**MATHEMATICS**

**PAGEMAKER10**

**ELLIPSE**

Q1. Distance between the directrix of the ellipse is

(a) 8

(b) 12

(c) 18

(d) 24

L1Difficulty1

Qtag Mathematics

Qcreator Pagemaker10

Q2. The distance between the foci of the ellipses 3x2 + 4y2 = 48 is

(a) 2

(b) 4

(c) 6

(d) 8

L1Difficulty1

Qtag Mathematics

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Q3. If the eccentricity of an ellipse be , then its latus rectum is equal to

(a) minor axis

(b) semi-minor axis

(c) major-axis

(d) semi-major axis

L1Difficulty1

Qtag Mathematics

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Q4. The equation represent an ellipse, if

(a) r > 2

(b) 2 < r < 5

(c) r > 5

(d) none

L1Difficulty1

Qtag Mathematics

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Q5. The locus of the point which moves such that the ration of its distance from two lined point is the plane is always a constant k (< 1) is

(a) Hyperbola

(b) Ellipse

(c) Straight Line

(d) Circle

L1Difficulty1

Qtag Mathematics

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Q6. If the line y = 2x + c be a tangent to the ellipse then c is

(a) ± 4

(b) ± 6

(c) ± 1

(d) ± 8

L1Difficulty1

Qtag Mathematics

Qcreator Pagemaker10

Q7. Minimum area of the triangle by any tangent to the ellipse with the co-ordinate axes is

(a)

(b)

(c) ab

(d)

L1Difficulty1

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Q8. If the line x Cos + y Sin = p be normal to the ellipse , then

(a) p2 (a2Cos2 + b2 Sin2) = a2 – b2

(b) p2 (a2 Cos2 + b2 Sin2) = (a2 – b2)2

(c) p2 (a2 + Sec2 + b2 Cosec2) = a2 – b2

(d) p2 (a2 Sec2 + b2 Cosec2) = (a2 – b2)2

L1Difficulty1

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Q9. An ellipse has OB as a semi minor axis F, F' are its foci and the angle FBF' at a right angle. The eccentricity of the ellipse is

(a)

(b)

(c)

(d)

L1Difficulty1

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Q10. The ellipse E1 : is inscribed in a rectangle R whose lines are parallel to the co-ordinate axis. Another ellipse E2 passing through the point (0, 4) circumscribes the rectangle R. The eccentricity of the ellipse E2 is

(a)

(b)

(c)

(d)

L1Difficulty1

Qtag Mathematics

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**Solutions**

S1. Ans. (c)

Sol.

a = 6, b = 2

b2 = a2(1 – e2)

Directrix are x = ±

Distance between them

18.

S2. Ans. (b)

Sol.

a2 = 16, b2 = 12, e =

Distance is 2ae = 4.

S3. Ans. (d)

Sol.

e =

L.R. = = = a

semi major axis

S4. Ans. (b)

Sol.

r > 2 and r < 5

S5. Ans. (b)

Sol.

According to the definition.

S6. Ans. (b)

Sol.

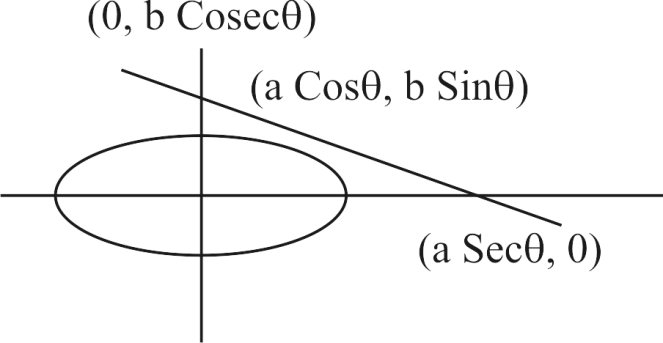
c =

c =

c = ± 6

S7. Ans. (c)

Sol.



Area a sec Cosec

× = > ab

S8. Ans. (a)

Sol.

Normal is ax sec – by Cosec = a2 – b2 straight line x Cos + y Sin = p will be normal to the ellipse

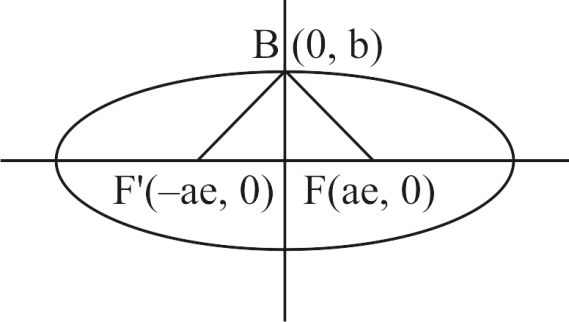
Cos =

Sin =

p2 (b2 Cosec2 + a2sec2) = (a2 – b2)2

S9. Ans. (a)

Sol.

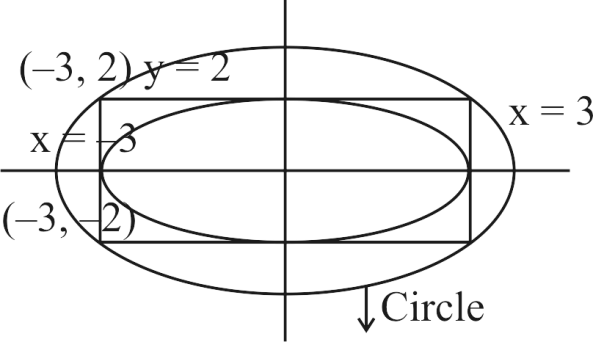


Slope of BF is

Slope of BF' is

F BF' = 90

S10. Ans. (c)



Sol.

