falls freely, it does not experience gravity.

30. **Assertion (A):** When a ball collides elastically with a floor, it rebounds with the same speed as with which it strikes.  
**Reason (R):** Kinetic energy of the system remains conserved in elastic collision.
31. Find the scalar product of two vectors,  $a = (3\hat{i} - 4\hat{j} + 5\hat{k})$  and  $b = (-2\hat{i} + \hat{j} - 3\hat{k})$ .  
(a) 25      (b) 25      (c) -25      (d) -18
32. If the radii of circular paths of two particles of equal masses are in the ratio 1:2, then to have a constant centripetal force, their velocities should be in the ratio:  
(a) 2:1      (b)  $\sqrt{2}:1$       (c) 1:2      (d)  $1:\sqrt{2}$

**(Case Study)**

33. If  $x$  is the kinetic energy before collision and  $y$  be the kinetic energy after collision then in inelastic collision:  
(a)  $x > y$       (b)  $x < y$       (c)  $x = y$       (d) none of the above
34. In elastic collision:  
(a) Total kinetic energy is conserved  
(b) Total linear momentum is conserved  
(c) Total energy is conserved  
(d) All of the above
35. In inelastic collision:  
(a) Total kinetic energy is conserved  
(b) Total linear momentum is conserved  
(c) Total energy is conserved  
(d) Both total energy and total linear momentum are conserved

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