MATHS

BOOKS - CHHAYA PUBLICATION MATHS (BENGALI ENGLISH)

ELLIPSE

Example

1. Find (a) the lengths of the major and minor axes (b) the length of latus rectum (c) coordinates of vertices (d) eccentricity (e) coordinates of foci and (f)

the equations of directrices for the following ellipse :

$9x^2 + 25y^2 = 225$

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2. Find (a) the lengths of the major and minor axes (b) the length of latus rectum (c) coordinates of vertices (d) eccentricity (e) coordinates of foci and (f) the equations of directrices for the following ellipse :

$25x^2 + 9y^2 = 225$

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3. Show that the equation $5x^2 + 9y^2 - 10x + 90y + 185 = 0$ represents an ellipse. Find the co-ordinates of it's center

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4. Show that the equation $5x^2 + 9y^2 - 10x + 90y + 185 = 0$ repesents an ellipse. Find length of latus rectum

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5. Show that the equation $5x^2 + 9y^2 - 10x + 90y + 185 = 0$ repesents an ellipse. Find eccentricity

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6. Find the coordinates of the vertices of the ellipse $5x^2 + 9y^2 - 10x + 90y + 185 = 0$

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7. Find the coordinates of foci of the ellipse $5x^2 + 9y^2 - 10x + 90y + 185 = 0$

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8. Show that the equation $5x^2 + 9y^2 - 10x + 90y + 185 = 0$ represents an ellipse and find the equations of the directrices of this ellipse .

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9. Taking the major and minor axes as the axes of coordinates, find the equation of the ellipse whose lengths of major and minor axes are 6 and 3 respectively

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10. Taking the major and minor axes as the axes of coordinates, find the equation of the ellipse

Which passes through the point (2,2) and (3,1)

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11. Taking the major and minor axes as the axes of coordinates, find the equation of the ellipse

whose length of latus rectum is 8 and length of semi - major axis is 9

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12. Taking the major and minor axes as the axes of coordinates, find the equation of the ellipse whose eccentricity is $\left(\frac{\sqrt{7}}{4}\right)$ and distance between the directrices is $\frac{16}{\sqrt{7}}$

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13. Taking the major and minor axes as the axes of coordinates , find the equation of the ellipse whose length of minor axis is 10 and distance between the f oci is 24

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14. Taking the major and minor axes as the axes of coordinates, find the equation of the ellipse whose length of latus rectum is $\frac{32}{5}$. Unit and the coordinates of one focus are (3,0)

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15. The coordinates of the foci of an ellipse are $(0, \pm 4)$ and the equations of its directrices are $y = \pm 9$. Find the length of the latus rectum of the ellipse

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16. The vertices of an ellipse ar (-1,2) and (9,2) . If the distance between its foci be 8 , find the equation of the ellipse and the eqations of its directrice .

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17. The eccentricity of an ellipse is $\frac{4}{5}$ and the coordinates of its one focus and the corresponding vertex are (8,2) and (9,2) . Find the equation of the ellipse. Also find in the same direction the

coordinates of the point of intersection of its major axis and the directrix.

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18. The coordinates of the focus of an ellipse are (1,2) and eccentricity is $\frac{1}{2}$, the equation of its directrix is $3x + 4y - 5 = 0$. Find the equation of the ellipse.

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19. Find the sum of the focal distance of any point on the ellipse $9x^2 + 25y^2 = 225$.

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20. The eccentricity of an ellipse is $\frac{2}{3}$ focus is S(5,4) and the major axis and directrix intersect at Z(8,7) . Find the coordinates of the centre of the ellipse .

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21. $(5, -4)$ and $(-3, 2)$ are two foci of an ellipse whose eccentricity is $\frac{2}{3}$. Then the length of the minor axis of the ellipse is-

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22. Find the eccentric angles of the ends of latera recta of the ellipse $2x^2 + 4y^2 = 1$.

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23. If t is veriable paramete, parameter, show that the locus of the point of intersection of the straight lines $\frac{tx}{a} + \frac{y}{b} - t = 0$ and $\frac{x}{a} - \frac{ty}{b} + 1 = 0$ represents an ellipse

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24. Find the equation to the ausiliary circle of the ellipse

$4x^2 + 9y^2 - 24x - 36y + 36 = 0$.

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25. Dentermine the position of the point (2,-3) with respect to the ellipse $\frac{x^2}{9} + \frac{y^2}{25} = 1$.

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26. The abscissa of the three points P , Q , R of an ellipse, one of whose focus is S , are in A.P . Prove

that the focal distances of the three points are also in A.P .

