MAJOR TEST

ALLEN AIIMS # 02 | **DATE : 14 - 05 - 2013**

FULL SYLLABUS

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
A.	**2**	**3**	**1**	**3**	**3**	**4**	**2**	**3**	**3**	**4**	**1**	**1**	**1**	**1**	**1**	**2**	**4**	**2**	**4**	**3**	**4**	**4**	**2**	**3**	**4**
Q	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
A.	**1**	**2**	**3**	**3**	**3**	**2**	**1**	**2**	**2**	**3**	**4**	**2**	**3**	**3**	**1**	**1**	**1**	**4**	**2**	**1**	**3**	**4**	**3**	**4**	**3**
Q.	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
A.	**2**	**1**	**4**	**1**	**4**	**2**	**1**	**2**	**2**	**2**	**1**	**2**	**4**	**1**	**1**	**2**	**2**	**4**	**4**	**3**	**3**	**4**	**2**	**2**	**3**
Q.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
A.	**4**	**3**	**4**	**2**	**1**	**4**	**4**	**1**	**2**	**1**	**4**	**1**	**2**	**2**	**2**	**3**	**1**	**3**	**3**	**3**	**4**	**3**	**3**	**4**	**4**
Q.	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
A.	**4**	**2**	**3**	**2**	**3**	**3**	**4**	**1**	**2**	**4**	**3**	**3**	**4**	**2**	**2**	**1**	**4**	**3**	**1**	**2**	**1**	**2**	**4**	**1**	**2**
Q.	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
A.	**1**	**4**	**2**	**3**	**4**	**2**	**4**	**2**	**1**	**3**	**2**	**4**	**4**	**4**	**4**	**3**	**3**	**1**	**2**	**2**	**3**	**1**	**3**	**2**	**2**
Q.	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
A.	**1**	**1**	**1**	**1**	**1**	**2**	**1**	**4**	**4**	**1**	**1**	**1**	**2**	**1**	**4**	**3**	**2**	**2**	**3**	**4**	**3**	**3**	**3**	**3**	**2**
Q.	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
A.	**1**	**2**	**3**	**4**	**1**	**1**	**3**	**2**	**3**	**2**	**2**	**1**	**2**	**1**	**2**	**1**	**4**	**2**	**2**	**1**	**2**	**3**	**3**	**4**	**1**

HINT – SHEET

22.

$$\vec{A}+\vec{B} = \left(A_x\hat{i}+A_y\hat{j}+A_z\hat{k}\right) + \left(B_x\hat{i}+B_y\hat{j}+B_z\hat{k}\right)$$

$$= \left(A_x+B_x\right)\hat{i}+\left(A_y+B_y\right)\hat{j}+\left(A_z+B_z\right)\hat{k}$$

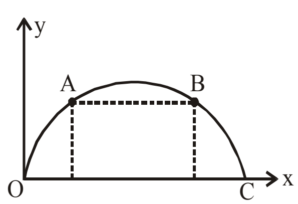
if $\vec{A}+\vec{B}=\vec{o}$

$$A_x+B_x=0 \Rightarrow A_x=-B_x$$

$$A_y+B_y=0 \Rightarrow A_y=-B_y$$

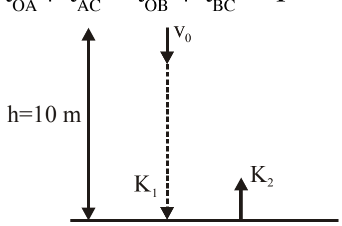
$$A_z+B_z=0 \Rightarrow A_z=-B_z$$

25.



$$t_{OA} + t_{AC} = t_{OB} + t_{BC} = T$$

26.



$$v_1^2 = v_0^2 + 2gh$$

At it looses 50% of its energy during collision so

$$K_2 = \frac{1}{2}K_1$$

$$\frac{1}{2}\ mv_2^2 = \frac{1}{2}\left[\frac{1}{2}m(v_0^2+2gh)\right]$$

$$v_2^2 = \frac{v_0^2}{2} + gh$$

After collision it is able to reach at 10m height

$$\text{so } \frac{1}{2}\ mv_2^2 = mgh$$

$$\frac{1}{2}m\left(\frac{v_0^2}{2}+gh\right) = mgh$$

$$\frac{v_0^2}{2}+gh = 2gh$$

$$\frac{v_0^2}{2}=gh$$

$$v_0 = \sqrt{2gh}=\sqrt{2\times 9.8\times 10}$$

$$= 14\ m/s$$

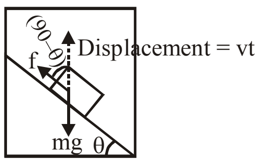
27. For low pass filter, frequency greater than $\frac{1}{C}$ can't pass trhough filter

$\Rightarrow f < \frac{1}{C} \Rightarrow f < \frac{1}{RC} = 4 \times 10^4$ Hz

$= 40$ KHz

in given options maximum frequency below 40 KHz is 10.62 KHz

28.



