MARKING SCHEME

Class- XI Session Ending Exam 2022-23 Subject – Physics

Sr.No	Answer / Description	Marks allotted
1	c	c
2	b	t
3	M	d
4	L	i
5	^{2}	m
6	T	e
7	$^{-}$	n
	^{1}	s
	c	i
	b) M $L^{-1}T^{-1}$	o
8	a V_a = tan 60	n T
9	and V_b=tan30	h
10	V_a/V_b = 3:1 B	e
11	f_r=mgsin30=	o
12	0.1x9.8x0.5=0.49	r
13	b) p_2 =80/100p_1 = 8/10 p_1	e
	mv2 =8/10 mv1 squaring both	m
14	side $V2^2$ =64/100 $v1^2$ 1/2mV_2^2	proof
15	=64/100 1/2mv_1^2	Law of orbit with dig
16	K_2 = 64/100K1 $\Delta k = k_1 - k_2$=	Law of Area or Law of Periods
17	36%	Y=FL/AΔL ΔL =
18	a) F/4	FL/YA A=
	c) 1: 8	$1mm^2 = 10^{-6}$M F=
	b)	3X9.8=29.4N
19	7	ΔL =
	0	29.4X1.5/2X
	J	10^{11} $X10^{-6}$ =
20	a	0.22mm OR
21	)	F= 1KG WT= 1000X980 dyne = $9.8x10^5$ dyne
22	a) 10J work done = area of triangle ABC	A = π $d^2/4$ = 0.03cm^2
23	= ½ x 80x$10^3$250x10^{-6} = 10J	Y=FL/AΔL
	b	ΔL/lx100=Fx100/A Y = 0.0021%
	)	State
	5	ment
	/	of
	3	Berno
	a	ulli’s
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24	a)	m
	a)	explan
25	d)	ation
	M_1= 1000 kg, m_2=8000kg, u_1 =32m/s, u_2= 4m/s ,v_1 = -8 m/s v_2=?	The factors pressure , temp, density and moisture affects
	$m_1u_1+m_2u_2 = m_1v_1 +m_2v_2$	
	V_2 = 72000/8000 = 9 m/s	
	C	
	o	
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	r	
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1 Mark each
½ M 1+1/2 M
1 M
1M
1+1 FORMULA
CONVERSION +
CALCULATION

1+1

1 M+1M

½ each x 4 = 2 M

the speed of in gases V $\propto \sqrt{T}$ V $\propto$ 1/density Pressure has no effect on speed of sound Sound travels faster in moist air			
26	Def	½ + ½ M	2 M
27	banking, dig	1 M 2 M	
28	Correct derivation	1m	
	Def and dig derivation Coordinates of geometrical centers C1 C2 C3 X ½ 3/2 ½ Y ½ ½ 3/2 X $_{cm}$=$m_1x_1+m_2x_2+m_3x_3/m_1+m_2+m_3$ = 5/6m Y_{cm} =$m_1y_1+m_2Y_2+m_3y_3/m_1+m_2+m_3$ = 5/6m	1M 1M	
29 Derivation The minimum speed with which a body must be projected in order that it will escape from the earth gravitational filed is called as escape velocity. the escape velocity can be easily formulated which is: Putting the value of g = GM/R^2, the value of escape velocity becomes: From these two equations, it can be said that the escape velocity depends on the planet's radius and the planet's mass only and not on the body's mass.	Def. + diagram		1 M 2 M
30 Y= 0.05sin 2 π(0.4x – 5t) compare it with standard equation Y = a sin (kx –wt) Y = a sin 2 π(x/ λ – νt) i) Amplitude = 0.05 m ii) 1/ λ = 0.4 Wavelength λ = 1/0.4 = 2.5 m iii)K = 2 π/ wavelength= 2x3.14/2.5=2.512rad/ m	=2.5/20=0.125 Kg/m Velocity (v)= √T/m= √200/0.125 =40 m/s Time taken by disturbance to reach the other end t=L/v =20/40=0.5 s		

