Sri Chaitanya IIT Academy, India

A.P, TELANGANA, KARNATAKA, TAMILNADU, MAHARASHTRA, DELHI, RANCHI

A right Choice for the Real Aspirant

ICON CENTRAL OFFICE, MADHAPUR-HYD

Sec: Sr. IPLCO **Date: 17-10-15**

Time: 9:00 AM to 12:00 Noon **RPTM-9** **Max.Marks: 360**

KEY SHEET

MATHS		CHEMISTRY		PHYSICS	
Q.NO	ANSWER	Q.NO	ANSWER	Q.NO	ANSWER
1	4	31	2	61	3
2	2	32	2	62	1
3	3	33	2	63	4
4	3	34	3	64	1
5	3	35	2	65	3
6	2	36	2	66	4
7	3	37	3	67	1
8	4	38	3	68	2
9	1	39	1	69	1
10	4	40	3	70	3
11	1	41	4	71	3
12	1	42	3	72	3
13	1	43	4	73	3
14	1	44	2	74	4
15	2	45	1	75	2
16	3	46	3	76	1
17	1	47	4	77	1
18	4	48	1	78	2
19	4	49	2	79	2
20	4	50	1	80	1
21	1	51	3	81	4
22	2	52	4	82	3
23	1	53	2	83	1
24	2	54	3	84	3
25	2	55	3	85	4
26	4	56	1	86	3
27	2	57	2	87	1
28	3	58	4	88	2
29	3	59	2	89	4
30	2	60	2	90	1

PHYSICS

61. $f_{AB} = |f_A - f_B|$
$f_{AC} = |f_A - f_C|$
$f_{BC} = |f_B - f_C| \Rightarrow Either\ |f_{AB} + f_{AC}|\ or\ |f_{AB} - f_{AC}|$

62. $I_R = I_0 + I_0 + 2\sqrt{I_0^2}\cos\left(\frac{2\pi}{1}\cdot 1\right) = 4I_0$

63. $0.6 = \frac{2\pi}{\lambda} \Rightarrow \lambda = \frac{5\pi}{3}\ cm = \frac{2L}{3} \Rightarrow L = 15.7\ cm$

64. All choices show amplitude of 2 cm, wavelength 1m and wave-velocity of 5.0 m/s.

But only (a) shows y = 0 and

$\frac{dy}{dt}(\neq 0) < 0\ for\ x = 0, t = 0$.

65.

$A_r = 0.02 \times 0.75 = 0.015;$

$y_r = +0.015\sin 8\pi\left[t + \frac{x}{20}\right];$

There is no phase difference of π produced as the reflection is from rarer medium.

66. $A_r = \left|\frac{v_2 - v_1}{v_1 + v_2}\right| A_i;\ v_2 = \frac{v_1}{2}$

$\therefore\ Energy\ reflected = \frac{1}{9} \times energy\ incident$

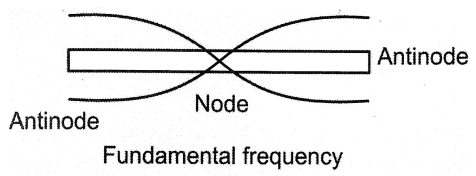
67. $A = A_0 \sin\frac{4\pi x}{l}$

68. Reflection from denser medium produces a phase difference of π.

69. The wave suffers a phase difference of π when reflected by denser medium.

70. Since tension in string I > tension in string II $\Rightarrow V_I > V_{II}$

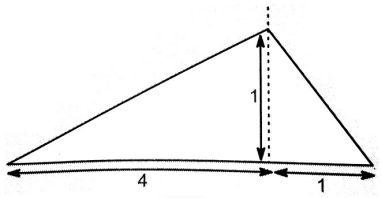
71.



For second overtone $n = 2 \Rightarrow L = (2n+1)\frac{\lambda}{2}$

$$\Rightarrow \quad \lambda = \frac{2L}{5} \quad \therefore v = \frac{c}{\lambda} = \frac{5c}{2L}$$

72. The shape of the string will be



Area $= \frac{1}{2} \times 5 \times 1 = 2.5\ cm^2$

Wave velocity $= 5\sqrt{\frac{5 \times 1000}{50}} m/s = 10\, m/s$

Thus the part with slope $\frac{1}{4}$ will be present at $x = 13cm$ and $t = 0.015$.

73. Conceptual

74. Conceptual

75.

$$A_R = A_0\sqrt{1^2 + 2^2 + 2 \cdot 1 \cdot 2 \cdot \cos 60^o} = \sqrt{7}A_0$$
$$\therefore\ I_R = 7I_0$$

76.
$$\lambda = vT$$
$$\lambda' = (v - v_s)T$$

77. Path difference $= \Delta x = d_2 - d_1 = 0.5$

$$\Delta\phi = \frac{2\pi}{\lambda}\Delta x = \frac{2\pi.v}{\upsilon}\Delta x$$
$$2\pi \times \frac{100}{300} \cdot \frac{1}{2} = \frac{\pi}{3}$$

Intensity at C:

$$\frac{P_1}{4\pi d_1^2} + \frac{P_2}{4\pi d_2^2} + \frac{2}{4\pi d_1 d_2}\sqrt{P_1 P_2}\cos\left(\frac{\pi}{3}\right)$$
$$= 6\ W/m^2$$

78. Use Doppler's effect.

79. For points A and B, path difference = π

$\therefore$ Destructive interference at point A and B.

At point C, path difference = 50 m = $\frac{\lambda}{2} \pm \frac{\lambda}{2}$

80.
$$L_1 + e = \frac{\lambda}{4}$$
$$L_2 + e = \frac{3\lambda}{4}$$
$$L_2 - L_1 = 2(L_1 + e)$$
$$e = \frac{L_2 - 3L_1}{2}$$
$$e = \frac{0.35 - 0.3}{2} = \frac{0.05}{2}$$
$$e = 0.025\,m$$

81.
$$f_1 = f_0 \frac{\upsilon - \upsilon_0 \cos\theta}{\upsilon}$$
$$f_2 = f_0 \frac{\upsilon - \upsilon_0}{\upsilon}$$

Thus, $f_1 > f_2$ $[\because \upsilon_0 \cos\theta < \upsilon_0]$

82. Conceptual

83. Use Doppler Effect

84. Use $E = \int_0^L \frac{1}{2}\lambda K^2 v^2 A^2 \sin^2 Kx\, dx$

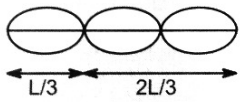
85. Pressure variation in the medium $= -B\frac{\Delta V}{V} = -B\frac{\Delta S}{\Delta x}$

[B = Bulk modulus of gas]

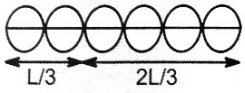
86. Conceptual

87.

$$\frac{3\lambda}{2} = L$$



Fundamental $v = \frac{3}{2L} v$



88. Conceptual

89. $\int_0^{\lambda/2} \frac{1}{2} \rho s \omega^2 [2A\cos Kx]^2 \, dx$

90.