

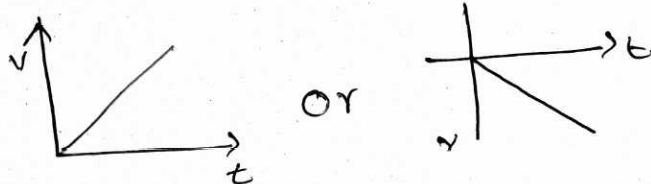
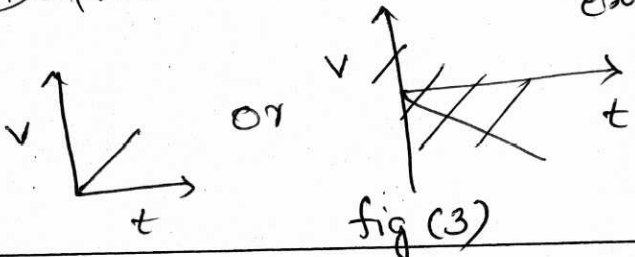
PHYSICS

FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2018

SUBJECT: PHYSICS FIRST YEAR

CODE. NO: 115

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
1		b) Thermodynamics.	1	1
2		statement of II axes theorem / eqn.	1	1
3		b Intensity of gravitational field has same dimensions as that of acceleration.	1	1
4		Kinetic	1	1
5		2 s	1	1
6		Velocity - time graph	1	2
		Derivation of $x = v_0 t + \frac{1}{2} a t^2$	1	
7	a	$E = \frac{1}{2} m (v \cos \theta)^2$ or $E = \frac{1}{2} m v^2 (\frac{1}{2})$ $v = u \cos \theta (\frac{1}{2})$	1	2
	b	$E = \frac{1}{2} \times 0.2 \times (20 \times \cos 40) ^2$ $= 23.47 \text{ J}$ or (Answer only $\frac{1}{2}$)	1	
8	a	0	4 x $\frac{1}{2}$	2
	b	-ve / 0		
	c	+ve		
	d	+ve		

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
9	a	$-\frac{GMm}{R} + \frac{1}{2}mv^2 = 0$ $v = \sqrt{\frac{2GM}{R}}$ <p>or any correct derivation (2) eqn only (1)</p>	1	2
10	a	Yield point or elastic limit	1	2
	b	Few apart / close	1	
11		$v = \frac{2}{9\eta} a^2 (\rho - \sigma) g$ <p>substitution Ans only (1/2)</p>	1	2
12	a		1	3
	b	Definition or correct explanation	1	
	c		1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
13	a	ii) The momentum acquired by the gun and shot have the same magnitude	1	3
	b	$V = \frac{mv}{M}$ $V = \frac{mv}{M} = \frac{0.02 \times 80}{100} = 0.016 \text{ m/s}$ <p>or</p> <p>eqn & sub</p> <p>∴ answer only (1/2)</p>	1	
14.	a	Derivation $g_d = g \left(1 - \frac{d}{R}\right)$	2	3
	b	<p>At surface $d=0$ $g_d = g$</p> <p>or</p> <p>At Centre $d=R$ $g_d = 0$</p>	1	

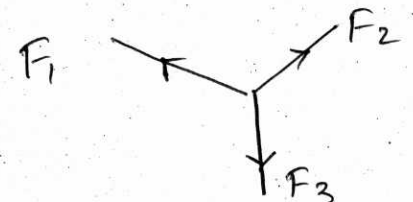
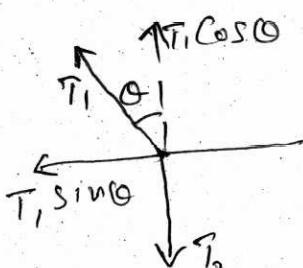
Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
15	a	Hydraulic lift	1	
	b	$P = F/A = \frac{3000 \times 9.8}{425 \times 10^{-4}}$ $= 691 \times 10^5 \text{ N m}^{-2}$ <p>OR</p> <p>eqn only (1)</p> <p>substitution (1)</p> <p>OR</p> $F_1/A_1 = F_2/A_2 \quad (1)$	1	3
16	16	<p>derivation $P = \frac{1}{3} \rho m \bar{v}^2$</p> <p>eqn or fig only (1)</p> <p>OR</p> <p>change in momentum = $2mV_x$</p> <p>Force - (1) L (1)</p> <p>Pressure - (1)</p>	3	3
17	17	<p>Heat lost by water</p> $= 0.3 \times 4186 \times 43.3 = 54376 \text{ J}$ <p>heat absorbed by ice to melt</p> $= 0.15 L_f$	1	
			1	

