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 : 06-12-15
TIME : 02:00 AM TO 05: 00 PM	2013_P2 MODEL	MAX MARKS : 180

KEY & SOLUTIONS

PHYSICS

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

CHEMISTRY

21	**ABC**	22	**BCD**	23	**AB**	24	**ABCD**	25	**ABC**	26	**BC**
27	**ABC**	28	**ABCD**	29	**C**	30	**D**	31	**A**	32	**A**
33	**A**	34	**B**	B	**A**	36	**B**	37	**A**	38	**D**
39	**B**	40	**B**								

MATHEMATICS

41	**ABCD**	42	**D**	43	**ABD**	44	**ABCD**	45	**BC**	46	**ABCD**
47	**ABD**	48	**ABD**	49	**D**	50	**D**	51	**A**	52	**B**
53	**A**	54	**B**	55	**B**	56	**C**	57	**A**	58	**A**
59	**A**	60	**A**								

MATHS

41. $\sin(1-x)\geq 0, \cos x \geq 0, \sin(1-x)=\cos x$

$\Rightarrow \cos x = \cos\left(\frac{\pi}{2}-(1-x)\right) x = 2n\pi \pm \left(\frac{\pi}{2}-1+x\right) \Rightarrow 2x = 2n\pi - \frac{\pi}{2}+1 \Rightarrow x = n\pi - \frac{\pi}{4}+\frac{1}{2}$

Least positive $x=\frac{1}{2}+\frac{7\pi}{4}$ a=1,b=7,c=4

42. $\left.\begin{array}{l}\tan A = a\\ \tan B = b\\ \tan C = c\end{array}\right\} given \frac{\sqrt{2}a+b}{b\sqrt{2}+c} = \frac{\left(\sqrt{2}a+b\right)\left(b\sqrt{2}-c\right)}{2b^2-c^2} = \frac{2ab+\left(b^2-ac\right)\sqrt{2}-bc}{2b^2-c^2}$ is rational if $b^2=ac$

$D)\frac{a^2+b^2+c^2}{a+c-b} = \frac{(a+c-b)^2+2ab+2bc-2ac}{a+c-b}$

$= \frac{(a+c-b)^2+2\left(ab+bc-b^2\right)}{(a+c-b)} = (a+c-b) = \frac{(a+c-b)^2+2\left(ab+bc-b^2\right)}{a+c-b} = (a+c-b)+2b = a+b+c$

which is an integer.

43. $A+B=C \Rightarrow \tan C - \tan A - \tan B = \tan A \tan B \tan C$

44.

45. $P=4$

A) No.of solutions=0

B) No.of solutions=6

C) No.of solutions=4

D) No.of solutions=2

46.

47.

48. $\left.\begin{array}{l}n_1=5\\ n_2=9\end{array}\right\}$

49.

50.

51. clearly $\sin\theta, \cos\theta, \sin\theta\cos\theta$ are roots

$\therefore \lambda^2+\mu^2+\delta^2=\sin^2\theta+\cos^2\theta+\sin^2\theta\cos^2\theta$

$=1+\frac{1}{4}\sin^2\theta\in\left[1,\frac{5}{4}\right]$

Maximum value $=\frac{5}{4}\ \frac{\pi}{4}<\theta<\frac{\pi}{2}\sin\theta\cos\theta<\cos\theta<\sin\theta\Rightarrow \frac{\begin{matrix}\lambda=\sin\theta\cos\theta\\ \delta=\sin\theta\end{matrix}}{\lambda+\delta=\sin\theta(1+\cos\theta)}$

Maximum occurs at $\theta=\frac{\pi}{3}$ Maximum $=\frac{3\sqrt{3}}{4}$

53.

54. $A\cap B\cap C$ Consists of half ring area required area $=\frac{1}{2}\left(\pi\left(R^2-r^2\right)\right)=\frac{\pi}{2}\{16-12\}=2\pi$

(Also same for the other question)

55. $\tan\left(\frac{19\pi}{24}\right)=2+\sqrt{2}-\sqrt{3}\Rightarrow a=2,\ b=3$

$GE=\cos 24^0\cos 48^0\cos 96^0\cos 168^0=\cos 24^0\cos 48^0\cos 84^0\cos 12^0$

$=\left(\frac{1}{4}\frac{\cos 72^0}{\cos 36^0}\right)\left(\frac{1}{4}\frac{\cos 36^0}{\cos 72^0}\right)=\frac{1}{16}=\frac{1}{a^4}$

$GE=\left(1+\cos\frac{11}{8}\right)\left(\sin\frac{3\pi}{8}\right)=\left(\frac{\sqrt{2}-1}{2\sqrt{2}}\right)\left(\frac{\sqrt{2}+1}{2\sqrt{2}}\right)=\frac{1}{8}=\frac{1}{2b+a}$

56.

57. $\left.\begin{matrix}x=n\pi\\ y=\frac{m\pi}{2}\\ z=(4k-1)\frac{\pi}{6}\end{matrix}\right\}m,n,k\in z$

$\therefore x+y=(2n+m)\frac{\pi}{2}$

58. A) For $a=-7,-4,-8,0$ there exists x and θ

B) $x=0$ solution $\Rightarrow n=1$

C) $x=0,\frac{\pi}{2},2\pi\Rightarrow sum=\frac{5\pi}{2\pi}$

D) $GE=0$

59. A) Range of a is $\left[\frac{-5}{4}\right] \Rightarrow \left|\frac{m}{l}\right| = 4$

B) No of solutions=5 $\left(\because n + \frac{1}{x} = \frac{7-3n}{3n-1}\right)$

C) No of values=8

D) $GE = \sum_{s=1}^{\infty} \frac{\tan\left(\frac{\theta}{2^n}\right)}{2^{n-1} fos\left(\frac{\theta}{2^{n-1}}\right)} = \frac{2}{\sin 2\theta} - \frac{1}{\theta} \left.\begin{array}{r} \Rightarrow a = 2 \\ b = 2 \end{array}\right\} a + b = 4$

60. A) $\alpha = 0 \Rightarrow \left[\frac{\alpha}{2}\right] = 0$

B) $GE = 2^6 \Rightarrow$= No of divisions=7

C) No.of solutions=1 $(\because n = 0\, is\, only\, root)$

D) $\sin\left(x + x^2\right) - \sin x^2 = \sin x \Rightarrow x^2 + x = 2n\pi\,(or)\,x^2 - 2k\pi$ No of solutions=2