

## Scoring Indicators

### APPLIED PHYSICS – I

Q No	Scoring Indicators	Split score	Sub Total	Total score
I	PART A			9
1	Unit	1	1	
2	$R = A + B$	1	1	
3	The gravitational force between Earth and the Sun	1	1	
4	$\frac{1}{12}Ml^2$	1	1	
5	Graphite	1	1	
6	Conduction	1	1	
7	Shearing	1	1	
8	Surface energy	1	1	
9	$kgm^{-1}s^{-1}$ or $Nsm^{-2}$	1	1	
II	PART B			24
1	Parallelogram law – statement  Diagram - addition of vectors by parallelogram method	1.5  1.5	3	
2	Period of the second hand of the watch, $T = 1 \text{ min} = 60 \text{ s}$  $\omega = \frac{2\pi}{T}$  $\omega = \frac{2 \times 3.14}{60} = 0.1047 \text{ rad/s}$	1  1  1	3	
3	$\text{Power} = \frac{\text{Energy}}{\text{time}}$  $\text{Power} = \frac{3000}{10} = 300 \text{ W}$	1  2	3	

4	One example for each energy transformation (a) Conversion of kinetic energy into potential energy (b) Conversion of light energy into electrical energy (c) Conversion of electrical energy into sound energy	1 1 1	3	
5	Surface roughness Molecular adhesion Deformations	1 1 1	3	
6	Power – Definition SI unit – watt (W) 1 hp = 746 W	1 1 1	3	
7	Heat – definition Temperature – definition When heat is given to a body, its temperature increases, and when heat is taken from a body, its temperature decreases	1 1 1	3	
8	Hooke's law – Statement SI unit of elastic modulus – N/m <sup>2</sup> or Pa	2 1	3	
9	Capillarity – Definition The acute angle of contact – capillary rise The obtuse angle of contact – capillary depression	1 1 1	3	
10	$A_1 v_1 = A_2 v_2$ $v_2 = v_1 \times \frac{r_1^2}{r_2^2} = 5 \times \frac{6^2}{4^2} = 11.25 \text{ m/s}$	1 2	3	
III	PART C			42

1	Note on Systematic errors (three types)	3	7	
	Note on Random errors	2		
	Note on Least count error	2		
2	Explanation of recoil of the gun using the law of conservation of momentum	4	7	
	$V_g = -\frac{m_b v_b}{M_g}$	1		
	$V_g = -\frac{30 \times 10^{-3} \times 300}{6} = -1.5 \text{ m/s}$	2		
3	Derivation of the equation: $v = r\omega$	3	7	
	Definition of angular acceleration	1		
	Derivation of the equation: $a = r\alpha$	3		
4	Note on the moment of inertia (definition, factors on which moment of inertia depends, equation, unit)	4	7	
	Note on the radius of gyration (definition, equation, unit)	3		
5	Definition of resolution of a vector	1	7	
	Rectangular resolution (definition, figure, equations for rectangular components)	4		
	Discussion of a real-life example	2		
6	The explanation for banking of roads	3	7	
	Diagram	1		
	Derivation of equation for the angle of banking	3		
7	Statement of the law of conservation of energy	1	7	
	Derivation of total energy at the starting point of fall (A)	2		
	Derivation of total energy at an intermediate point (B)	2		
	Derivation of total energy at the endpoint (C)	2		

8	Note on heat transfer by convection Note on heat transfer by radiation	4 3	7	
9	Young's modulus – definition Derivation of the equation: $Y = \frac{FL}{A \Delta L}$ $\Delta L = \frac{MgL}{\pi r^2 Y}$ $\Delta L = \frac{MgL}{\pi r^2 Y} = \frac{8 \times 9.8 \times 4}{3.14 \times (1 \times 10^{-3})^2 \times 9 \times 10^{10}}$ $\Delta L = 1.11 \times 10^{-3} \text{ m}$	1 2 1 2 1	7	
10	Surface tension – property of a liquid surface to minimize its surface area, liquid surface behaves like a stretched membrane Molecular-level explanation of surface tension Surface tension – definition, equation, and its unit Discussion of any application of surface tension	1 2 2 2	7	
11	Mercury thermometer – figure Description and working of the mercury thermometer Schematic diagram of a pyrometer Description and working of the pyrometer	1 2 1 3	7	
12	Figure + description Derivation of the equation: $A_1 v_1 = A_2 v_2$ Statement of the principle of continuity Discussion of one example	1 3 1 2	7	