Kendriya Vidyalaya Sangathan

New Delhi

Support Material in Mathematics

(Important Formula & questions)

FOR CLASS XI (2012)

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CHAPTER-7

(PERMUTATION & COMBINATION)

Points to be remembered

1. Fundamental principle of counting:-

If one operation can be performed in 'm' different ways and if corresponding to each way of performing this operation,there are 'n' different ways of performing second operation ,the two operations together can be performed in (mXn) ways.

2. Factorial:-

The continued product of first 'n' natural numbers is called factorial 'n' or 'n' factorial and is denoted as 'n!'.

3. 0! has no meaning. Conventionally, we define 0! =1.

4. The number of permutation (arrangements of 'n' different things taken 'r' at a time given by ^nP_r (0<=r<=n)

^nP_r = n!/(n-r)!

5. The number of ways in which 'r' vacant places can be filled up with 'n' different things is given by n^r.

6. The number of permutations of 'n' things taken altogether,when 'p' of the things are alike of one kind, 'q' of them alike of another kind, 'r' of them alike of a third kind and the remaining all different is given by:-
n!/(p!q!r!).

7. The number of ways of arranging 'n' distinct objects along a round table= (n-1)!

8. The number of ways of arranging 'n' persons along a round table so that no person has the same two neighbours=(n-1)!/2

9. In forming a necklace, there is no distinction between a clockwise and anticlock wise direction. Hence, the no. of necklace formed with 'n' beads of different colours =(n-1)!/2

10. The number of combination of 'n' different things taken 'r' at a time is given by ^nC_r, (0<=r<=n)

^nC_r= n!/r!(n-r)!

11. $^nC_r + {}^nC_{(r-1)} = {}^{(n+1)}C_r$ where 1<=r<=n, and n,r belongs to N.

12. $^nC_r/{}^nC_{(r-1)}$ = (n-r+1)/r where n,r belongs to N, 1<=r<=n.

13. The number of ways in which (m+n) things can be divided into two groups containing 'm' and 'n' things respectively is given by= (m+n)!/m! n!

SHORT ANSWER TYPE QUESTIONS

1. Find HCF & LCM of 4!,5!,6!?

2. If 1/8! + 3/7! = x/9!, find x?

3. Find 'n' if 5 P(4,n)=6 P(5,n-1)?

4. In how many ways can the letters of the word "EQUATION" be arranged?

5. Ten students are participating in a race. In how many ways can the first three prizes be won?

6. In how many ways can 4 books on mathematics and 3 books on english be placed on a shelf so that books on the same subject always remain together?

7. How many words can be formed out of letters of the word "TRIANGLE". How many of those will begin with 'T' and end with 'E'?

8. In how many ways can 3 prizes be given to 10 students when a student can receive any number of prizes?

9. How many different arrangements can be made from the letters of the word "ENGINEERING"?

10. In how many ways can 6 beads of different colours form a necklace?

11. Evaluate ${}^{10}C_7 + {}^{10}C_6$?

12. If C(2n,3):C(n,3):: 11:1 ,find 'n'?

13. Find the no. of straight lines and no. of triangles that can be formed from 15 non collinear points?

14. Find the no. of all 4-digit nos. with no digit being repeated?

15. Find the no. of all 3-digit even natural nos?

LONG ANSWER TYPE QUESTIONS(4 MARKS)

1. How many nos. greater than 56000 can be formed by using the digits 4,5,6,7,8 if no digit is repeated in any no.?

2. Find the no. of ways in which the letters of "ARRANGEMENT" can be arranged so that the 2 R's and 2 A's don't occur together?

3. A committee of 6 is to be formed from 6 boys and 4 girls. In how many ways can this be done if the committee contains :

(a) 2 girls?   (b) atleast 2 girls?

4. A man has 7 relatives , 4 of them are ladies and 3 gentlemen, his wife also has 7 relatives , 3 of them are ladies and 4 gentlement. In how many ways can they invite a dinner party of 3 ladies and 3 gentleman so that there are 3 of man's relatives and 3 of wife's relatives?

5. Find the no. of all possible arrangement of the letters of the word "MATHEMATICS" taken 4 at a time?

6. From a class of 25 students, 10 are to be chosen for an excursion party. there are 3 students who decide that either all of them will join or none of them will join. In how many ways can the excursion party be chosen?

