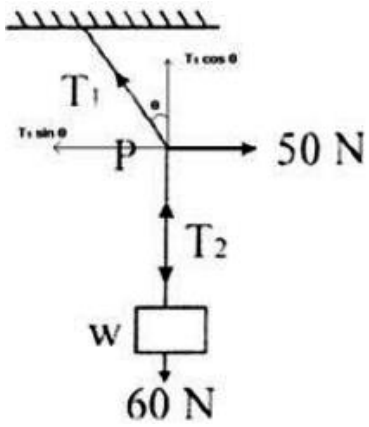
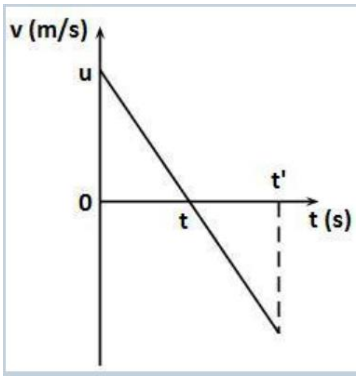
INDIAN SCHOOL MUSCAT
ANNUAL EXAMINATION
SUBJECT : Physics

CLASS: XI **MARKING SCHEME : SET C**

Max.Marks: 70

	Section A	
1	b OR d	(1)
2	a	(1)
3	(a) or (b)	(1)
4	d	(1)
5	b	(1)
6	c	(1)
7	c **OR** b	(1)
8	b	(1)
9	b	(1)
10	c	(1)
11	b	(1)
12	a	(1)
13	a	(1)
14	a	(1)
15	Presence of moisture in air decreases the density and hence velocity increases .	(1)
16	mechanical energy per unit volume consumed by the material	(1)

17	Gravitational force<Weak nuclear force<Electromagnetic force<Strong Nuclear force	(1)
18	90 degree	(1)
19	Torque and angular momentum	(1)
20	Statement of Wien's displacement law.	(1)
	Section B	
21	(a) No, total linear momentum after explosion should eb zero so flying in mutually perpendicular direction is not possible . (1 mark) (b) To increase time taken to bring down momentum (1 mark)	(2)
22	Using equation of motion $S= ut + ½ at^2$ $a = 2 m/s^2$ (1) F= ma F= 14000 N (1) **OR**  $T_1 \sin \theta = 50$ $T_1 \cos \theta = 60$ **tan θ =5/6** **or θ = tan^{-1}(5/6) = 39.8**	(2)
23	deducing the relation between kinetic energy and absolute temperature T of an ideal gas.	(2)

	OR any four postulates of kinetic theory of gases	
24	(a) showing graphically how acceleration due to gravity varies as we move from the centre of the earth to great heights above the surface of the earth. (1) (b) KE = -E =15 x 10^9 J, E = PE/2 = - 15 x 10^9 J,	(2)
25	Yes . a body having potential energy need not have momentum No. a body having momentum will have kinetic energy	(2)
26	Explanation of how in a thermos flask the loss of heat due to three modes is minimized.	(2)
27	$\frac{\Delta P}{P} = \left[3\frac{\Delta a}{a} + 2\frac{\Delta b}{b} + \frac{1}{2}\frac{\Delta c}{c} + \frac{\Delta d}{d}\right]$ = 14%	(2)
	Section C	
28	Showing among the three bodies the sphere has the greatest and the ring has the least velocity of the centre of mass at the bottom of the inclined plane.	(3)
29	Derivation for acceleration due to gravity at a height h above the surface of the earth of radius R in terms of acceleration due to gravity g on the surface of the earth. OR Statement and proof law of periods for planetary motion.	(3)
30	(a) No. the motion is not under gravity alone. (1 mark) (c) To show that the path followed by a projectile is a parabola when it is projected at an angle θ with the horizontal. (2 marks)	(3)
31	(a) velocity-time graph for an object thrown vertically upwards returning to the point of projection.  (1 mark) (b) Yes. For a body at rest. (1 mark)	(3)

	(c) Yes, projectile motion (1 mark)	
32	(a) any two difference between adiabatic and isothermal process. (b) Reason :efficiency of a heat engine cannot be 100% or unity (c) coefficient of performance of a refrigerator working between -3^0 C and 27^0 C $= T_2/(T_1 - T_2) = 9$	(3)
33	Derivingthe ratio of the frequencies of the harmonics in the string.	(3)
34	Define degrees of freedom. (1) For one mole of a monoatomic gas derive the expression for C_p and C_v (1) and calculate the ratio of C_p/C_v. (1)	(3)
	Section D	
35	(d) Statement (1) and proof Bernoulli's principle (2). (e) Low pressure (1 mark) (f) fine capillaries in the soil are broken (1 mark) **OR** (g) Definition of terminal velocity. (1) (h) Derivation of expression for the terminal velocity attained by a spherical body falling through a viscous medium. (2) (i) $F=6\pi \eta r v = 1.35 \times 10^{-6}$ N	(5)
36	(j) To show that the oscillations of a simple pendulum are simple harmonic and derive the expression for time period of the simple pendulum. (3 marks) (k) Reason why soldiers are asked not to march over old bridges: resonance might damage the bridge. (1 mark) (l) graph showing the variation of energy with respect to time for a harmonic oscillator executing damped oscillations. (1 mark) **OR** (m)Definition of Simple harmonic motion.(1) (n) Derivation of the differential equation for a simple harmonic motion. (2) (o) $Y = 0.05 \sin (50 \pi t + \pi/3)$ (i) time period T= 0.04 s (ii) amplitude a = 0.05 m (iii) velocity amplitude = 2.5π m/s or 7.85 m/s	(5)
37	(p) To show that in case of one dimensional elastic collision of two bodies , the relative velocity of separation after collision is equal to the relative velocity of approach before collision.	(5)

	(q) ½ mv^2 = 10% of ½ mu^2 = (10/100) x 1000 v = 63.24 m/s **OR** (r) Statement of the law of conservation of mechanical energy. (1) (s) To show that the total mechanical energy of a freely falling body under gravity is conserved. (2) (t) Showing the variations in kinetic energy , potential energy and total energy graphically (2)	