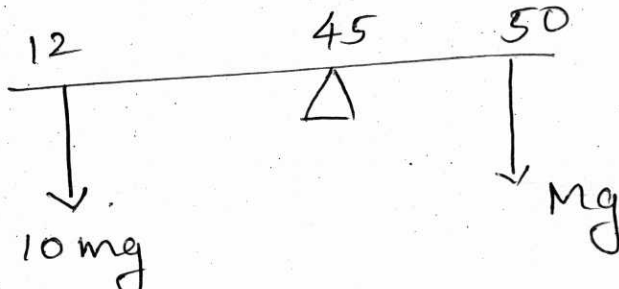
Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
		Heat absorbed by water $Q_{\text{room ice}} = 0.15 \times 4186 \times 6.7$ $= 4207 \text{ J}$	$\frac{1}{2}$	3
		$54376 = 4207 + 0.15 L_f$ $L_f = 3.34 \times 10^5 \text{ J/kg}$ OR heat lost = heat gained (i) $\text{heat lost} = m c \Delta T \text{ --- (i)}$ $\therefore H = mL \text{ --- (i)}$	$\frac{1}{2}$	
18	a	True / False.	1	
	b	$\frac{\Delta P}{P} \times 100\% = 3 \frac{\Delta a}{a} \times 100\% +$ $2 \frac{\Delta b}{b} \times 100\% +$ $\frac{1}{2} \frac{\Delta c}{c} \times 100\% +$ $\frac{\Delta d}{d} \times 100\%$	2	

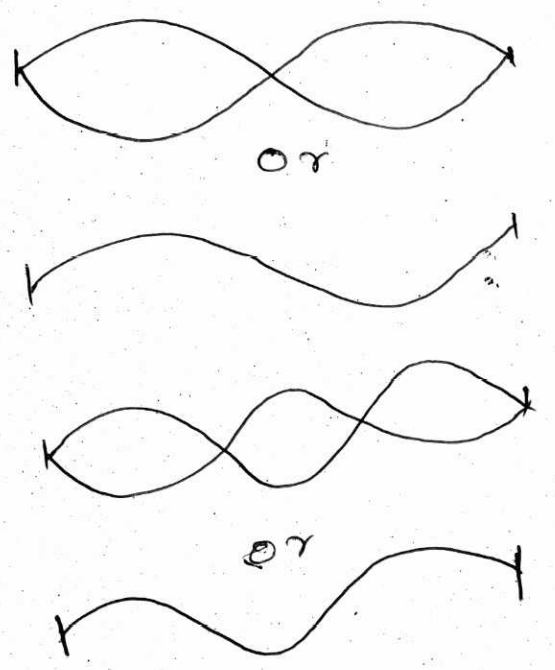
Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
		$\frac{\Delta P}{P} \times 100\% = 13\%$ <p>OR</p> <p>If \sqrt{cd} is taken as \sqrt{cd} Then $\frac{\Delta P}{P} \times 100 = 11.5\%$ Give 3 score</p>	1	4
18	a	90°	1	4
	b	$a = \frac{v^2}{r} = r\omega^2$ $a = r(2\pi f)^2$ <p>Substitution</p> <p>OR</p> $\omega = \frac{2\pi}{T} \quad \text{--- (1)}$ $\omega = 2\pi f \quad \text{--- (1)}$	1	
20	a	0	1	
	b	$ F = \sqrt{50} \text{ N}, d = \sqrt{50} \text{ m}$ $\vec{F} \cdot \vec{d} = 16 \text{ N m}$ $\cos \theta = \frac{\vec{F} \cdot \vec{d}}{Fd} = 0.32$	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
		<p style="text-align: center;">OR</p> $\vec{F} \cdot \vec{d} = Fd \cos \theta$ $ \vec{F} = \sqrt{50} \text{ N}$ $ \vec{d} = \sqrt{50} \text{ m}$	<p style="text-align: center;">1 1 1</p>	
21	a	$\eta = 1 - \frac{T_2}{T_1} \text{ or } \eta = 1 - \frac{Q_2}{Q_1}$	1	
	b	All processes	1	
	c	$\frac{T_2}{T_1} = \frac{Q_2}{Q_1}$ $\frac{273}{373} = \frac{Q_2}{4200}, Q_2 = 3075 \text{ J}$	2	4
		OR		
	b	four processes $(4 \times \frac{1}{2})$	2	
	c	$\frac{T_2}{T_1} = \frac{Q_2}{Q_1}$	$\frac{1}{2}$	
		Substitution or Answer	$\frac{1}{2}$	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
22	a	$a = -10x$	1	4
	b	$v = -A\omega \sin \omega t$	1	
		$a = -A\omega^2 \cos \omega t$	1	
		$a = -\omega^2 x$	1	
		<p>OR</p>		
	b	$v = \frac{dx}{dt} \quad - (1/2)$		
		$a = \frac{dv}{dt} \quad - (1/2)$		
		$a = -\omega^2 y \quad (1)$		
		$v = \omega \sqrt{A^2 - x^2} \quad (1)$		
		<p>OR</p>		
		<p>Also derivations with $x = A \sin \omega t$) - give full credit</p>		