(y + 2) (y – 2) + (x + 3) (x – 3) = 0

it passes through (0, 4) =

e =

**LEVEL-II**

Q1. If and are the equations of a pair of conjugate diameters of an ellipse, then the eccentricity of the ellipse is

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

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Q2. The distance of the point on the ellipse from a focus is

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q3. The equation of the ellipse whose one focus is at (4, 0) and whose eccentricity is 4/5, is

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q4. The foci of are

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q5. The line passing through the extremity of the major axis and extremity of the minor axis of the ellipse meets its auxiliary circle at the point . Then the area of the triangle with vertices at and the origin is

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q6. The normal at a point on the ellipse meets the -axis at . If is the mid point of the line segment , then the locus of intersects the latus rectums of the given ellipse at the points

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q7. The locus of a variable point whose distance from is times its distance from the line , is

(a) Ellipse

(b) Parabola

(c) Hyperbola

(d) None of these

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q8. The equation of the tangent to the ellipse making an angle of with -axis is

(a)

(b)

(c)

(d) None of these

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q9. The position of the point (1, 3) with respect to the ellipse

(a) Outside the ellipse

(b) On the ellipse

(c) On the major axis

(d) On the minor axis

L3Difficulty3

Qtag Mathematics

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Q10. The line will be tangent to the ellipse if

(a)

(b)

(c)

(d) None of these

L3Difficulty3

Qtag Mathematics

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**Solutions**

S1. Ans. (c)

Sol.

[Conjugate diameters]

S2. Ans. (c)

Sol.

Focal distance of any point on the ellipse is equal to Here

Here,

S3. Ans. (b)

Sol.

Here, and

Now

Hence, equation of the ellipse is .

S4. Ans. (a)

Sol.

The equation of the ellipse is or

Here,

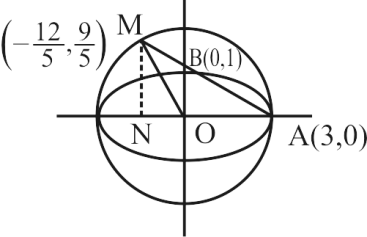
S5. Ans. (d)

Sol.

Equation of auxiliary circle is ….(i)

Equation of is ….(ii)

On solving (i) and (ii), we get

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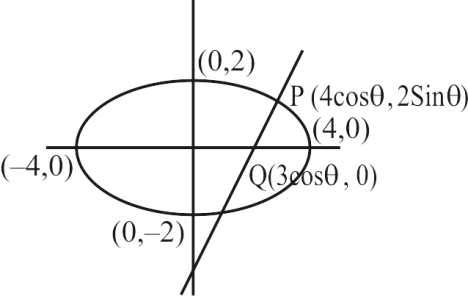
Now, area of

S6. Ans. (c)

Sol.

Equation of normal

(say)

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and

Locus ….(i)

For given ellipse

….(ii)

Solving (i) and (ii), we get

Required points

S7. Ans. (a)

Sol.

Let point

So,

Locus of is which is equation of an ellipse.

**Trick :** The ratio So, it is ellipse (fundamental concept).

S8. Ans. (c)

Sol.

Therefore, equation of tangent is

S9. Ans. (c)

Sol.

Therefore, the point is inside the ellipse.

Equation of major axis is and point (1, 3) lies on it.

S10. Ans. (a)

Sol.

is tangent to if

or

**LEVEL-III**

Q1. The locus of the point of intersection of mutually perpendicular tangent to the ellipse is

(a) A straight line

(b) A parabola

(c) A circle

(d) None of these

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q2. The equation of the tangent at the point of the ellipse is

(a)

(b)

(c)

(d) None of these

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q3. The angle between the pair of tangents drawn to the ellipse from the point (1, 2) is

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q4. The equations of the tangents of the ellipse which passes through the point (2, 3) is

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q5. If any tangent to the ellipse cuts off intercepts of length and on the axes, then

(a) 0

(b) 1

(c)

(d) None of these

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q6. The value of for which the line is a normal to the conic is

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q7. The pole of the straight line with respect to ellipse is

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q8. The sum of focal distances of any point on the ellipse with major and minor axes as and respectively, is equal to

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q9. The equation of ellipse whose distance between the foci is equal to 8 and distance between the directrix is 18, is

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q10. In an ellipse the distance between its foci is 6 and its minor axis is 8. Then its eccentricity is

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

**Solutions**

S1. Ans. (c)

Sol.

It is a fundamental concept.

S2. Ans. (d)

Sol.

The point does not lie on ellipse.

S3. Ans. (c)

Sol.

and

S4. Ans. (a)

Sol.

The tangent will be But it is tangent to the given ellipse, therefore Hence tangents are and

**Trick :** Only answer (a) satisfy the point (2, 3).

S5. Ans. (b)

Sol.

The tangent at to the ellipse is

or

Intercepts are,

S6. Ans. (d)

Sol.

We know that the equation of the normal at point on the curve is given by

….(i)

Comparing equation (i) with we get

or ….(ii)

or

S7. Ans. (b)

Sol.

We know that equation of polar at point is

….(i)

Which is similar to given straight line ….(ii)

Comparing (i) and (ii), we get

Hence the point is

S8. Ans. (a)

Sol.

Sum of focal distances of a point in an ellipse is always equal to length of major axis of that ellipse. It is a property of ellipse.

S9. Ans. (d)

Sol.

Hence, the required equation is

S10. Ans. (c)

Sol.

Distance between foci = 6

Minor axis = 8

Hence,