**MODEL QUESTION PAPER**
**CLASS XI**
**SEMESTER III**

**F.M.=30**

**General Instructions:**

1. **All questions are compulsory**
2. **Each question carries 1 mark**
3. **There are four options for each question. You are to select only one option as answer.**

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**1.** The dimensional formula of impulse is same as the dimensions of;

(a) Momentum
(b) Force
(c) Acceleration
(d) torque

**Ans: (a)**

**2.** The radius of a thin wire measured by a certain instrument is 0.16 mm. The area of cross section in $mm^2$ in correct significant figures is;

**(a)** 0.080384
**(b)** 0.08
**(c)** 0.080
**(d)** 0.0804

**Ans: (c)**

**3.** In a vernier callipers, one main scale division is 'x' cm and 'n' divisions of vernier scale coincide with (n-1) main scale division. The least count (in cm) of the instrument is;

**(a)** $\left(\frac{n-1}{n}\right)x$
**(b)** $\frac{nx}{n-1}$
**(c)** $\frac{x}{n}$
**(d)** $\frac{x}{n-1}$

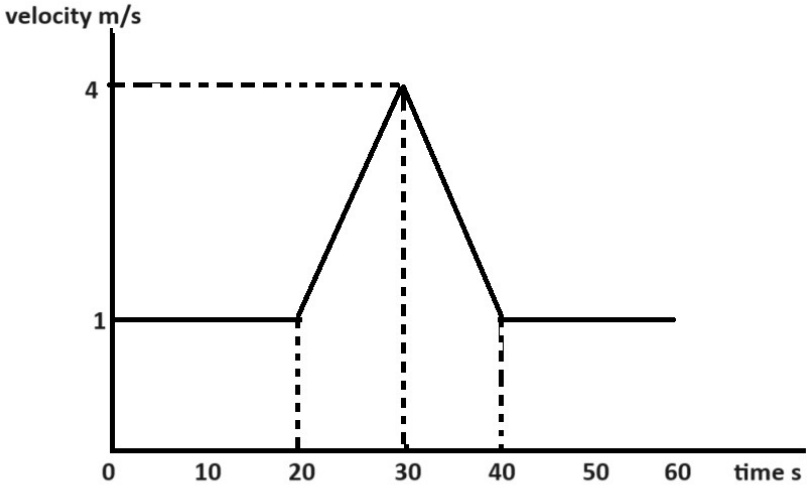
**Ans: (c)**

**4.** The percentage errors in the measurement of length and time period of a simple pendulum are 1% and 2% respectively. The maximum error in the value of acceleration due to gravity is;

**(a)** 3%
**(b)** 5%
**(c)** 6%
**(d)** 8%

**Ans: (b)**

**5.** The velocity - time graph for a moving object is shown below. The displacement of the object during the time for which the acceleration is non-zero is;




**(a)** 60 m
**(b)** 50 m
**(c)** 40 m
**(d)** 30 m

**Ans: (b)**

**6.** If $\left|\vec{a}+\vec{b}\right| = \left|\vec{a}-\vec{b}\right|$ the angle between vectors $\vec{a}$ and $\vec{b}$ is;

**(a)** $0^o$
**(b)** $90^o$
**(c)** $180^o$
**(d)** $45^o$

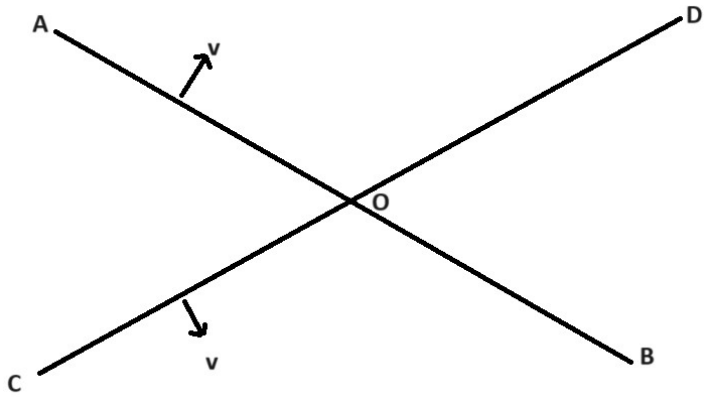
**Ans: (b)**

**7.** If a stone is released from a balloon rising with acceleration 'a' at the instant when its velocity is 'v', then immediately after release the acceleration and velocity of the stone are respectively;

**(a)** a (upward), v (upward)
**(b)** g (upward), v (upward)
**(c)** g (downward), v (upward)
**(d)** g-a (downward), v (upward)