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
23	a	Vector sum of all forces = 0	1	5
	b	$T \cos \theta = 60$	1	
		$T \sin \theta = 50$	1	
		$\theta = \tan^{-1}(5/6) = 40^\circ$	1	
	c	40° or no change	1	
a	OR $\vec{F}_1 + \vec{F}_2 + \vec{F}_3 = 0$ or $\sum \vec{F} = 0$	2		
b	OR 	2		
c		2		
c	no change / 40° OR length is independent	1		

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
24	a	$\vec{\tau} = \vec{r} \times \vec{F}$	1	
	b	 <p> $2 \times mg \times 33 = mg \times 5$ $2 \times 5 \times g \times 33 = mg \times 5$ $m = 66g$ </p>	1	5
	c	derivation of $\vec{\tau} = \frac{d\vec{L}}{dt}$	2	
	a	OR $\vec{\tau} = \vec{r} \times \vec{F}$	2	
	b	sig or Principle of moments or eqns like $m_1 r_1 = m_2 r_2$	1	
	c	eqn only	1	
		derivation	1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
25	a b c b	Capillarity OR Capillary rise zig + deriv small OR Correct derivation zig OR derivation OR eqn only	1 3 1 3 1 2 1	5
26	a		1	

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total
	b	Correct proof	2	5
	c	$\lambda = \frac{1}{2L} \sqrt{\frac{T}{\mu}}$ $T = 248 \text{ N}$	1	
		OR	1	
	a	each fig (1 mark) Total (2 marks)	2	5
	b	Proof	2	
	c	$\lambda = \frac{1}{2L} \sqrt{\frac{T}{\mu}}$	1	
		OR		
	(b)	Fundamental frequency	1	
		$\lambda = \frac{v}{2L}$		

- ① JAYAKUMAR. J-S CHSS, BHOOVARUCAN
KOLLAM
2. Roy T. Mathew CIVHSI MWAKUZHA
3. Anu V Sivaji H.S.S Vaskala
4. Shaji - G ; St. Joseph's BHSS ; Kozhikode
Shy (MOB. 9495015717)
5. Muhammod Basheer M, CIVHSS (Sports) Kannur
6. SENSON K VARGHESE CHSS THRISSUR
7. Johnson Joseph St Louis Thombamang (6440)
8. Dinesh Kema - K
9. Sabu Mathew St. Michael's HSS Kaduthimuttu
10. MANOJKUMAR. P.K PRM KULAVALLUR HSS
90974558672
11. LISO VARGHESE. K.R.P.M HSS Seethathodu.
12. Paramod Kumar - Ple CIVHSS Panyoli 9446255139
13. Hankushman P Kumpuch HSS, Palkkad
14. Binu. P.J. St. Mary's HSS Mullanokaly, Wayanad. 9961006844
15. JIBY A. PAUL, St. Mary's HSS Morenkkal 9947753139
16. MANOJ. N, CHSS THRIKKAV, PONANI 9037433872
17. Maya - G , TDHSS, Thuvaveer 9847164179
18. DALYON. S CIVHSS KADAKKAL, KOLLAM 9895735403
19. ASA. K. REVI , CIVHSS Kothala, Kottayam. 9447105317
20. Smitha D.V. CIVHSS Poovachal TUM 9495204069
21. SHEEBA. K. S. , VHSS KARALAM, THRISSUR. 9349712978.