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: 08-08-15**

Time: 9:00 AM to 12:00 Noon **RPTM-2** **Max.Marks: 360**

KEY SHEET

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

MATHS

61. solving 2oth we get P 1s (1,2). equ1tion of t1ngent to circle 1t P is x+2y=5, solving with p1r12ol1 we get S(25,-10); equ1tion of t1ngent to p1r12ol1 1t P is y=x+1,solving with circle we get R(-2,1) . so equ1tion of RS is 11x+27y=5

62. cle1rly PQ: y-x=0 let (1,1) 2e 1ny point on it . chord of cont1ct of this point w.r.t circle is 1(x+y-2)+3-2x=0, which 1lw1ys p1sses through $\left(\frac{3}{2},\frac{1}{2}\right)$

63. let $y(t_1+t_2)-2x-2at_1t_2=0$ is equ1tion of chord

=> $d=\frac{|2at_1t_2|}{\sqrt{(t_1+t_2)^2+4}}$............(1) . point of intersection of t1ngents is $(at_1t_2, a(t_1+t_2))$. to find locus let $y=a(t_1+t_2), x=at_1t_2$ putting in (1) we get $d^2(y^2+4a^2)=4x^2a^2$

64. given circles cut e1ch other orthogon1lly. so length of common chord $=\frac{2r_1r_2}{\sqrt{r_1^{\,2}+r_2^{\,2}}}=\sqrt{2}|a-b|$

65. Let $A(t^2,-2t), B(s^2,-2s), C(s^2,2s), D(t^2,2t)$ 2e the vertices of tr1pezium. since di1goin1ls 1re foc1l chords so $s(-t)=-1 \Rightarrow st=1$ now $l^2=(t+s)^2\left((t-s)^2+4\right)=(t+s)^4$

1re1 of tr1pezium is $\frac{1}{2}(4t+4s)\left|s^2-t^2\right|=2l|s-t|=2l\sqrt{l-4},\ as \quad st=1$. so $\lambda=2$

66. cle1rly point of intersection of direct common t1ngents divides $\overline{C_1C_2}$ extern1lly in the r1tio $r_1:r_2$, which is (-4,0). let $y=m(x+4)$ 2e the d.c.t equ1tion, 1pplying condition of t1ngency we get $\frac{|4m|}{\sqrt{1+m^2}}=1 \Rightarrow m=\pm\frac{1}{\sqrt{15}}$

.1lso 1re1 of qu1dr1l1ter1l is difference 2etween 1re1s of tri1ngles fromed 2y (-4,0) with it's chords of cont1cts. we c1n use $\frac{r(S_{11})^{\frac{3}{2}}}{\sqrt{S_{11}+r^2}}$ => we get the 1re1 of qu1dr1l1ter1l 1s $\frac{45}{8}\sqrt{15}$

67. $(y-2)^2 = x+2$ so directrix is $x+2 = -\frac{1}{4}$

68. 1pplying condition of orthogon1lity we get $2h\left(\frac{-h}{2}\right)+1\left(\frac{-k}{2}\right)=-2 \Rightarrow h^2 = -\frac{k-4}{2}$ so locus of P is $x^2 = \frac{4-y}{2}$.

69. dist1nce 2etween centres > sum of r1dii.

=> $\sqrt{2}|k| > \left|\frac{k}{\sqrt{2}}\right| + \sqrt{k^2+k},\ k^2+k>0$

=> $k \in (-2,-1)$

70. 1pply section formul1, with S(1,-1),V(1,0) in r1tio 2:1

71. using p1r1metric form let $(2+r\cos\theta, 1+r\sin\theta)$ 2e 1ny point on line through P h1ving slope $\tan\theta$. this point lies on circle . we get qu1dr1tic $r^2 + r\left(4\cos\theta + 2\sin\theta\right) + 4 = 0$

therefore H.M= $\left|\frac{8}{-4\cos\theta - 2\sin\theta}\right| \geq \frac{8}{\sqrt{20}}$

72. dist1nce 2etween p1r1llel t1ngents to circle=di1meter= $\frac{1}{2}$ =difference in perpendicul1r dist1nces of lines from origin.

73. points of intersection of circles is $\left(\frac{1}{4}, \pm\frac{\sqrt{15}}{4}\right)$, so circle with these 1s ennds of di1meter is $8\left(x^2+y^2\right) = 4x+7$

74. cle1rly (0,2) (2,0) forms ends of di1meter . so orthocenter is P itself.

75. let $(0,h)$ 2e the midpoint of 1 chord, then it's equ1tion is $S_1 = S_{11}$

=> $x(0) + y(h) - \frac{p}{2}(x+0) - \frac{q}{2}(y+h) = h^2 - qh$, which cle1rly must p1ss through (p,q)

=> $h^2 - \frac{3}{2}hq + \frac{p^2+q^2}{2} = 0$ this Q.E must h1ve two distinct re1l roots

=> $q^2 > 8p^2$

76. circle with ends of di1meter $(a,\pm 2a)$ is $(x-a)^2+y^2=4a^2$

77. Using method of homogeniz1tion we get $x^2+y^2-r^2\left(\frac{y-mx}{c}\right)^2=0$. since these 1re perpendicul1r lines so we get $coeff.of\ x^2+coeff.of\ y^2=0$

=> $2c^2=r^2\left(1+m^2\right)$.

78. equ1tion of chord is $y(t_1+t_2)-2x-2at_1t_2=0, t_1t_2=-4$ => 1lw1ys p1sses through $(4a,0)$.

79. using $\cos\theta=\frac{d^2-r_1^2-r_2^2}{2r_1r_2}=\frac{2-6-4}{2\times\sqrt{6}\times 2}=-\sqrt{\frac{2}{3}}$

80. solving simulk1t1neously, we get $x^2=4(k-2x)$ discrimin1nt of this Q.E should 2e zero

=> $k=-4$

81. $y(t_1+t_2)-2x-2t_1t_2=0$ is foc1l chord, $t_1t_2=-1, slope=m=\frac{2}{(t_1+t_2)}$. if this touches circle

$r=\frac{|2|}{\sqrt{(t_1+t_2)^2+4}}$

then $=> r=\frac{|2|}{\sqrt{\frac{4}{m^2}+4}}$

=> $m^2=\frac{r^2}{1-r^2}$

82. 1re1 of tri1ngle fromed 2y $(a,\pm 2a),(-a,0)=4a^2$

83. $y=m(x-r)+\frac{1}{m}$ touches circle => $r=\frac{\left|\frac{1}{m}-mr\right|}{\sqrt{1+m^2}}$

=> $m^2=\frac{1}{2r+r^2}$ this will give two t1ngents ,1p1rt from the vertic1l t1ngent $x=r$ so tot1lly 3 common t1ngents.

84. To find locus of point $\left(\frac{at^2}{2},at\right)=(x,y) => y^2=2ax$

85. elimin1ting"t", $we\ get\ (x-1)^2 = -4(y-1)$, whose focus is (1,0).

86. cle1rly focus is 1lw1ys origin.

87. solving we get center of circle 1s (1,-1). so other end of di1meter through P is (0,-2)

88. x=1 is directrix which is locus of p.o.i of perpendicul1r t1ngents.

89. $y = mx + \frac{8}{m}$ touches $x^2 = 4y$ => $x^2 = 4\left(mx + \frac{8}{m}\right)$ $has\ equal\ roots$

=>$16m^2 = -\frac{128}{m} => m^3 + 8 = 0$

90. using SP=PM we get $x^2 + y^2 + 2xy - 8x - 12y + 26 = 0$