INDIAN SCHOOL MUSCAT
ANNUAL EXAMINATION
SUBJECT : Physics

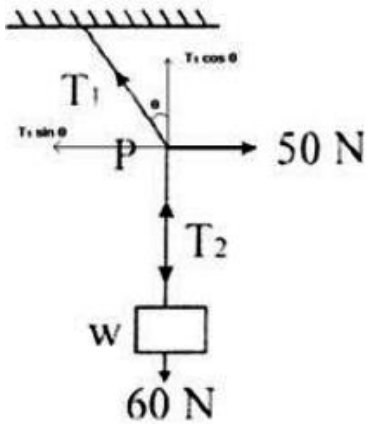
CLASS: XI MARKING SCHEME –SET B

Max.Marks: 70

	Section A	
1	b) 20 S	(1)
2	(a) or (b)	(1)
3	b)	(1)
4	(a)	(1)
5	d)	(1)
6	c)	(1)
7	a)	(1)
8	b)	(1)
9	a)	(1)
10	b)	(1)
11	(a)	(1)
12	c) **OR** b)	(1)
13	c)	(1)
14	b) **OR** d)	(1)
15	mechanical energy per unit volume consumed by the material	(1)
16	Torque and angular momentum	(1)

17	90 degree	(1)
18	Presence of moisture in air decreases the density and hence velocity increases .	(1)
19	Statement Wien's displacement law .	(1)
20	Gravitational force<Weak nuclear force<Electromagnetic force<Strong Nuclear force	(1)
	Section B	
21	deducing the relation between kinetic energy and absolute temperature T of an ideal gas. **OR** any four postulates of kinetic theory of gases.	(2)
22	(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)
23	Yes . a body having potential energy need not have momentum No. a body having momentum will have kinetic energy	(2)
24	reason for the following (a) Chinaware is wrapped in straw paper before packing: impact will take a longer time to reach the chinaware through straw of paper (b) When tyres are properly inflated , the area of contact between the tyres and the ground is reduced which in turn reduces rolling friction	(2)
25	$KE = \frac{1}{2}mv^2$ Thus, $\frac{\triangle KE}{KE} \times 100 = \frac{\triangle m}{m} \times 100 + 2\frac{\triangle V}{V} \times 100$ = 8%	(2)
26	Explanation how in a thermos flask the loss of heat due to three modes is minimized.	(2)
27	Using equation of motion S= ut + ½ at^2 a = 2 m/s^2 (1) F= ma F= 14000 N (1)	(2)

OR



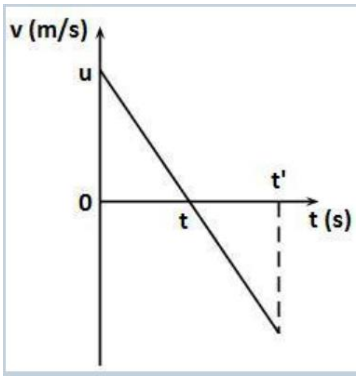
$T_1 \sin \theta = 50$

$T_1 \cos \theta = 60$

$\tan \theta = 5/6$

or $\theta = \tan^{-1}(5/6) = 39.8$

Section C

28	(a) No. the motion is not under gravity alone. (1 mark) (b) 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)
29	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)
30	(a) velocity-time graph for an object thrown vertically upwards returning to the point of projection.  (1 mark)	(3)

	(b) Yes. For a body at rest. (1 mark) (c) Yes, projectile motion (1 mark)	
31	Derivation of expression 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. (3 marks) **OR** Statement (1) and proof law of periods for planetary motion (2) .	(3)
32	Define degrees of freedom (1) . For one mole of a monoatomic gas derive the expression for Cp and Cv (1) and calculate the ratio of Cp/Cv (1)	(3)
33	Discussion about the harmonics formed in an open organ pipe and show that the frequencies of the harmonics are in the ratio 1:2:3.	(3)
34	(a) Any two difference between adiabatic and isothermal process. (b) Reason :efficiency of a heat engine cannot be 100% or unity? (c) the coefficient of performance of a refrigerator $= T_2/(T_1 - T_2) = 9$	(3)
	Section D	
35	(a)showing that the oscillations of a simple pendulum are simple harmonic and derive the expression for time period of the simple pendulum. (b) Resonance might break bridge (c) graph showing the variation of energy with respect to time for a harmonic oscillator executing damped oscillations. **OR** (a)Definition of Simple harmonic motion. (b) Derivation the differential equation for a simple harmonic motion. (c) $y = 0.05 \sin (50 \pi t + \pi/3)$ time period T= 0.04 s amplitude a = 0.05 m velocity amplitude = 2.5 π m/s or 7.85 m/s	(5)
36	(a) Statement and proof Bernoulli's principle. (3 marks) (b) High speed results in Low pressure (c) Capillary tubes break and keep the moisture from escaping **OR** (a) Definition of terminal velocity. (b) Derivation of expression for the terminal velocity attained by a spherical body falling through a viscous medium.	(5)

	(c) F= 0.034dynes.	
37	(a) 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. (b) $\frac{1}{2} mv^2 = 10\% \text{ of } \frac{1}{2} mu^2 = (10/100) \times 1000$ $v = 63.24$ m/s **OR** (c) Statement of the law of conservation of mechanical energy. (d) To show that the total mechanical energy of a freely falling body under gravity is conserved. (e) To show the variations in kinetic energy , potential energy and total energy graphically.	(5)