$w = F\, d \cos\theta$

$w = f(vt)\cos(90 - \theta)$

$\because$ Angle between friction and displacement is $(90° - \theta)$

$\because f = mg\sin\theta$

$\therefore w = (mg\sin\theta)(vt)(\sin\theta)$

$= mgvt\sin^2\theta$

32. $\frac{1}{\lambda} \propto \left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$

33. $\frac{eV_{O_1} + \phi_0}{eV_{O_2} + \phi_0} = \frac{hc/\lambda_1}{hc/\lambda_2} = \frac{\lambda_2}{\lambda_1}$

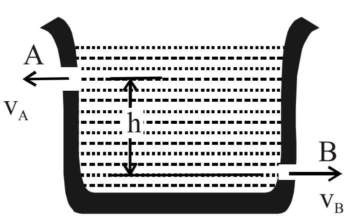
34. Active fraction $= \frac{1}{4} = \frac{1}{2^{+1/T_{1/2}}}$

$\therefore \quad t = 2T_{1/2}$

35. Net force $= F = F_B - F_A = \frac{\Delta p_B}{\Delta t} - \frac{\Delta p_A}{\Delta t}$

$= av_B\rho \times v_B - av_A\rho \times v_A$

$F = a\rho\left(v_B^2 - v_A^2\right)$ ....(1)



According to Bernoulli's theorem

$\rho_A + \frac{1}{2}\rho v_A^2 + \rho gh \Rightarrow \rho_B + \frac{1}{2}\rho v_B^2 + 0$

$\Rightarrow \frac{1}{2}\rho\,(v_B^2 - v_A^2) = \rho gh$

$v_B^2 - v_A^2 = 2gh$ ....(2)

from equation (1) and (2) we get $F = 2a\rho gh$

37. $V_1 = V_0,\ P_1 = \frac{P_0}{2},\ T_1 = \frac{P_0V_0}{2R}$

$V_2 = 2V_0,\ P_2 = \frac{4P_0}{5},\ T_2 = \frac{8P_0V_0}{5R}$

$\Delta T = \frac{11}{10}\frac{P_0V_0}{R}$

38. By Newton's Law of cooling

$T = T_S + (T_H - T_S)e^{-kt}$

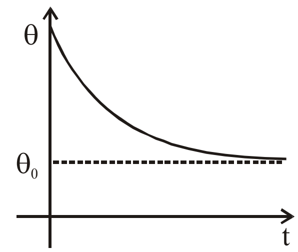
$T_S \rightarrow$ Temp. of surrounding

$T_H \rightarrow$ Temp. of body at $t = 0$

$K \rightarrow$ constant

$T \rightarrow$ Temp. of body at time t

So graph is



39. PT^2 = constant and $PV = nRT$

implies $V \propto T^3$

$\Rightarrow \frac{\Delta V}{V} = 3\frac{\Delta T}{T}$

$\Rightarrow \gamma = \frac{\Delta V}{V\Delta T} = \frac{3}{T}$

40. As gas expands isothermelly

so $P_1 = \frac{P}{2}$

In adiabatic process PV^γ = constant

so $PV^\gamma = P_A(2V)^\gamma$

$\Rightarrow \frac{P_1}{P_A} = 2^{\gamma-1}$

41. $t = t_{stone} + t_{sound}$

$t = \sqrt{\frac{2h}{g}} + \frac{h}{V}$

42. $\lambda = \frac{V}{n} = \frac{1.7\times10^3}{4.2\times10^6} = \frac{17}{42} \times 10^{-3}$

43. $\frac{\lambda}{2} = \ell_2 - \ell_1 = 79.8 - 25.3$

$\frac{\lambda}{2} = 54.5$ cm

$\lambda = 109$ cm

$V = n\lambda = 340 \times \frac{109}{100} = 347$ Hz

44. According to Q. frequency of B may be 318 Hz or 330 Hz. As no. of beat decreases if tension in the string A (i.e. frequency) is reduced so n_B = 318 Hz

