FIRST YEAR HIGHER SECONDARY EXAMINATION SAY/IMP SEPTEMBER 2016

(Scheme of Valuation)

Subject : Physics **Code No. 415**

Qn. No	Scoring Indicators	Split Score	Total Score
1.	c) Strong nuclear force.	1	1
2. a.	$\frac{\Delta A}{A} \times 100 = \frac{\Delta l}{l} \times 100 + \frac{\Delta b}{b} \times 100$	1	
	$\frac{\Delta A}{A} \times 100 = 4.3\%$	1	
	[Result only give 1 mark]		
b.	Dimension of LHS $= M^0 L^0 T^1$	$\frac{1}{2}$	
	Dimension of RHS $= M^0 L^0 T^{-1}$	$\frac{1}{2}$	
	OR		
	(Dimensions of any two quantities in the equation give 1 mark)		4
	[LHS] ≠ [RHS] ∴ Equation is not correct	1	
3. a.	iii) BC	1	
b.	6m/s × 5s = 30m	1	
	[Graph is not marked correctly, So give 1 mark for related attempt.]		
c.	$S = V_0 t + \frac{1}{2} a t^2$	1	4
	$h = \frac{1}{2} g t^2$	$\frac{1}{2}$	
	$t = \sqrt{\frac{2h}{g}}$	$\frac{1}{2}$	
	[$h = \frac{1}{2} g t^2$ – 1 score, Final answer – 1 score]		

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4 a.	ii) work	1	
b.	Draw parabolic path	1	
	mark direction of velocity	$\frac{1}{2}$	
	mark direction of acceleration	$\frac{1}{2}$	
c.	$v^2 = v_0^2 + 2as$ [Any correct derivation give 2 mark]	1	5
	$0 = V_0^2 \sin^2\theta - 2gH$	$\frac{1}{2}$	
	$\therefore H = \frac{V_0^2 \sin^2\theta}{2g}$	$\frac{1}{2}$	
	[Final equation only give 1 mark]		
5. a.	Concurrent Forces / Concurrent	1	
b.	$F_3 = \sqrt{F_1^2 + F_2^2 + 2F_1F_2\cos\theta}$	1	
	Mass of Stone = $\sqrt{150^2 + 100^2 + 0}$	$\frac{1}{2}$	3
	Mass of stone = 180.3×10^{-3} kg	$\frac{1}{2}$	
	[Give full score for weight also]		
	[Give mark if angle is taken as 30° also]		
	[can be solved using parallelogram method (2)]		
	[Final result only give 1 mark]		
6 a.	Normal reaction $N = mg$	$\frac{1}{2}$	
	$\mu_s mg = \frac{mv_{max}^2}{R}$	$\frac{1}{2}$	3
	$V_{max} = \sqrt{\mu_s Rg}$	1	
b.	Any one reason	1	

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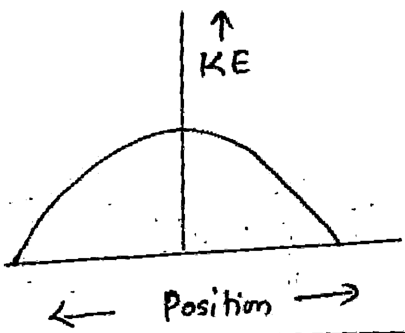
7. a.	Statement OR equation	1	
b.	PE = mgH	$\frac{1}{2}$	
	$v^2 = 2gH$	$\frac{1}{2}$	
	Prove $\frac{1}{2}mv^2 = mgH$	1	
	[Proof of law of conservation of mechanical energy in the case of freely falling body → 2 mark]		4
c.	i) Negative	1	
8A. a.	Law of conservation of angular momentum OR $I\omega$ = constant	1	
b.	$KE_{Total} = KE_{rotational} + KE_{Translational}$	$\frac{1}{2}$	
	$KE_{Total} = \frac{1}{2}I\omega^2 + \frac{1}{2}mv^2$	$\frac{1}{2}$	5
	$I = mk^2$	$\frac{1}{2}$	
	$v = R\omega$	$\frac{1}{2}$	
	$KE_{Total} = \frac{1}{2}mv^2\left(1 + \frac{k^2}{R^2}\right)$	1	
	OR		
	[$KE_{Total} = \frac{1}{2}I\omega^2 + \frac{1}{2}mv^2$ – 2mark]		
c.	Torque	1	
	OR		
8B a.	Parallel axis theorem	1	
b.	Diagram	$\frac{1}{2}$	
	mark I and I_o in diagram	$\frac{1}{2}$	
	$I = I_o + ma^2$	1	