7. Find the no. of ways in which 5 boys and 5 girls can be seated in 10 seats in a row if the boys and girls are to be seated alternately?

8. In how many ways can the letters of the word "ASSASSINATION" be arranged so that all the S's are together?

9. In an experiment, a question paper consists of 12 questions divided into 2 parts i.e part1 & part2 containing 5 & 7 questions. A student is required to attempt 8 questions in all, selecting atleast 3 from each part. In how many ways can a student select the questions?

10. How many 6-digit nos. can be formed from the digits 0,1,3,5,7,9 which are divisible by 10 and no digit is repeated?

11. Prove that ${}^{2n}C_n = (1.3.5.7.....(2n-1)X2^n)/n!$

12. How many even nos. are there with 3-digits such that if 5 is one of the digits, then '7' is the next digit?

13.A teacher wants to arrange 5 students on the plat form such that the buy YUSUF occupies the first position and the girls GEETA & SEETA are always together. How many such arrangements are possible?

14. How many different nos. with distinct digits can be formed from the digits 2,3,5,7,9. How many of them are odd?

CHAPTER-8

(BINOMIAL THEOREM)

Points to be remembered:-

1. If 'n' is a natural no., 'x' & 'a' are any two nos. then $(x+a)^n = {}^nC_0\, x^n + {}^nC_1\, x^{(n-1)}\, a + {}^nC_2\, x^{(n-2)}\, a^2 + \ldots\ldots + {}^nC_r\, x^{(n-r)}\, a^r + \ldots\ldots + {}^nC_n\, a^n$.

2. General term: $T_{(r+1)} = {}^nC_r\, x^{(n-r)}\, a^r$

3. Middile terms:

(a) If 'n' is even,there is only one middle term.
Required middle term=$T(_{(n/2)+1)}$

(b) If 'n' is odd, there are two middle terms.
Required middle terms are= $T_{((n+1)/2)}$ and $T_{((n+3)/2)}$

4. (r+1)th term from end in the expansion of (x+a)(r+1beginning in the expansion of (x+a)^n.

SHORT ANSWER TYPE QUESTIONS(1 MARK EACH)

1. Find the 3rd term in the expansion of $(2x+3/x^2)^7$

2. Write the general term in the expansion of $(3x^2-1/5x)^8$

3. Write the values of ${}^6C_0+{}^6C_1+{}^6C_2+\ldots\ldots{}^6C_6$

4. Find the term void of 'x' in the expansion of $(x/a + a/x)^{12}$

5. Find the no. of terms in the expansion of $(1+x)^{12} + (1-x)^{12}$

6. Find 'n' if the coefficient of 3rd term from the end in the expansion of $(1+x)^n$ is 45

7. Find teh no. of non-zero terms in gthe expansion of (1+3

8. Find the coefficients of x^m and x^n in the expansion of $(1+x)^{(m+n)}$

9. If p+q=1, then find the value value of

10. If the coefficient of $(r+4)^{th}$ & $(2r+1)^{th}$ terms in the expansion of $(1+x)^{18}$ are equal, find 'r'

11. Find the middle term in the expansion of $(x+ 1/x)^6$

12. Write the 1st two terms in the expansion of $(1+0.01)^{10000}$

13. Using binomial theorem , evaluate $(11)^4$

14. Find the term containing x^3 in the expansion of $(x-2y)^7$

15. Find the integral parts of

LONG ANSWER TYPE QUESTIONS (4 MARKS EACH)

1. Simplify $(x+y)^6 + (x-y)^6$ and hence evaluate

   $(2 + \sqrt{3})^6 + (2 - \sqrt{3})^6$

2. Using binomial theorem prove that $3^{(2n+2)}$-8n-9 is divisible by 64 for all n belongs to N.

3. Find 'a' ,'b' & 'n' if the 1st three terms in the expansion of $(a+b)^n$ are 729,7290 & 30375

4. If 6^{th}, 7^{th}, 8^{th} & 9^{th} terms in the expansion of $(x+y)^n$ are a,b,c & d then prove that $(b^2 -ac)/(c^2 -bd) =4a/3c$

5. Find the coefficient of 'x' in the expansion of (1-2x^3+3x^5)(1+1/x)^8?

6. If the term free from 'x' in the expansion of $(1—2x)^{10}$ is 405, find 'k'?

7. If 'n' is an even positive integer,show that the middle term in the expansion of $(x+1/x)^n$ is equal to ${}^nC_n/2$

8. Prove that the coefficient of x^n in the expansion of $(1+x)^{2n}$ is twice the coefficient of x^n in the expansion of $(1+x)^{(2n-1)}$

9. If the coefficient of (r-1)th, rth and (r+1)th terms in the expansion of $(1+x)^n$ are in the ration 1:3:5 ,find both 'n' & 'r'?