**Ans: (c)**

**8.** If two lines AB and CD intersect at O at an inclination α. If they move out parallel to themselves with speed 'v', the speed of O is;




**(a)** v
**(b)** 2v
**(c)** v cosα
**(d)** v cosec(α/2)

**Ans: (d)**

**9.** A body released from a certain height above the ground falls through a height 'h' in the first 't second. In the next second it falls through a distance;

**(a)** g
**(b)** g/2
**(c)** $\sqrt{2gh} + g$
**(d)** $\sqrt{2gh} + \frac{g}{2}$

**Ans: (d)**

**10.** When the speed of a car is 'v', the minimum distance over which the car can be stopped is 's'. If the speed becomes 'nv', the minimum distance over which it can be stopped would be;

**(a)** s/n
**(b)** ns
**(c)** $s/n^2$
**(d)** $n^2s$

**Ans: (d)**

**11.** If the retardation produced by air resistance to the particle is $1/10^{th}$ of acceleration due to gravity, the time to return from the maximum height

**(a)** Increases by 9%
**(b)** Decreases by 9%
**(c)** Increases by 11%
**(d)** Decreases by 11%

**Ans: (c)**

**12.** Two vectors $\vec{A}$ and $\vec{B}$ are such that $\vec{A} + \vec{B} = \vec{C}$ and $A^2 + B^2 = C^2$. Then the angle between $\vec{A}$ and $\vec{B}$ is;

**(a)** $0^o$
**(b)** $60^o$
**(c)** $90^o$
**(d)** $120^o$

**Ans: (b)**

**13.** The component of vector $2\hat{\imath} + 3\hat{\jmath}$ along the direction of $\hat{\imath} + \hat{\jmath}$ is;

**(a)** $\frac{1}{5}(\hat{\imath} + \hat{\jmath})$

**(b)** $\frac{2}{5}(\hat{\imath} + \hat{\jmath})$

**(c)** $\frac{5}{2}(\hat{\imath} + \hat{\jmath})$

**(d)** $\frac{5}{2}(2\hat{\imath} + 3\hat{\jmath})$

**Ans: (c)**

**14.** A smooth inclined plane of angle $30^0$ is placed on the floor of a train compartment moving with constant acceleration 'a'. When a block is placed on the inclined plane, it does not slide up or down. The acceleration 'a' is;

**(a)** g

**(b)** $\frac{g}{2}$

**(c)** $\frac{g}{\sqrt{2}}$

**(d)** $\frac{g}{\sqrt{3}}$

**Ans: (d)**

**15.** When forces $F_1$, $F_2$ and $F_3$ are acting on a particle of mass 'm' such that $F_2$ and $F_3$ are mutually perpendicular then the particle remains stationary. If $F_1$ is removed, the acceleration would be;

**(a)** $\frac{F_1}{m}$

**(b)** $\frac{F_2F_3}{mF_1}$

**(c)** $\frac{F_2-F_3}{m}$

**(d)** $\frac{F_2}{m}$

**Ans: (a)**

**16.** A car and a truck collide on the road. The car suffers extensive damage while the truck suffers little damage. This is because;

**(a)** The truck applies a greater force on the car due to its large size.

**(b)** The car applies a greater force on the truck since it is capable of moving faster.

**(c)** Forces on both are equal but the car having less mass suffers greater retardation.

**(d)** The car is not built to withstand collisions

**Ans: (c)**

**17.** A block of mass M is pulled along a sooth horizontal surface by a rope of mass 'm'. Force F is applied at one extremity of the rope. The force exerted by the rope on the block is;

**(a)** $\mathrm{F(M + m)}$

**(b)** $\mathrm{F(M - m)}$

**(c)** $\frac{FM}{M-m}$

**(d)** $\frac{FM}{M+m}$

**Ans: (c)**

**18.** If the normal reaction force is doubled, the coefficient of friction would;

**(a)** Be Halved

**(b)** Be Doubled

**(c)** Be Tripled

**(d)** Remain same

**Ans: (d)**

**19.** A constant force acts on a body of mass 'm' that is initially at rest. If it acquires a velocity 'v' in moving a specific distance, then 'v' and 'm' are related as;

**(a)** $v \propto \frac{1}{\sqrt{m}}$

**(b)** $v \propto \frac{1}{m}$

**(c)** $v \propto m$

**(d)** $v \propto \sqrt{m}$

**Ans: (a)**

**20.** A car accelerates on a horizontal road due to the force exerted by;

**(a)** Road on the car

**(b)** Car on the road

**(c)** Engine of the car

**(d)** Air on the engine

**Ans: (a)**

**21.** A weight W is at rest on a horizontal plane. The angle of friction is θ. The minimum force required to displace the body along the horizontal plane would be;

