JEE-ADVANCE-2014-P1-Model

Time: 09:00 AM to 12:00 Noon **IMPORTANT INSTRUCTIONS** **Max Marks: 180**

PHYSICS:

Section	Question Type	+Ve Marks	- Ve Marks	No.of Qs	Total marks
Sec – I(Q.N : 1 – 10)	Questions with Multiple Correct Choice	3	0	10	30
Sec – II(Q.N : 11 – 20)	Questions with Integer Answer Type	3	0	10	30
Total				**20**	**60**

CHEMISTRY:

Section	Question Type	+Ve Marks	- Ve Marks	No.of Qs	Total marks
Sec – I(Q.N : 21 – 30)	Questions with Multiple Correct Choice	3	0	10	30
Sec – II(Q.N : 31 – 40)	Questions with Integer Answer Type	3	0	10	30
Total				**20**	**60**

MATHEMATICS:

Section	Question Type	+Ve Marks	- Ve Marks	No.of Qs	Total marks
Sec – I(Q.N : 41 – 50)	Questions with Multiple Correct Choice	3	0	10	30
Sec – II(Q.N : 51 – 60)	Questions with Integer Answer Type	3	0	10	30
Total				**20**	**60**

PART-III_MATHEMATICS **Max Marks : 60**

Section-1
(One or More options Correct Type)

This section contains 10 multiple choice equations. Each question has four choices (**A**) (**B**)(**C**) and (**D**) out of which **ONE or MORE** are correct.

41. The locus of a point, which is such that the lengths of tangents from it to two concentric circles having centre at (α,β) and radii λ and μ, are inversely proportional to their radii, is a circle C of area 10π then

A) centre of C is at centre of given circles

B) Centre of C is at $\sqrt{10}$ from centre of given circles

C) $\lambda^2+\mu^2=10$

D) $\lambda^2+\mu^2=100$

42. Tangents from $P(2,3)$ to a circle C touch at $A(1,4)$ and $B(3,4)$ then

A) $a+b+c=13$ if equation of C is $x^2+y^2+ax+by+c=0$

B) The radius of the circle is $\sqrt{2}$

C) The circumcentre of ΔPAB lies inside C

D) The area of ΔQAB, where Q is centre of C, is 1 square unit

43. A circle C which touches the curve $y^2+xy-x^2=4$ at (2,2) and also touches the line $x-3y-6=0$ then

A) The number of possible circles C is infinite

B) Equation of C can be $x^2+y^2-5x-y+4=0$

C) Equation of C can be $x^2+y^2-8x-2y+\frac{29}{2}=0$

D) The point (1,0) lies inside C

44. Five circles $S_i = 0, i = 1,2,3,4,5$ have centres respectively at $C_1(0,0), C_2(2,2), C_3(6,10), C_4(1,-2), C_5(4,-3)$ and the line $y = mx + c$ is common tangent to all five circles such that C_1, C_2, C_3 lie on one side and C_4, C_5 lie on other side of the tangent. It is given that sum of radii of $S_1 = 0$ and $S_2 = 0$ is equal to radius of $S_4 = 0$ and also sum of radii of $S_2 = 0, S_3 = 0$ is equal to the radius of $S_5 = 0$ then

A) $m = c$ B) $m + c = 0$ C) $m^2 + c^2 = 2$ D) $|m| = |c|$

45. Let the tangents drawn to the circle $x^2 + y^2 = 16$ from the point $P(0,h)$ meet the x-axis at A and B. If the area of ΔAPB is minimum then which may be true

A) $h = 4\sqrt{2}$ B) $AB = 8\sqrt{2}$

C) in radius of ΔAPB is $4\left(2-\sqrt{2}\right)$ D) Perimeter of ΔAPB is $8+4\sqrt{2}$

46. If ABCD is a square of side 4 units M is the midpoint of CD. Now circle with radius 2 and centre M intersects another circle with radius 4 and centre A at the points P and Q. If A is the origin and B is (4,0) and if P is (α, β) then $\left[|\alpha| + |\beta|\right]$ is ([] is G.I.F)