10. If a_1,a_2,a_3 & a_4 are the coefficients of any 4 consecutive terms in the expansion of $(1+x)^n$, prove that

$(a_1/(a_1+a_2)) +(a_3/(a_3+a_4)) = 2a_2/(a_2+a_3)$

CHAPTER-9

(SEQUENCE AND SERIES)

Points to remember :-

1: A function f: N-->R is called a real ***sequence*** where 'N' is the set of natural nos. & R be the set of real numbers.

2. A sequence following some definite rule(or rules) is called a progression.

3. If the terms of aq sequence are connected by plus or minus signs, a series is formed.

4. A sequence is called an arithmetic progression iff the difference of any term from its preceding term is constant.

5. General term of an A.P $Tn=a+(n-1)d$

6. Sum to n-terms of an A.P : $Sn=(n/2)[2a+(n-1)d]$

7. Arithmetic mean between two nos. 'a' & 'b' is $A.M=(a+b)/2$

8. To insert 'n' arithmetic means between two given numbers, we have :

$A_n= a +n[(b-a)/(n+1)]$

9. General term of G.P = $T_n = ar^{(n-1)}$

10. Sum to n-terms of a G.P= { $a(r^n -1)/(r-1)$, if r>1 & $a(1-r^n)/(1-r)$, if r<1 }

11. G.M between two positive nos. 'a' & 'b' is $G.M=(ab)^{1/2}$

12. Arithmetic mean between two distinct positive nos. is always greater than their G.M.

13. If the sum is given, then in an A.P

(i) 3 nos. are taken as $a-d, a, a+d$.

(ii) 4 nos. are taken as $a-3d, a-d, a+d, a+3d$.

14. If the product is given, then in a G.p

(i) Three nos. are taken as: $a/r, a, ar$

(ii) four nos. are taken as: $a/r^3, a/r, ar, ar^3$

15. $1+2+3.....+n = n(n+1)/2$

16. $1^2 + 2^2 + 3^2 +.....+n^2 = n(n+1)(2n+1)/6$

17. $1^3 + 2^3 + 3^3 +.....+n^3=[n(n+1)/2]^2$

18. $a + ar + ar^2 + ar^3 +....... = a/(1-r)$ if $r<1$)

SHORT ANSWER TYPE QUESTIONS (1 MARK EACH)

1. If 1/5, x & 1/4 are in A.P, find 'x'?

2. Find the sum of first 30 terms of the series 2 + 6 + 10 +.....?

3. If $A_n = (n^2+1)/2n$, find A_5?

4. Find the sum of all 2-digit nos.?

5. Find the fourth term of the sequence 1,4,9......?

6. Find 'n' if 1+2+3+......+ n = 210 ?

7. Find the no. of terms in the series 5+8+11+14+....... if the last term is 95?

8. If $S_n= 5n^2+ 2n$, find T_n?

9. Find 'x' if x+9, x-6 & 4 are three consecutive terms of a G.P?

10. Find the G.M between 64/27 & 3/16?

11. Find the 5^{th} term of the sequence 1/2, 3/4, 7/8, 15/16,.........?

12. Find which term of the sequence 12,8,16/3...... is 512/729 ?

13. Sum the series 18 - 12 + 8 -............?

14. Find the 5^{th} term of the sequence 1,3,7,15.......?

15. Write the n^{th} term of the sequence 1, 1+2, 1+2+3,..........

16. Find the sum : $5^2 + 6^2 + 7^2 + 8^2 + 9^2 + 10^2$?

LONG ANSWER TYPE QUESTION (4/6MARKS)

1. The 4^{th} term of an A.P is equal to 3 times the first term and the seventh term exceeds twice the 3^{rd} term by 1. Find the 1st term & the common difference?