**(a)** Wsinθ

**(b)** Wcosθ

**(c)** Wcotθ

**(d)** Wtanθ

**Ans: (d)**

**22.** A bag of sand of mass M is suspended by a rope. A bullet of mass 'm' travelling at speed 'v' gets embedded in it. The loss in kinetic energy is;

**(a)** $\frac{Mmv}{(M+m)}$

**(b)** $\frac{M+m}{Mmv}$

**(c)** $\frac{Mmv^2}{2(M+m)}$

**(d)** $\frac{2(M+m)}{Mv^2}$

**Ans: (c)**

**23.** A body is moved along a straight line using a machine delivering constant power. The distance moved by the body in time 't' depends on;

**(a)** $(mt)^{4/3}$

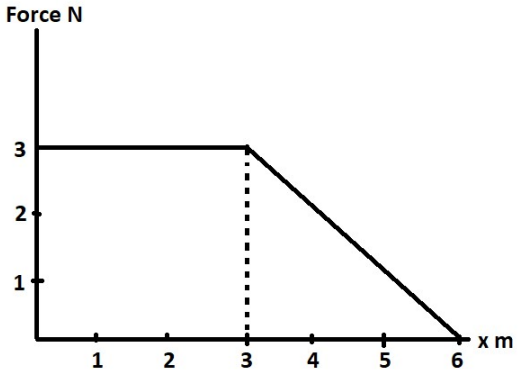
**(b)** $(mt)^{3/4}$

**(c)** $t^{2/3}m^{1/3}$

**(d)** $t^{3/2}m^{-1/2}$

**Ans: (d)**

**24.** A force acting on an object varies with distance x as shown in the figure. The force is in N and x is in m. The work done by the force in moving the object from x=0 m to x=6 m is




**(a)** 18 J
**(b)** 13.5 J
**(c)** 9 J
**(d)** 4.5 J

**Ans: (b)**

**25.** A heavy vehicle and a light vehicle posses equal kinetic energy. They are brought to rest by equal retarding force. The one that comes to rest in a shorter distance is;

**(a)** Heavy vehicle
**(b)** Light vehicle
**(c)** Neither
**(d)** Data insufficient to conclude

**Ans: (c)**

**26.** Two bodies posses equal linear momentum. Their masses are $m_1$ and $m_2$ while their kinetic energies are $E_1$ and $E_2$ respectively. The ratio $E_1$:$E_2$ is;

**(a)** $m_1 : m_2$
**(b)** $m_2 : m_1$
**(c)** $m_1^2 : m_2^2$
**(d)** $m_2^2 : m_1^2$

**Ans: (b)**

**27.** A ball is dropped down with an initial velocity *u* from a height of 10 m. It loses 50% of its kinetic energy after striking the ground. It rises through the same height after collision. The value of '*u*' is;

**(a)** 42 m/s
**(b)** 28 m/s
**(c)** 14 m/s
**(d)** 7 m/s

**Ans: (c)**

**28.** A particle executes SHM with an amplitude 'a'. The period of oscillation is 'T'. The minimum time taken by the particle to travel half the amplitude from equilibrium position is;

**(a)** $\frac{T}{4}$
**(b)** $\frac{T}{8}$

**(c)** $\frac{T}{12}$

**(d)** $\frac{T}{2}$

**Ans: (c)**

**29.** When two displacements represented by $y_1 = a\,sin\omega t$ and $y_2 = b\,cos\omega t$ are superposed, the motion is;

**(a)** Simple harmonic with amplitude a/b

**(b)** Simple harmonic with amplitude $\sqrt{a^2 + b^2}$

**(c)** Simple harmonic with amplitude $\frac{a+b}{2}$

**(d)** not simple harmonic

**Ans: (b)**

**30.** A particle is executing SHM along a straight line. Its velocity at distances $x_1$ and $x_2$ from the mean position are $v_1$ and $v_2$ respectively. Its time period is;

**(a)** $2\pi\sqrt{\frac{x_2^2-x_1^2}{v_1^2-v_2^2}}$

**(b)** $2\pi\sqrt{\frac{v_1^2+v_2^2}{x_1^2+x_2^2}}$

**(c)** $2\pi\sqrt{\frac{v_1^2-v_2^2}{x_1^2-x_2^2}}$

**(d)** $2\pi\sqrt{\frac{x_2^2+x_1^2}{v_1^2+v_2^2}}$

**Ans: (a)**