45. $x = A\cos(\omega t + \phi)$
$1 = A\cos\phi$ .....(1)
$v = -A\omega\sin(\omega t + \theta)$
$\pi = -A\pi\sin\phi$
$-1 = A\sin\phi$ ....(2)
from (1) & (2)
$A = \sqrt{2}$
$\tan\phi = -1$
$\therefore\ \phi$ will be $-\frac{\pi}{4}$

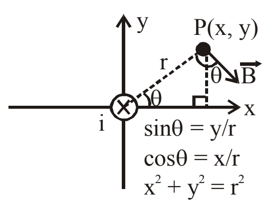
53. $B = \frac{\mu_0 M}{2\pi R^3}$

$x = \frac{B}{M} \propto \frac{1}{R^3}$

$x' = \frac{x}{8}$

54. $\vec{B} = (B\sin\theta)\hat{i} - (B\cos\theta)\hat{j}$

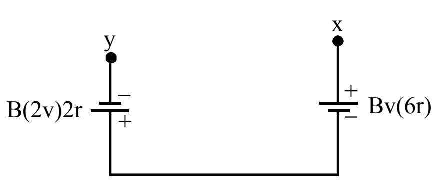
$B = \frac{\mu_0 i}{2\pi r}$



$\vec{B} = \frac{\mu_0 i}{2\pi r^2}(y\hat{i} - x\hat{j})$

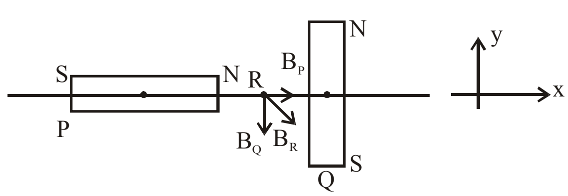
$\vec{B} = \frac{\mu_0 i}{2\pi(x^2 + y^2)}(y\hat{i} - x\hat{j})$

55.



$V_{xy} = 6Bvr + 4Bvr = 10Bvr$

56. $B_R = \sqrt{B_P^2 + B_Q^2} = \sqrt{(2B)^2 + (B)^2} = \sqrt{5}B$



57. $X_L = \omega L = 10^3 \times 2 \times 10^{-3} = 2\Omega$

$X_C = \frac{1}{\omega C} = \frac{1}{10^3 \times 400 \times 10^{-6}} = 2.5\Omega$

$Z = X_L - X_C = 0.5\ \Omega$

$I = \frac{V}{Z} = \frac{100}{0.5} = 200A$

$V_L = IX_L = 200 \times 2 = 400V$

59. Maximum wavelength is given by $Z_F = \frac{a^2}{\lambda_{max}} \Rightarrow$

$\lambda_{max} = \frac{a^2}{Z_F} = \frac{(50)^2}{20 \times 10^3} = 0.125$ m = 12.5cm.

60. Angular fringe width $\alpha \propto \lambda$

$\frac{\alpha_1}{\alpha_2} = \frac{\lambda_1}{\lambda_2} \Rightarrow \frac{\alpha_{air}}{\alpha_{water}} = \frac{\lambda_{air}}{\lambda_{water}}$

$\because\ \lambda_{water} = \frac{\lambda_{air}}{\mu_m}$; $\alpha_{water} = \frac{\alpha_{air}}{\mu_m} = \frac{0.2}{4/3} = 0.15°$.