2. In an A.P p^{th}, q^{th} and r^{th} terms are 'a','b' & 'c', prove that p(b-c) + q(c-a)+ r(a-b)= 0.

3. If a^2, b^2, c^2 are in A.P , prove that a/(b+c) , b/(c+a) , c/(a+b) are in A.P

4. If the roots of the equation $a(b-c)x^2 + b(c-a)x + c(a-b)=0$ are equal , prove that 1/a , 1/b ,1/c are in A.P.

5. The sum of n-terms of two arithmetic series are in the ratio (7n+1):(4n+27), find the ratio of their 11th terms?

6. The sum of first p,q,r terms of an A.P are a,b &c , prove that a(q-r)/p + b(r-p)/q + c(p-q)/r =0

7. The sum of three consecutive nos. in an A.P is 18 and their product is 192. Find the numbers?

8. The ratio of the 2nd to 7th of 'n' A.M's between -7 & 65 is 1:7, find 'n'?

9. Three numbers whose sum is 15 are in A.P. If 8, 6 & 4 be added to them

respectively, then these are in G.P. Find the numbers?

10. Prove that the product of first n-terms of a G.P ,whose first term is 'a' & last term is 'l' is $(al)^{(n/2)}$

11. If a,b,c,d are in G.P , prove that

$$(a^2 + b^2 + c^2)(b^2 + c^2 + d^2) = (ab + bc + cd)^2$$

12. Find the sum of n terms of the sequence 7, 77, 777,7777,........?

Problems for bright students

Q1.The sum of two numbers is six times their geometric mean. Show that the numbers are in the ratio $(3+2\sqrt{2})/(3-2\sqrt{2})$

Q2.Show that the ratio of the sum of first n- terms of a G.P to the sum of terms from (n +1)th to (2n)th term is 1/ r n

Q3.Show that $$\frac{1 \times 2^2 + 2 \times 3^2 + \dots + n(n+1)^2}{1^2 \times 2 + 2^2 \times 3 + \dots + n^2 \times (n+1)} \quad \frac{3n+5}{3n+1}$$

Q4.Sum the series : 1+ 5 +14 +30 +........upto n-terms

Q5. If S_1 ,S_2 & S_3 denote respectively the sum of first n- natural numbers, their squares & their Cubes then show that $9S_2^2 = S_3(1+8S_1)$

Q6. If a ,b , c are in G .P & the equations $ax^2 + 2bx + c = 0$ & $dx^2 + 2ex + f = 0$ have a common root then show that d/a , e/b , f/c are in A.P.

CHAPTER –10

STRAIGHT LINES

Points to be remembered :

1) Distance between two points (x_1, y_1) &(x_2,y_2) is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
2) Centroid of a triangle having vertices (x_1, y_1) ,(x_2,y_2) &(x_3,y_3) is ((x_1+x_2+x_3)/3 ,(y_1+y_2+y_3)/3)

3) Incentre of a triangle is given by ((ax_1+ bx_2+ cx_3)/(a + b+ c) , (ay_1+ by_2+ cy_3)/(a + b+ c))

4) Equation of a line having slope 'm' & Y- intercept 'c' is given by $y= mx + c$

5) Equation of a line passing through a given point (x_1, y_1) & having slope 'm' is given by $y - y_1 = m(x - x_1)$

6) Equation of a line passing through two given points (x_1, y_1) &(x_2,y_2) is given by $y - y_1$ = ($x - x_1$)

y2—y1 x2—x1

7) Equation of a line making intercepts 'a' & 'b' from the co-ordinate axis is given by $x/a + y/b = 1$

8) Equation of a line in normal form is given by $x \cos\alpha + y \sin\alpha = p$

9) Angle between two lines having slopes 'm_1' & 'm_2' is given by

$\tan\theta = (m_1 - m_2)/ (1 + m_1.m_2)$

a) Two lines will be parallel if $m_1 = m_2$ & perpendicular

if $m_1.m_2 = -- 1$

10) Distance of a point (x_1, y_1) from the line $ax+ by + c = 0$ is given by

$/ (ax_1+ by_1+ c)/ \sqrt{a^2 +b^2} /$

SHORT ANSWER TYPE QUESTIONS

1) Find the incentre of the triangle whose vertices are (1,2),(3,4) &(--5,4)

2) Find the equation of the line having slope '2' & passing through the point (3,--5)

3) Find the equation of the line passing through two given points (--4, 3) & (4,6)

4) Find the distance of the point(x,y) from the origin.

