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 **JEE ADVANCED** **DATE : 03-01-16**

TIME : 09:00 AM TO 12: 00 Noon **2013_P1 MODEL** **MAX MARKS : 180**

KEY & SOLUTIONS

PHYSICS

1	**C**	2	**A**	3	**A**	4	**C**	5	**B**	6	**A**
7	**B**	8	**C**	9	**B**	10	**A**	11	**C**	12	**ACD**
13	**BD**	14	**AC**	15	**AB**	16	**5**	17	**7**	18	**3**
19	**2**	20	**2**								

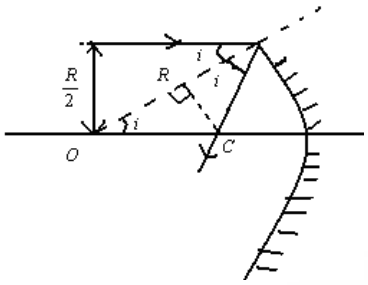
CHEMISTRY

21	**B**	22	**D**	23	**B**	24	**C**	25	**A**	26	**A**
27	**B**	28	**D**	29	**D**	30	**A**	31	**ACD**	32	**ACD**
33	**B**	34	**ABC**	35	**AB**	36	**2**	37	**2**	38	**1**
39	**5**	40	**2**								

MATHEMATICS

41	**D**	42	**C**	43	**B**	44	**C**	45	**A**	46	**D**
47	**B**	48	**D**	49	**C**	50	**A**	51	**CD**	52	**ABCD**
53	**BD**	54	**ABD**	55	**ABC**	56	**4**	57	**2**	58	**3**
59	**4**	60	**6**								

PHYSICS

1. 

From figure $BC\cos i = \frac{R}{2}$

$\therefore OC = \frac{R}{\sqrt{3}}$ & $x = R - \frac{R}{\sqrt{3}}$

2. Taking PV^x = constant

x =3/2

$C = \frac{3R}{2} + \frac{R}{1-x} = \frac{-R}{2}$

3.

4.

$Pe^{\alpha V} = P_0$

$or\ \ PV = P_0 V e^{-\alpha V} = nRT$

$T = \frac{P_0}{nR}\left[Ve^{-\alpha V}\right]$, $\frac{dT}{dV} = \frac{P_0}{nR}\left[e^{-\alpha V} + Ve^{-\alpha V}(-\alpha)\right]$

$or\ \ \alpha = \frac{1}{V}$

$\therefore T = \frac{P_0}{nR} = \frac{e^{-1}}{\alpha} = \frac{P_0}{neR\alpha}$

$\frac{d^2T}{dV^2} = \frac{P_0}{nR}\left[-\alpha e^{-\alpha R} + (1-\alpha V)e^{-\alpha V}(-\alpha)\right]$

$= -\frac{P_0}{nR}e^{-\alpha V}\left[2-\alpha V\right]$

$\left(\frac{d^2T}{dV^2}\right)_{\alpha=\frac{1}{V}} = -\frac{P_0\alpha}{nR}e^{-1}$

5. $I = 4I_0\cos^2\frac{\varphi}{2}$

$\frac{dI}{dt} = -4I_0\sin\varphi.\frac{d}{dt}\left[\frac{2\pi}{\lambda}(d\tan\theta)\right]$

$= -4\sin\left[\frac{d\lambda}{D}\right]\frac{d}{dt}\left[\frac{2\pi}{\lambda}.\frac{d\lambda}{D}\right]$

$= -4\left[\frac{2x10^{-3}}{12}x5x10^{-10}\right]\frac{2\pi}{D}.\frac{d}{dt}(d)$

$$= \frac{-4x10^{-12}}{21} \cdot \frac{2\pi}{12}$$

$$= \frac{\pi}{18} x10^{-12}$$

6. Principal axis for L_1 is 0.5 cm below x- axis and 0.5 cm above for L_2
For L_1
v = 100 cm m = -1
For L_2
v = 175/6 and m = 5 /12

7. $Q = \sigma\left(T_1^4 - T_3^4\right)$
$= \sigma\left(T_3^4 - T_4^4\right)$
$= \sigma\left(T_4^4 - T_2^4\right)$
$3Q = \sigma\left(T_1^4 - T_2^4\right) = Q_0$

CHEMISTRY

21. Dissociation leads to lower molecular weight.

22. $m = \frac{2.4}{6.0} \times \frac{1000}{100} = 0.4m(urea)$

$0.1m\ Hg_2(NO_3)_2 \Rightarrow 3 \times 0.1m = 0.3m(particles)$

$\frac{2.4}{6.0} \times \frac{1000}{90} \Rightarrow m > (0.4m)$

$Hg_2(NO_3)_2$ 0.24 m urea solutions suffer depression in freezing point than 0.2 m NaCl.

23. Nernest Equation based.

24. Fact.

25. Common ion effect on HCOOH by $HCOONa\ and\ NH_4OH$ by NH_4Cl.

26. Fact.

27. Change in Vanthoff Factor. After ppt is removed.

28. Boiling point of pure water 373K. Hence Ethanol – water azoetrope is a low boiling azoetrope.

29. $10^{-2}F \Rightarrow \left[H^+\right] = 10^{-2}(to\ be\ developed)$

$Formed\left[H^+\right] = 5 \times 10^{-3}$

$\therefore efficiency = \frac{5 \times 10^{-3}}{10^{-2}} \times 100 = 50\%$