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27. Find the locus of the middle points of chords of an ellipse drawn through the positive extremity of the minor axis

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28. If S,S' be the foci of an ellipse and p be any point on it show that

$$\tan\left(\frac{1}{2}\right)\angle PSS' \times \tan\left(\frac{1}{2}\right)\angle PS'S = \frac{1-e}{1+e}$$

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29. The eccentricity of an ellipse is $\frac{1}{2}$ and its one focus is at S(3,2) , if the vertex nearer of S be A (5,4) , find the equation of the ellipse .

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MCQ

1. If e be the eccentricity of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, then e =

A. $\sqrt{1 - \frac{b^2}{a^2}}$

B. $\sqrt{1 - \frac{a^2}{b^2}}$

C. $\sqrt{1 + \frac{b^2}{b^2}}$

D. $\sqrt{1 + \frac{a^2}{b^2}}$

Answer: A

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2. If the length of the minor axis of an ellipse is equal to the distance between their foci, then eccntricity of the ellipse is _

A. $\frac{\sqrt{3}}{2}$

B. $\frac{2}{\sqrt{3}}$

C. $\frac{1}{\sqrt{2}}$

D. $\sqrt{2}$

Answer: C

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3. The parametric equations of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ are _

A. $x = a\cos\phi, y = b\sin\phi$

B. $x = a\cos\phi, y = a\sin\phi$

C. $x = a\tan\phi, y = b\sec\phi$

D. $x = a\sec\phi, y = b\tan\phi$

Answer: A

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4. The eqation of auxiliary circle of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is _

A. $x^2 + y^2 = 4a^2$

B. $x^2 + y^2 = 2a^2$

C. $x^2 + y^2 = a^2$

D. none of these

Answer: C

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5. If a point moves on a plane is such a way that the sum of its distances from two fixed points on the plane is always a constant then the locus traced out by the moving point on the plane will be _

A. a straight line

B. a circle

C. a parabola

D. an ellipse

Answer: D

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6. The length of latus rectum of the ellipse $9x^2 + 25y^2 = 225$ is _

A. $\frac{18}{5}$ unit

B. $\frac{16}{5}$ unit

C. $\frac{9}{5}$ unit

D. $\frac{8}{5}$ unit

Answer: A

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7. The coordinates of the vertices of the ellipse $4x^2 + y^2 = 16$ are_

A. $(0, \pm 2)$

B. $(0, \pm 3)$

C. $(0, \pm 4)$

D. $(0, \pm 1)$

Answer: C

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8. The eccentricity of the ellipse $4x^2 + 25y^2 = 100$ is

–

A. $\frac{\sqrt{12}}{5}$

B. $\frac{3\sqrt{7}}{5}$

C. $\frac{7\sqrt{3}}{5}$

D. $\frac{\sqrt{21}}{5}$

Answer: A

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9. The length of latus rectum of the ellipse $25x^2 + 9y^2 = 225$ is _

A. $\frac{16}{5}$ unit

B. $\frac{18}{5}$ unit

C. $\frac{8}{5}$ unit

D. $\frac{9}{5}$ unit

Answer: B

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10. The coordinates of the vertices of the ellipse $x^2 + 4y^2 = 16$ are _

A. $(\pm 2, 0)$

B. $(\pm 3, 0)$

C. $(\pm 4, 0)$

D. $(\pm 5, 0)$

Answer: C

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11. The length of major axis of the ellipse $4x^2 + 9y^2 = 36$ is _

A. 6 unit

B. 4 unit

C. 2 unit

D. 8 unit

Answer: A

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12. The eccentricity of the ellipse $25x^2 + 4y^2 = 100$ is _

A. $\frac{7\sqrt{7}}{5}$

B. $\frac{3\sqrt{7}}{5}$

C. $\frac{7\sqrt{3}}{5}$

D. $\frac{\sqrt{21}}{5}$

Answer: D

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13. The length of minor axis of the ellipse $9x^2 + 4y^2 = 36$ is _

A. 1 unit

B. 2 unit

C. 3 unit

D. 4 unit

Answer: D

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14. The coordinates of the point on the ellipse $9x^2 + 16y^2 = 144$ are $\left(2, \frac{3\sqrt{3}}{2}\right)$, find the eccentric angle of the point .

A. 90°

B. 60°

C. 30°

D. 45°

Answer: C

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15. If the equation $\frac{x^2}{4-m}+\frac{y^2}{m-7}+1=0$ represents an ellipse then _

A. $m<4$

B. $m>7$

C. $m>7$ or $m<2$

D. $4<m<7$

Answer: D

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16. The sum of the focal distances of any point on the ellipse $4x^2+25y=100$ is_

A. 4

B. 5

C. 10

D. none of these

Answer: C

17. If the distance between the foci of an ellipse is equal to the length of the latus rectum, then its eccentricity is _

A. $\frac{1}{\sqrt{2}}$

B. $\frac{\sqrt{5}-1}{2}$

C. $\frac{1}{2}$

D. $\frac{\sqrt{5}-1}{4}$

Answer: B

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18. The eccentricity of the ellipse $5x^2 + 9y^2 = 1$ is _