A) 3 B) 4 C) 5 D) 6

47. If a chord of the circle $x^2 + y^2 - 4x - 2y - c = 0$ is trisected at the points $\left(\frac{1}{3}, \frac{1}{3}\right)$ and $\left(\frac{8}{3}, \frac{8}{3}\right)$ then

A) Length of the chord $7\sqrt{2}$ B) c = 20

C) Length of intercept of the circle on x-axis $4\sqrt{6}$

D) The circle passes through $(-2,-2)$

48. Consider the family of circles $x^2+y^2-2x-2\lambda y-8=0$ passing through two fixed points A and B. Also S=0 is a circle of this family, the tangents to which at A and B intersect on the line $x+2y+5=0$ then

A) AB=6

B) radius of S=0 is $3\sqrt{2}$

C) $\alpha+\beta=4$ where centre of S=0 is (α,β)

D) Common chord of family of circles is y-axis

49. The locus of the centre of the circles which touches the circle $x^2+y^2-2x-4y+\left(1-2\sqrt{3}\right)=0$ internally and the tangents to which from (1,2) is making 60^0 angle with each other is

A) a circle

B) curve with perimeter $\frac{4}{3}\left(1+\sqrt{3}\right)\pi$

C) an ellipse

D) a curve which bounds an area $\frac{8}{9}\left(2+\sqrt{3}\right)\pi$

50. If the lines $x+2y=1$ and $\lambda x+y=4$ cut the lines of the pair $xy-x-y+1=0$ at A,B,C,D which are concyclic then

A) $\lambda=2$

B) $\lambda=-2$

C) radius of circle $=\sqrt{5}$

D) radius of circle 5/2

Section-2
(Integer Value Correct Type)

This section contains 10 questions. The answer to each question is a **single digit integer, ranging** from 0 to 9 (both inclusive).

51. Tangents are drawn to the circle $x^2+y^2=1$ at the points where it is met by the circles $x^2+y^2-(\lambda+6)x+(8-2\lambda)y-3=0,\lambda$ being parameter. If the locus of point of intersection of these tangents is $y=mx+c$ then $\frac{c}{m}$ equals

52. If (α,β) is a point on the circle whose centre is on x-axis and which touches the line $x+y=1$ at $(3,-2)$ then greatest value of $\alpha+\beta$ equals

53. Two circles can be drawn to pass through $(1,0),(4,0)$ and touch y-axis. If they intersect at an angle θ, then the value of $25\cos\theta-2$ equals

54. Consider a square ABCD of side length 2. Let P be the set of all segments of length 2 with end points on adjacent sides of square ABCD. The mid points of the segments in P enclose a region with area Δ then the value of $\|[\Delta-\pi]\|$ equals where [] is G.I.F

55. Two parallel chords of a circle of radius 2 are distance $\sqrt{3}+1$ apart. If the chords subtend at the centre, angles of $\frac{\pi}{k}$ and $\frac{2\pi}{k}$, where $k>0,$ then the value of $[k]$ equals ([] is G.I.F)

56. Let AB be a chord of the circle $x^2+y^2-4x-4y+4=0$ which subtend an angle 90^0 at the point (2,3), and if locus of the mid point of AB is a circle having centre at (α,β) then $\alpha\beta$ equals

57. The number of integral values of x for which the chord of the circle $x^2+y^2=125$ passing through the point $P(x,8)$ gets bisected at the point $P(x,8)$ and has integral slope is

58. If the equation of the locus of the middle point of a chord of the circle $x^2+y^2=2(x+y)$ such that the pair of lines joining the origin to the point of intersection of the chord and the circle are equally inclined to the x-axis is $ax+by=1$ then $a+b$ equals

59. Two chords of lengths a^2-1 and $3(a+1)$ of a circle with centre at $(2,1)$, bisect each other and if length of the chord of the circle subtending 90^0 at its centre is k then the value of $\frac{\sqrt{2}}{3}k$ equals

60. If the in circle of ΔABC touches the sides BC, CA, AB respectively are $D(3,4),E(4,3),F(5,0)$ and if the slope of internal bisector of $\angle A$ is $\frac{m}{n},m,n\in N,G.C.D(m,n)=1$ then $m+n=$