OR

Mass per unit length(m) = M/l

1+1+1

½ Marks

½ Marks

1 Marks

1 Marks

31		(a) Diagram of projectile $= x/u\cos\theta$ $U = u\sin\theta$ $a = -g$ Vertical distance covered in time t S = $ut + \frac{1}{2} at^2$ $= u\sin\theta\, x/u\cos\theta - 1/2\, g\, x^2/u^2\cos^2\theta$	Is equation of parabolic motion (b) For θ=45 the horizontal range is maximum R_{max} = u^2/g $H_{max} = u^2\sin^2 45/2g = u^2/4g = R_{max}/4$ Therefore $R_{max} = 4H_{max}$ OR (i) Time of maximum height Let tm be the time taken by the projectile to reach maximum height H_{max} At highest point vertical component velocity zero V =u +at $T_m = u\sin\theta/g$ Time of flight	

i g h t : d e f T f = 2 u s i n θ / g	V 2 - u 2 = 2 a s $0 - (u\sin\theta)^2 = 2(-g)H_{max}$ $H_{max} = u^2\sin^2\theta/2g$ ii) two angle of projections for same horizontal range	1/2M 1/2M 2M 2 M 1M
i i i)		1M
H m a x d e f i n i t i o n		1M

R = $u^2 \sin 2\theta / g$ replacing θ by (90- θ) we get = $u^2 \sin 2(90 - \theta)/g$ = $u^2 \sin (180 - 2\theta)/g$ = $u^2 \sin 2\theta / g$ = R Hence from given velocity of projection a projectile has the same horizontal range for angle of projection θ and (90 - θ)			2M
31	**a) Derivation** b) Correct proof and interpretation OR a) Def : Specific heat of monoatomic gas Specific heat of diatomic gas b) Oxygen is diatomic gas, therefore energy associated with 1 mole of oxygen U =5/2 RT hence Internal energy of1g of oxygen u=U/M= 1/32 x 5/2 RT = 5/64 x 8.31 x 273 = 177.2 J	3 M 2M 1M + 1M 1 M 1M 1M 2 M	
33	a)	Total Energy of SHM = K.E + P.E X = A cos (wt + $\emptyset_0$) V = dx/dt = -wA sin (wt + $\emptyset_0$) 1 M K.E = 1/2mV^2 $= 1/2m\ (-wA\ sin\ (wt + \emptyset_0)2$ $= 1/2mw^2A^2(sin^2(wt + \emptyset_0)$ 1M $K.E = ½\ mw^2A^2sin^2(wt +$	

$\emptyset_0$)

l*ike wise*

$P.E. = 1/2mw^2A^2cos2$(wt+ $\emptyset_0$)

1M

T.E = KE + PE

b) M= 1kg K = 50 N/m ,A = 10 cm y =0.05m 2M

KE = 1/2k ($A^2 – y^2$) = 0.1875 J

P.E. = ½ k y^2= 0.0625 J **OR**

a)

dig and normal mod of close end pipe 1 M

First mode of vibration L = $\lambda 1/4$

λ_1 = 4L

ν_1 = v/ λ_1 = v/4l 1m

$Second\ mode\ of\ vibration$

L = 3 λ_2/4

λ_2= 4L/3

ν_2 = v/ λ_2 = 3v/4L = 3 ν 1M

Third mode of vibration

L = 5 λ_3/4

λ_3= 4L/5

ν3 = v/ λ_3 = 5/4L = 5 ν

b) freq=110Hz v = 330m/s

fundamental frequency of an open end pipe 2 M

= v/ 2L

330/2x110 = 1.5m

34

Section-E

Q 1 (a) f= μR μ=f/R = f/mg= 49/100 = .49 = .5 1 M

Q 2 (d) $\mu = \tan 30$ = 1/√3=0.57 1 M Q 3 (a)

F = μmg =0.3 x1.5 =.45 kgf 1 M

Q 4 (d) F_a= 1.2kgf= 1.2x 9.8 N

F_r = 0.45x 9.8 N

1 M

a = (F_a-F_r)/m= 4.9m/s2

35 Q 1 b 1 M

Q 2 a 1M

Q 3-Correct defination 1M

Q 4-Correct Hook's law 1M