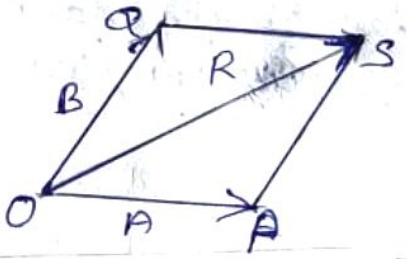
FIRST YEAR HIGHER SECONDARY EXAMINATION (Sep-2021)

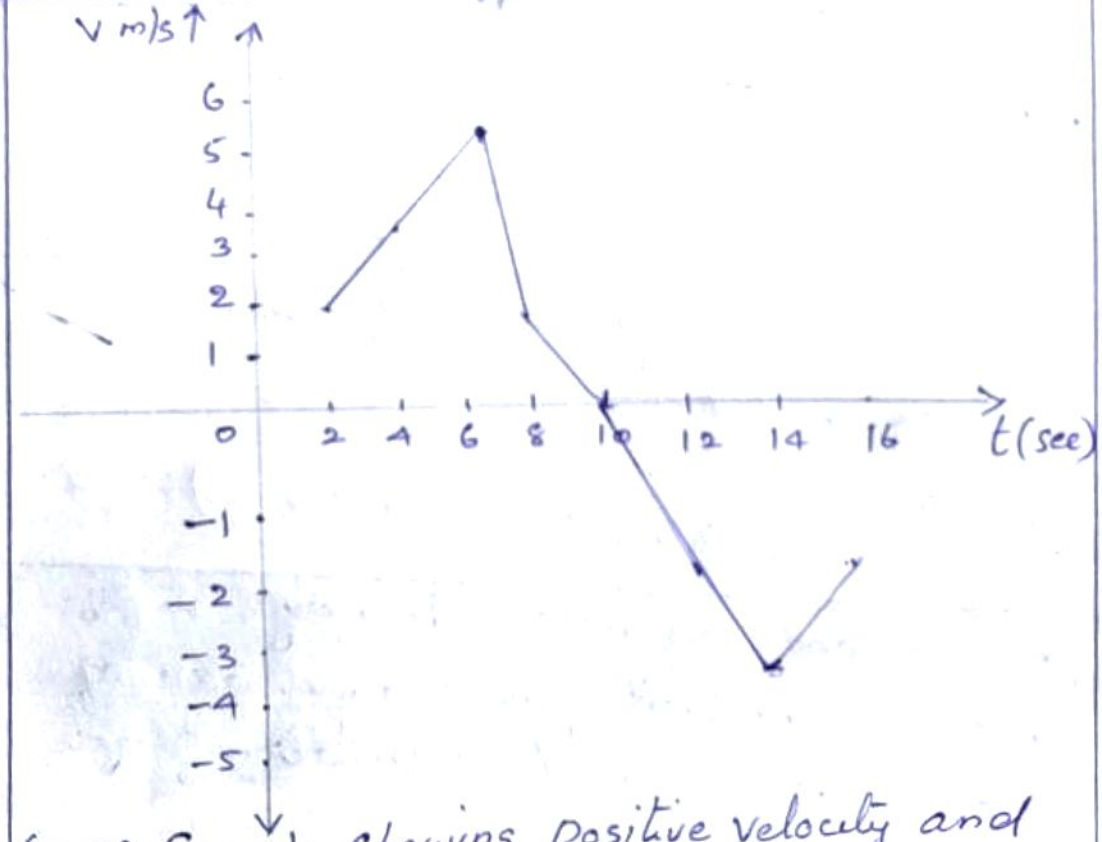
SUBJECT : PHYSICS

Code No: FY.224

GO SCORES

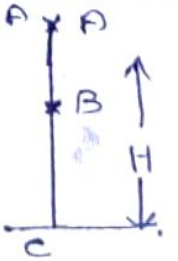
Qn No.	Sub Qn No.	Answer key / Value points	Score	Total Score
1		Gravitational force		1
2		Astronamy / Astro physics		1
3		Vector		1
4		Moment of inertia		1
5		$PV = MRT$ / $PV = nRT$ / $PV = RT$		1
		(OR) Any two correct answer give (3) score		
		(OR) Any one correct answer give (1½) score		
6		It is the ratio of length of arc to the radius		2
		(OR) $\theta = \frac{\text{Arc}}{\text{Radius}}$ / correct figure give (2) score		
		(OR) unit of angle (radian) give (1) score		
7	a	$V = 0$	1	2
	b	$a = 9.8$ / $a = -9.8$ / $a = g$ / $a = -g$	1	
		(OR) Any one correct (a) or (b) give (2) score		
8				2
		(OR) Vector sum $R = \sqrt{A^2 + B^2 + 2AB\cos\theta}$ give (2) score		
		OR $\vec{R} = \vec{A} + \vec{B}$ (Direction of R not necessary give (2) score)		