5) Write the slope of the line which is parallel to x- axis.

6) Find 'x' if the points (-2,3),(3,5)&(x,4) are collinear.

7) Find the angle between the lines $2x—3y + 2 = 0$ & $x – 2y = 5$

8) Find the point on the line $2x + 5y +4 = 0$ whose ordinate is 5

9) Find 'x' if the point (x,5) is equidistance from the points (6,7) & (3,8)

10) Find the equation of the line passing through the point (2, --1) & making an angle of 30^0 with x- axis.

LONG ANSWER TYPE QUESTIONS (4/6) MARKS

1) Find the co-ordinates of the foot of the perpendicular from the point (--1,3) to the line $3x - 5y = 4$

2) Find the distance of the point (2,5) from the line $x/2 + y/3 = 1$ measured parallel to the line $y = 2x + 3$

3) If 'p' & 'q' be the lengths of perpendiculars from the origin to the lines $x \cos\theta - y \sin\theta = k \cos 2\theta$ & $x \sec\theta + y \operatorname{cosec}\theta = k$, respectively, prove that $p^2 + 4q^2 = k^2$

4) In triangle ABC with vertices A(2,3),B(4,-1) & C(1,2) find the equation & length of altitude from the vertex A.

5) Find the image of the point (2,5) with respect to the line $3x - 5y = 2$, considering the line as a plane mirror.

6) Find the equation of a line drawn perpendicular to the line $x/4 + y/6 = 1$, through the point where it meets the y- axis.

7) If the lines $y = 3x + 1$ & $2y = x+3$ are equally inclined to the line $y= mx + 4$, find the value of 'm'

8) Find the equation of the line through the intersectionof the lines $4x+ 7y =3$ & $5x - y = 0$ & perpendicular to the line $3x - 2y = 0$

9) Find the equation of the line mid way between the parallel lines $9x - 6y - 7 = 0$ & $3x + 2y + 6 = 0$

10) Find the co-ordinates of the incentre of the triangle formed by the lines $y = 15$, $5x - 12y = 0$ & $3x+ 4y = 0$

CHAPTER—11

CONIC SECTIONS

Points to be remembered:

A conic section (or a conic) is a curve of intersection of a right circular cone of two nappes & a plane. The curves so obtained are called parabola, ellipse & hyperbola.

1) The equation of a circle having centre at (h ,k) & radius 'r' is given by $(x - h)^2 + (y - k)^2 = r^2$ It is called central form of the circle.

2) If the centre is at the origin then the equation becomes
   $x^2 + y^2 = r^2$ It is called simplest or standard form of circle.

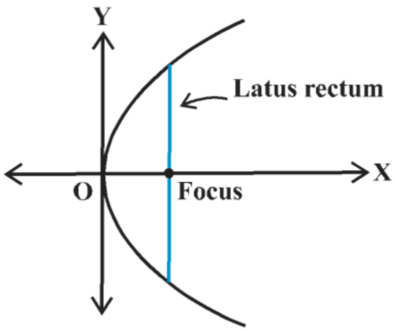
3) $x^2 + y^2 + 2gx + 2fy + c = 0$ is called general form of circle

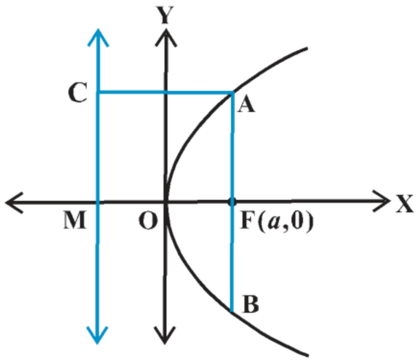
4) If the two end points of the diameter of a circle are (x_1,y_1) &(x_2,y_2)then the equation of the circle is $(x - x_1)(x - x_2) + (y - y_1)(y - y_2) = 0$ It is called the diametric form of the circle.

