

ANSWER KEY

Code No

FY-424

FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2023

PART-III/III

SUBJECT : PHYSICS60 SCORES2 HOURS

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
1		IV. 10^{-10} m. or any option. Score - 1	1	5
2.		MASS	1	
3.		True	1	
4.		Centre of mass.	1	
5		Fusion / Freezing / Solidification.	1	
6.		Temperature.	1	
7		Frequency / wave length.	1	
8.		initial velocity, $u = u$. acceleration, $a = -g$ $v = 0$ $v = u + at$ $0 = u - gt$ $t = \frac{u}{g}$. OR $t = \frac{u \sin \theta}{g} / v = u + at$ — (1 Score)	1 1	2
9		The magnitude of vector is zero and has an arbitrary direction Any two properties / magnitude is zero — (2 Score)	1 1	2

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
10	a) b)	<p>Conservative force.</p>	1 1	2
11		<p>1. Mass of the body 2. Size and shape 3. Distribution of Mass about the axis of Rotation 4. position and orientation. (Score $\frac{1}{2} \times 4 = 2$)</p> <p>OR</p> $I = MR^2 / I = MK^2 \quad (1 \text{ score})$	2	2
12	a. b.	<p>ii). $t_1 = t_2$</p> <p>statement</p> <p>OR</p> <p>LAW OF AREA / Kepler's 2nd LAW. (1 score)</p>	1 1	2
13	a. b.	<p>Surface tension / To minimise Surface area.</p> <p>Surface Tension</p> <p>OR</p> <p>A OR B Correct (2 marks)</p>	1 1	2
14	a. b.	<p>Conduction</p> <p>Convection.</p> <p>OR RADIATION - (1 score)</p>	1 1	2
15.	a. b.	<p>At the maximum height of a body projected vertically upward</p> <p>OR Any correct example / SHM (1 score)</p> <p>proof OR Graph only - 1 any relevant method - 2</p>	1 2	3

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16	a. b.	Law of Conservation of momentum. Derivation or mass of the gun more/mass of the bullet/Less/ equation score - (2)	1 2	3
17	a. b. c.	Young's Modulus OR Any Explanation about elasticity (score-1) for a given stress, strain is less Compressibility = $\frac{1}{\text{Bulk modulus}} = \frac{1}{2 \times 10^9} = 0.5 \times 10^{-9}$	1 1 1	3
18	a. b.	YES explanation OR equation of continuity/Bernoulli's principle / Area increases pressure decreases. score (1) Definition. OR $\eta = \text{stress} / \text{strain rate}$ $\eta = \frac{F}{6\pi\eta r v}$ (Score - 1)	1 1 1	3
19.	a. b.	Statement OR equation (score-1) Derivation OR $W = \int p dv / p v = n R T$ / Final equation only (score - 1)	1 2	3

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
20.	a.	Statement. or $E = \frac{1}{2} k_B T$ - (score -1)	1	3
	b.	Hydrogen $V_{rms} \propto \frac{1}{\sqrt{m}}$ or Hydrogen (score -1)	1	
	c.	Explanation. or. Correct equation / $KE \propto T$ (score -1)	1	
21	a.	Derivation or equation only / Fig. only score -1 Any method. score (2)	2	3
	b.	No / Explanation	1	
22.	a.	Definition or $[LHS] = [RHS]$ (score -1)	1	4
	b.	Correct Derivation or Dimension of M, v, g, h ($\frac{1}{2}$ score each) Dimensionally correct (score 1)	2	
	c.	i. 5 (score $\frac{1}{2}$) ii. 5 (score $\frac{1}{2}$)	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
23	a.	Diagram and marking.	2	4
	b.	<p>----- derivation</p> <p>or</p> <p>Derivation $V_{max} = \sqrt{\frac{Rg(\mu + \tan\theta)}{1 - \mu \tan\theta}}$</p> <p>$\mu = 0$ Score $(1\frac{1}{2})$</p> <p>$V_{max} = \sqrt{Rg \tan\theta}$ Score $\frac{1}{2}$</p>	2	
24	a	<p>$P = \sqrt{2mE}$ $m_L > m_e$ so $P_L > P_e$</p> <p>or</p> <p>Lorry (score - 1)</p>	1	4
	b	<p>Proof</p> <p>or</p> <p>Statement / Final equation (score 1)</p>	3	
25	a.i)	<p>Standing wave Definition</p> <p>or</p> <p>Figure only (score 1)</p>	1	4
	ii)	<p>Derivation</p> <p>or</p> <p>Figure of two mode (score 2)</p> <p>/ both equation</p>	2	
	b.	Antinode / Node	1	
26	a.	<p>Parabola.</p> <p>or</p> <p>Figure Score - 1</p>	1	
	b.	Derivation	2	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
	C.	$H = \frac{R}{2}$ $H = \frac{u^2 \sin^2 \theta}{2g}$ $H_{\max} = \frac{u^2}{2g} = \frac{1}{2} \frac{u^2}{g} = \frac{1}{2} R$ <p>OR equation of H / Equation of R (Score -1) (each)</p>	1 1	5
27	a.	Statement or equation (score =1)	1	5
	b.	$L = l\omega$ i. out stretching I increases, ω decreases. ii. folding I decreases, ω increases. OR $L = l\omega$ (score - 1)	1 1	
	c.	Derivation or Final answer (score 1)	2	
28	a.	iv. 11 km/s	1	5
	b.	Derivation or Final equation only (1 score) $V = \sqrt{2gR} / V = \sqrt{\frac{2gM}{R}}$ score (1)	3	
	c.	r.m.s velocity of gas molecules > escape velocity from moon.	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
29	a.	i). Acute	1	5
	b.	Derivation or Diagram only (1 score) /final equation	3	
	c.	$h \propto \frac{1}{r}$ or $h = \frac{2s \cos \theta}{r \rho g}$ (score 1)	1	
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