Qn no	Sub Q: no	Answer key / value points	Score	Total Score
9		Two vectors are said to be equal if they have same magnitude and same direction (OR) fig: of two equal vectors give (2) Score		2
10	a	negative	1	2
	b	zero	1	
		(OR) If any one part is correct give (2) Score		
11		Joule / kgm^2s^{-2} / kwh / Nm ML^2T^{-2} (OR) Any other unit of energy / dimensional formula give (2) Score (Any one part correct give (2) score)	1 1	2
12		statement / equation ($F = \frac{Gm_1m_2}{r^2}$ / $F \propto \frac{m_1m_2}{r^2}$)		2
13		statement / Stress $\propto$ strain / $\frac{\text{Stress}}{\text{Strain}}$ = Const		2
14		A - Proportionality limit B - elastic limit (or) Yield Point (OR) Any one A (or) B Correct give (2) Score	1 1	2
15		Statement (or) Equation of first law of thermodynamics ($\Delta Q = \Delta U + \Delta W$) / $\Delta W = P\Delta V$ (OR) Statement of law of conservation of Energy give (2) score (OR) Law of Conservation of Energy give (1) score		2

Q No	Sub Q:No	Answer key / Value points	Score	Total score
16		Isochoric process – Constant volume / workdone = 0 Iso baric process - Constant pressure / $W = P\Delta V$ (OR) Definition of any one process give (2) score	1 1	2
17		Kilogram, time, ampere, kelvin amount of substance, luminous intensity	½ mark each	3
18		 (OR) Graph showing positive velocity and negative velocity give (2) Score (OR) Velocity and time marked in any axis give (2) Score (OR) Graph showing only x and y axis give One Score (OR) Any related attempt give (3) Score (difficulty level of question is very high)		3

Q.NO	Sub Q.NO	Answer key / Value points	Score	Total Score
19		Statement of Newtons Second law	2	3
		$F = ma$ / $F = \frac{dP}{dt}$	1	
		(OR) statement (or) equation give (2) Score		
20		Statement / $F_s \propto N$ / $F_s = \mu_s N$ / $F_s \leq \mu_s N$		3
		OR		
		Maximum static friction is independent of Area of Contact give (2) Score		
		(OR) Definition of friction / static friction give (1) Score		
21		Definition (or) any correct equation of angular velocity	2	3
		$V = r\omega$	1	
		(OR) Any one correct answer give (2) score		
22		M.I depends on mass of the body, its size, Shape, distribution of mass about axis of rotation, position and orientation of axis of rotation		3
		(OR) Any two factors give (3) Score		
		OR $I = mR^2$ / $I = mk^2$ give (2) score		
23		Correct derivation $\left[g' = g\left(1 - \frac{2h}{R}\right)\right]$		3
		$g = \frac{Gm}{R^2}$ – 1 score , $g' = \frac{Gm}{(R+h)^2}$ ... 1 score		
		$\frac{g'}{g} = \frac{R^2}{(R+h)^2}$ ... 1 score		
		(OR) Final equation only (2) score		
		(OR) Fig only give (1) Score		

Qn no.	Sub Qn no	Answer key / Value points	Score	max score
24		Correct derivation (OR) $P=\frac{1}{3}nm\bar{v}^2$ give one score Average K.E $=\frac{3}{2}k_BT$ only equation give (2) score. (OR) Any one correct equation give (2) score		3
25		Derivation of max: height $H=\frac{V_0^2\sin^2\theta}{2g}$	2	4
		Derivation of Horizontal Range $R=\frac{V_0^2\sin 2\theta}{g}$	2	
		(OR) Derivation of one correct equation give (3) score (OR) Final equation only (1) Score each		
26		$\omega=\frac{2\pi}{T}$ (or) $\omega=2\pi\nu$	1½	4
		$a=r\omega^2$ (or) $a=\frac{v^2}{r}$	1½	
		$\omega=\frac{88}{25}$ rad/s or 3.52 rad/s	½	
		$a=9.91\ m/s^2$	½	
		(OR) Final answer only give (1) score (unit not necessary) (OR) If one part alone is correct (ω or a) give (3) score (OR) Direction of centripetal acceleration is towards the centre of circle give 1 score		