5) $x = r\cos\theta$, $y = r\sin\theta$, $0< \theta< 2\pi$ is the parametric representation of the circle $x^2 + y^2 = r^2$, 'θ' is called the parameter

6) $x = h + r\cos\theta$ & $Y = k + r\sin\theta$ $0< \theta< 2\pi$ is the the parametric equation of the circle $(x - h)^2 + (y - k)^2$

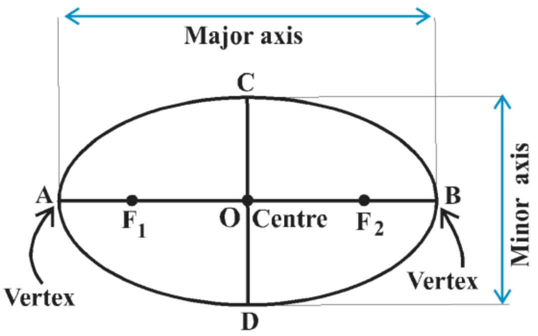
7) Main points about Parabola

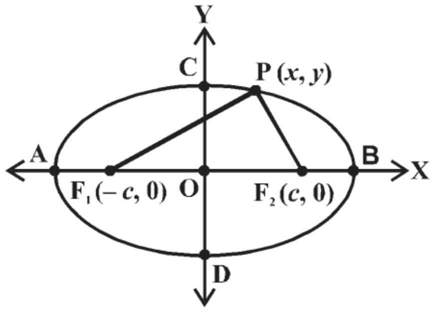




Equation	$Y^2 = 4ax(a > 0)$	Y^2 = --4ax(a > 0)	$x^2 = 4ay(a > 0)$	x^2 = --4ay(a > 0)
Axis	Y= 0	Y= 0	X = 0	X = 0
Directrix	X = --a	X = a	Y = --a	Y = a
Focus	(a,0)	(--a,0)	(0,a)	(0, - a)
Vertex	(0,0)	(0,0)	(0,0)	(0,0)
Length of latus rectum	4a	4a	4a	4a
Equation of latus rectum	X = a	X = --a	Y = a	Y = --a
Focal distance of the point (x,y)	a + x	a -- x	a + y	a – y

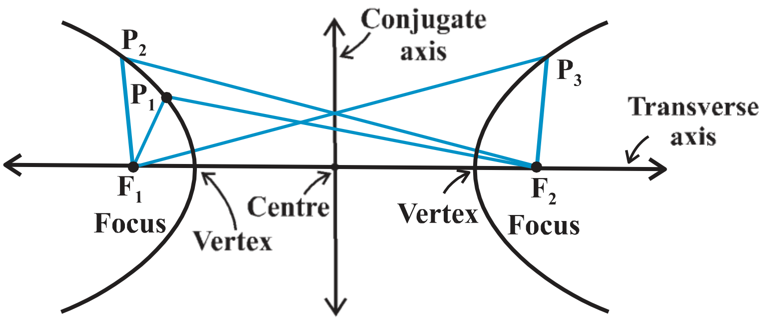
8) Main points about ellipse

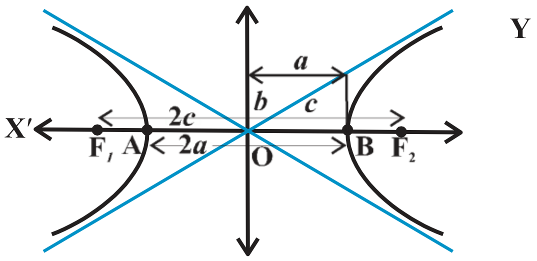




Equation	$x^2/a^2 + y^2/b^2 = 1$, (a>b>0)	$x^2/b^2 + y^2/a^2 = 1$, (a>b>0)
Equation of major axis	y = 0	x = 0
Length of major axis	2a	2a
Equation of minor axis	x = 0	Y = 0
Length of minor axis	2b	2b
Vertices	(a,0)	(0,a)
Foci	(ae,0)	(0,ae)
Directrices	x = a/e	Y = a/e
Equation of latus rectum	x = ae	Y = ae
Length of latus rectum	$2b^2/a$	$2b^2/a$
Centre	(0,0)	(0,0)
Focal distance of any point(x,y)	a—ex ,a + ex	a—ey ,a + ey

9) Main points about hyperbola





Equation	x^2/a^2 -- y^2/b^2 =1, (a>0,b>0)	x^2/a^2 --y^2/b^2 =1, (a>0,b>0)
Equation of transverse axis	y = 0	x = 0
Length of transverse axis	2a	2a
Equation of conjugate axis	x = 0	Y = 0
Length of conjugate axis	2b	2b
Vertices	(a,0)	(0,a)
Foci	(ae,0)	(0,ae)
Directrices	x = a/e	Y = a/e
Equation of latus rectum	x = ae	Y = ae
Length of latus rectum	$2b^2/a$	$2b^2/a$
Centre	(0,0)	(0,0)
Focal distance of any point(x,y)	/ex—a/ , /ex + a/	/ey—a/ , /ey + a/