Qn.No	Scoring Indicators	Split Score	Total Score
c.	$I = \frac{3MR^2}{2}$	1	5
	Moment of inertia	1	
9 a.	Statement of law or equation	1	5
b.	$\frac{mv_o^2}{R+h} = \frac{GMm}{(R+h)^2}$	1	
	$V_o = \sqrt{\frac{GM}{R+h}}$ or $\sqrt{\frac{GM}{R}}$ or $\sqrt{gR}$	1	
c.	$V_e = \sqrt{2gR}$	$\frac{1}{2}$	
	$V_o = \sqrt{gR}$	$\frac{1}{2}$	
	$V_o = \frac{V_e}{\sqrt{2}} = \frac{20}{\sqrt{2}}$	$\frac{1}{2}$	
	$V_o = 14.14$ Km/s	$\frac{1}{2}$	
	[Last two steps give 2 mark]		
10 a.	iv) Rigidity modulus	1	2
b.	Statement of law	1	
11 a.	273.16 K OR 273.01 K	1	3
b.	Correct explanation	2	
	(convection only 1 mark)		
12A a.	Av = constant	1	
b.	Figure	1	
	$W_1 - W_2 = (P_1 - P_2)\Delta V$	1	
	Change in KE	$\frac{1}{2}$	
	Change in PE	$\frac{1}{2}$	

Qn.No	Scoring Indicators	Split Score	Total Score
c.	$P+\frac{1}{2}\rho v^2+\rho gH$ = constant [Theorem only - 1 mark]	1	7
	$v = \sqrt{2gh}$	1	
	$v = 7.66$ m/s	1	
	OR		
12B a.	Explain / Define Surface tension	1	
b.	Figure	1	
	$P_i - P_o = \frac{2S\cos\theta}{a}$	1	
	$P_i - P_o = h\rho g$	1	
	$h = \frac{2S\cos\theta}{a\rho g}$	1	
c.	$\Delta P_{bubble} = 2 \times \Delta P_{Drop}$	1	7
	$\Delta P_{bubble} = 2\times 60 = 120 N/m^2$	1	
	[$\Delta P_{bubble} = \frac{4S}{r}$ - $\frac{1}{2}$, $\Delta P_{Drop} = \frac{2S}{r}$ - $\frac{1}{2}$]		
	[Final Answer only - 2 marks]		
13 a.	Any one difference	1	
b.	Explanation of four process or explanation using correct graph.	2	
	[Name of four process only or - 1 mark Graph only - 1 mark]		4
c.	$\eta = 1 - \frac{T_2}{T_1}$ or $\eta = 1 - \frac{Q_2}{Q_1}$	1	

Qn.No	Scoring Indicators	Split Score	Total Score
14.	Explanation or defention of mean free path.	1	2
	Any one factor (diameter of molecule, number density, Pressure, temp etc) $\left[l = \frac{1}{n\pi d^2} \text{ or } l = \frac{1}{\sqrt{2}\, n\pi d^2} \right]$ - 1 mark	1	
15. a.	Defenition or equation	1	4
b	$a = -\omega^2 x$	$\frac{1}{2}$	
	$\omega = \frac{2\pi}{T}$	$\frac{1}{2}$	
	$a = -0.986\ m/s^2$	1	
c.		1	
16 a.	$\nu' = \frac{\nu (V - V_L)}{V}$	$\frac{1}{2}$	4
	$\nu' = 474\ Hz$	$\frac{1}{2}$	
b.	Doppler effect	1	
c.	Diagram	1	
	mark node	$\frac{1}{2}$	
	mark antinode	$\frac{1}{2}$	