Qn no	Sub Qn no	Answerkey / Value Points	Score	max Score
27		Correct Any one difference between elastic and inelastic Collision	1	4.
		Correct derivation of expression for loss in K.E	3	
		(OR). Definition of elastic Collision (1½) Score Definition of inelastic Collision 1½ Score (OR) Any one definition alone is Correct give (2) score (OR) $m_1u_1 + 0 = (m_1+m_2)V$ ... (1) Score. $V = \frac{m_1u_1}{m_1+m_2}$ ... (1) Score Loss of K.E = $\frac{1}{2}m_1u_1^2 - \frac{1}{2}(m_1+m_2)V^2$ --- 1 Score $= \frac{1}{2}\frac{m_1m_2u_1^2}{m_1+m_2}$ --- (1) Score.		
28		Calculation of total Energy at any two positions OR: Calculation of total energy at any one position give (2) Score OR Statement of law of Conservation of energy give (1) Score Figure only give (1) Score 		4

Qn no	Sub Qn no	Answer key / Value points	Score	Total Score
29		Energy = Pxt / $P = \frac{w}{t}$	2	4
		Substitution and result (3.6×10^6 J)	2	
		OR		
		Any ~~related~~ attempt give (4) score.		
30		Correct derivation		4
		OR		
		escape velocity definition and final equation give (3) mark.		
		OR.		
		escape velocity = 11.2 give (1) mark		
		(OR)		
		final equation only ($V_e = \sqrt{2gR}$) give (2) mark.		
31		Statement of Pascal's law	2	
		Explanation of working of hydraulic lift	1	4
		figure	1	
32		For correct derivation		4
		(OR.) statement alone - (2) Score		
		Proof - (2) Score		
		final equation alone - (2) Score		
		Statement and final equation - (3) Score		
		(OR) Correct derivation with out statement give (4) Score		

Qn	Sub qn.	Answer key / value points	Score	Total Score
33	a	Latent heat for a solid - liquid state change is latent heat of fusion	1½	4
		Latent heat for liquid - gas state is called latent heat of vaporisation	1½	
	b.	Heat content of water vapour is more than that of same amount of boiling water	1	
		(OR) Any one part correct a (or) b give (3) Score. OR. Definition of Latent heat alone give (2) Score (OR) Any one Explanation Latent heat of fusion / Latent heat of vaporisation Correct give (2) marks		
34		Derivation $T = 2\pi\sqrt{l/g}$ OR Derivation of T by dimensional method give (4) Score (OR) Final equation only (2) Score OR fig only 1½ Score. fig and final equation (3) Score		4

Qn no	Sub Qn No.	Answer key / Value points	Score	Total
35	a	Amplitude = 5mm / .005m	1	4
	b	wavelength λ = 7.85cm / 0.078m	1	
	c	2.09 sec and 0.48 Hz	2.	
		(OR) Give (2) score to c if period / frequency correct (OR) Any two correct sections a, b, (or) c give (4) score (OR) Standard equation only give (1) score ($y = A\sin kx - \omega t$)		
36	a	Physical quantities on both sides of Physical relation must be same (or) Dimensionally similar quantities can be added (or) Subtracted from each other	2	5
	b	$T = k r^x m^y G^z$ $x = \frac{3}{2}$ $y = \frac{1}{2}$, $z = -\frac{1}{2}$ $T = k r^{3/2} m^{1/2} G^{-1/2}$	1 1 1	
		(OR) For (b) part any related attempt give (3) score		

Qn no	Sub Qn no	Answer key / Value points	Score	Total
37		Correct derivations (Any method) (OR) Any one relation $x = v_0t + \frac{1}{2}at^2$ (or) $v^2 = u_0^2 + 2ax$ give (5) score (OR) Calculation of area under velocity-time graph give (3) score (OR) Area under velocity-time graph gives displacement give (2) score		5
38	a	A- Normal reacting force B- Centripetal force ($f\cos\theta + N\sin\theta$)	2	5
	b	$V = \sqrt{\mu_s rg}$ / $V = \sqrt{rg\tan\theta}$	1	
		Substitution and answer $V = 1.71$ m/s	2	
		(OR) Final answer (1.71 m/s) only give (1) score (OR) A (or) B Correct give (2) score (OR) Any one part a (or) b correct give (4) score		
39		Statement of Perpendicular axes theorem / Equation $I_x = I_y + I_z$ (OR) Derivation alone give (3) score (OR) Final equation only ($I_d = \frac{mR^2}{4}$) give (2) score (OR) Statements and final equation only give (4) score	3	

Qn no	Sub Qn no	Answerkey / Value points	Score	Total
40	a	Unit - Nm^2kg^2	1	
		Dimension - $M^{-1}L^3T^{-2}$	1	5
	b	Correct derivation $g = \frac{GM}{R^2}$ – 1 score $g' = \frac{GM'}{(R-h)^2}$ – 1 score $g_d = g(1-d/R)$ – 1 score.	3	
		(OR) Only correct answer of a part give (3) score (OR) Final equation only give (2) score (OR) only b-part is correct then give (5) score If 5 score is given to b then equ (1) – 1½ mark equ (2) – 1½ mark Final equation – 2 mark. (OR) fig only give (1) score		

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