SHORT ANSWER TYPE QUESTIONS

1. Find the equation of the circle whose centre is (0,0) & radius 5 cm.
2. Find the vertex & focus of the parabola x^2 =-- 4ay
3. Find the point on the parabola $y^2 = 4ax$ whose focal distance is 4
4. Find the centre & radius of the circle $x^2 + y^2 – 2x + 3y = 4$
5. Find 'k' if the line $y = \sqrt{3}x + k$ touches the circle x2 + y2 = 25
6. If two ends of the diameter of a circle are (2,3) & (5,--1) find the equation of the circle.
7. Write down the foci of the hyperbola $x^2 – y^2 = 1$
8. Find the centre of the ellipse $9x^2 + 4y^2 = 36$
9. If the line y = mx + 1 is a tangent to the parabola $y^2 = 4x$ find 'm'
10. Find the length of semi- major & semi – minor axis of the ellipse $16\,x^2 + 25\,y^2 = 400$

LONG ANSWER TYPE QUESTION (4/6MARKS)

1. Find the equation of the circle circumscribing the triangle whose vertices are (2,0),(3,-2) &(6,4)
2. Find the equation of the circle which touches both the axes & the line 3x + 4y = 6
3. Show that the area of the triangle inscribed in the parabola $y^2=4ax$ is 1/8a $(y_1—y_2)(y_2—y_3)(y_3—y_1)$ where y_1, y_2 & y_3 are the co-ordinates of the angular points.

4. Find the co-ordinates of the foci, vertices , the length of latus rectum & eccentricity of the ellipse $100\ x^2 + 25\ y^2 = 2500$

5. An arch is in the form of a parabola with its axis vertical. The arch is 10 m high & 5 m wide at the base. How wide is it 2m from the vertex of the parabola.

6. A rod of length 12cm moves with its ends always touching the co-ordinate axes. Determine the equation of the locus of a point 'P' on the rod , which is 3cm from the end in contact with the x- axis.

7. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$, where one vertex is at the vertex of the parabola. Find the length of the side of the triangle.

8. Find the area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of its latus rectum.

9. An arch in the form of a semi ellipse. It is 8m wide & 2m high at the centre. Find the height of the arch at a point 1.5 m from one end.

10. Find the equation of the ellipse which passes through (-3,1) & has eccentricity $\sqrt{2/5}$, with x-axis as its major axis & centre at the origin.

CHAPTER—12

THREE DIMENSIONAL CO- ORDINATE GEOMETRY

Points to be remembered:

1) A locus is the set of all those points & only those points in space which satisfy certain given geometrical condition or conditions.

2) An equation in x, y & z is called the equation of the given locus if and only if it is satisfied by the co-ordinates of every point in the locus & by the co-ordinates of no other point in space.

3) Distance formula :

   The distance between the points (x_1,y_1,z_1) & (x_2,y_2,z_2) is given by v$(x_2 – x_1)^2 + (y_2 – y_1)^2$

4) Section formula :

   The co-ordinates of a point which divides the join of two points(x_1,y_1,z_1) & (x_2,y_2,z_2) in the ratio m:n internally is given by $(mx_2 + nx_1/ m+n, my_2 + ny_1/ m+n)$

SHORT ANSWER TYPE QUESTIONS

1) Find the distance of the point (1,-2.3) from the origin.

2) Find the mid point of the line joining (3,4,5) & (0,3,4)

3) Write the equation of the Y-Z plane.

4) Find 'x' if the point (2,4,0) is at a distance of 10 units from the pont (3,5,x)

5) Find the points on Y- axis which are at a distance of 2√ 6 units from the point

(-2,6,4)

LONG ANSWER TYPE QUESTION (4 MARKS)

1) Show that the points (5,-1,1), (7,-4,7) ,(1,-6,10) & (-1,-3,4)are the vertices of a rhombus.
2) Find the ratio in which the line segment joinig (3,5,7) &(--1,4,2) is divided by Y-Z plane.

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