61. Critical miscelle concentration $\propto \frac{1}{\text{size of alkyl gp.}}$

64. $\Delta T_f = i \times K_F \times m$

$2 = 1.72 \times \frac{20 \times 1000}{172 \times 50} \times i$

$i = \frac{2}{4} = \frac{1}{2} = 0.5$

66. $E_{cell} = E^\circ_{cell} - \frac{RT}{nF}\ell nQ$

$= E^\circ_{cell} - \frac{RT}{2 \times F}\ell n\frac{[0.001]}{[0.1]}$

$= E^\circ_{cell} - \frac{RT}{F}\ell n\ (10^{-2})^{1/2}$

$= 0 - \frac{RT}{F}\ell n\ (10^{-1})$

$E_{cell} = -\frac{RT}{F}\ell n[0.1]$

68. $2Al + \frac{3}{2}O_2 \longrightarrow Al_2O_3$

2×27gm $\longrightarrow \left(\frac{3}{2} \times 32\right)$gm of O_2

27 gm ....$= \frac{3 \times 32}{2 \times 54} \times 27$

= 24 gm

73. B is the limiting reactant

$\therefore$ reaction proceeds according to B

74. Values for $m = n^2 = 4^2 = 16$

75. Partial pressure $\propto$ mole fraction.

76. Electron is added on anion hence due to repulsion EA will be + ive.

77. $[\partial = r_A + r_B - 0.09\ \Delta EN]$

shoomaker-sterenson equation

79. $[CH_3Cl > CH_3F]$ dipolemoment

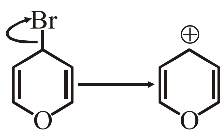
In CH_3Cl ∂ is more hence H is also high

82. In Alum $M_2SO_4 . M_2^1(SO_4)_3.24H_2O$

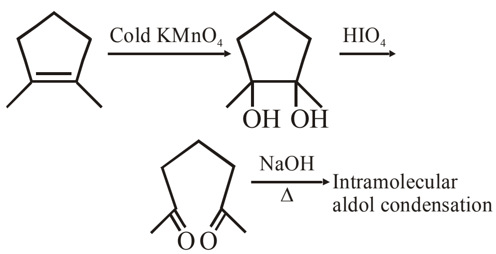
here M must be monovalent

84. Due to smaller size have more tendency to form complexes.

86. $CH_3-CH_2-\overset{\overset{CH_3}{|}}{CH}-CH_2-O-CH_2-CH_3 \xrightarrow{\text{Cold HI}} SN^2$ Reaction

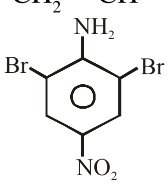
88. 

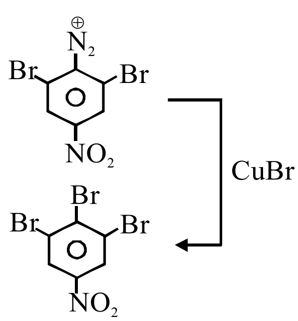
(Aromatic)

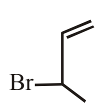
89. 

90. $A \Rightarrow CH_2 = CH - CH = O$

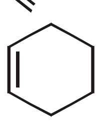
$B \Rightarrow CH_2 = CH - CH_3$

91. X = 

Y = (i) = , (ii) = 

94. (A) 

(B) 

(C) 

95. (P) gives acetone while (Q) gives propanal.

96. $CH_3-\ddot{N}H-\underset{\underset{O}{\|}}{C}-H$

*ℓp is delocalised

* least basic

97. NCERT (XII) Part-II Page # 443

101. NCERT, Page No. # 4 & 5

102. NCERT, Page No. # 18

103. NCERT, Page No. # 22

106. NCERT - Page No. # 101-102

107. NCERT - Page No. # 109, Fig. 7.11 (E/H)

108. NCERT - Page No. # 245, 95, 96

111. NCERT, Page No. 167

112. NCERT-XIth - Page No. # 212, 213

113. NCERT-XIth - Page No. # 248

114. NCERT-XIth - Page No. # 177

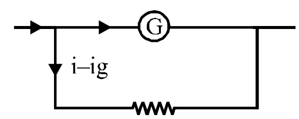
120. NCERT-XII-E, Fig. 3.2, Page No. 44

123. NCERT-XIIth, Page No. # 117

125. NCERT-XIIth, Page No. # 83

130. NCERT XIIth Pg. No.157-158(E), 169-171(H)

158. To increase the range of ammeter resistance should be decreased (So additional shunt is connected in parallel)



170. Deep pink color of $KMnO_4$

$(r_{xn}^{+7}$ unpaired electron is zero) is due to charge transfer spectra.

173. NCERT (2012), XII, Part-II, Page # 406

174. NCERT (2012), XII, Part-II, Page # 435

177. $\overset{sp^2}{CH_2}=\overset{sp^2}{CH}-\overset{sp}{C}\equiv\overset{sp}{CH}$

178. Red ppt of R–C≡C.Cu is formed.

181. NCERT, Page No. # 36 & 38

182. NCERT, Page No. # 38

186. NCERT-XIth - Page No. # 235

187. NCERT-XIth - Page No. # 204

192. NCERT-XIIth, Page No. # 78

193. NCERT-XIIth, Page No. # 77

196. NCERT XIth Pg. No.134(E),(H)