A. $\frac{3}{4}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{4}{5}$

D. $\frac{2}{3}$

Answer: D

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19. If e and a be the eccentricity and length of semi - major axis of an ellipse, then the difference between the length of its major axis and latus rectum is _

A. $2ae^2$

B. ae^2

C. $2a^2e$

D. none of these

Answer: A

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20. The coordinates of the centre of the ellipse $4x^2 + 9y^2 - 16x + 18y - 11 = 0$ are _

A. $(2, -1)$

B. $(-2, 1)$

C. $(1, -2)$

D. $(-1, 2)$

Answer: A

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Very Short Answer Type Qustions

1. Find the length of latus rectum and the coordinates of the foci of the ellipse $25x^2 + 4y^2 = 100$.

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2. find the length of the latus rectum of the ellipse

$$\frac{x^2}{9} + \frac{y^2}{16} = 1$$

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3. Calculate the eccentricity of the ellipse

$$\frac{x^2}{169} + \frac{y^2}{144} = 1$$

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4. Find the equations of the directrices of the ellipse

$$x^2 + 4y^2 = 4$$

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5. Find the distance between the foci of the ellipse $3x^2 + 4y^2 = 12$.

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6. Find the eccentricity of the ellipse if

the length of rectum is equal to half the minor axis of the ellipse .

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7. Find the eccentricity of the ellipse if

the length of minor axis is equal to half the distance

between the foci of the ellipse .

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8. Find the eccentricity of the ellipse if

the length of minor axis is eqal to the distance

between the latera recta .

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9. If the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and $\frac{x^2}{p^2}+\frac{y^2}{q^2}=1$ have the same eccentricity , show that aq = bp .

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10. The ellipse $\frac{x^2}{169}+\frac{y^2}{25}=1$ has the same eccentricity as the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. Find the ratio $\frac{a}{b}$.

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11. Find the positions of the points (i) (-3,1) (ii) (-2,-3) and (iii) (5,-2) with respect to the ellipse $3x^2 + 4y^2 = 48$

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12. For what values of a^2 does the point $\left(2\sqrt{3}, 1\right)$ lie outside the ellipse $\frac{x^2}{a^2} + \frac{y^2}{4} = 1$?

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13. The coordinates of the point on the ellipse $9x^2 + 16y^2 = 144$ are $\left(2, \frac{3\sqrt{3}}{2}\right)$, find the eccentric angle of the point .

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14. Find the coordinates of a point on the ellipse $x^2 + 2y^2 = 4$ whose eccentric angle is 60°

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15. If the ellipse $\frac{x^2}{a_1^2}+\frac{y^2}{b_1^2}=1\left(a_1^2>b_1^2\right)$ has same eccentricity as that of the ellipse $\frac{x^2}{a_2^2}+\frac{y^2}{b_2^2}=1\left(a_2^2>b_2^2\right)$ prove that $a_1b_2=a_2b_1$.

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16. Find (i) the centre, (ii) vertices, (iii) equations of the axes, (iv) lengths of the axes (v) eccentricity,(vi) the length of latus rectum, (vii) coordinates of foci and (viii) the equations of the directrices of each of the following ellipses :

$$\frac{(x+1)^2}{9}+\frac{(y-2)^2}{5}=1$$

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17. Find (i) the centre, (ii) vertices, (iii) equations of the axes, (iv) lengths of the axes (v) eccentricity,(vi) the length of latus rectum, (vii) coordinates of foci and (viii) the equations of the directrices of each of the following ellipses :

$3x^2 + 4y^2 + 6x - 8y = 5$

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18. Find (i) the centre, (ii) vertices, (iii) equations of the axes, (iv) lengths of the axes (v) eccentricity,(vi)

the length of latus rectum, (vii) coordinates of foci and (viii) the equations of the directrices of each of the following ellipses :

$9x^2 + 5y^2 - 30y = 0$

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19. Find the eccentricity, the length of latus rectum and the centre of ellipse

$9x^2 + 16y^2 - 54x + 64y + 1 = 0$

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20. Find the latus rectum , eccentricity and the coordinates of the foci of the ellipse

$9x^2 + 5y^2 + 30y = 0$

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21. Examine, with reasons, the validity of the following statement : $x^2 + 4y^2 + 2x - 24y + 33 = 0$ represents the equation of an ellipse whose eccentricity is $\frac{\sqrt{3}}{2}$

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22. The ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ passes through (-3 , 2) and its eccentricity is $\sqrt{\frac{3}{5}}$, find the length of its latus rectum.

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23. The ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ passes through the point of intersection of the lines 7x + 13 y - 87 = 0 and 5x - 8y + 7 = 0 and its length of latus rectum is $\frac{32\sqrt{2}}{5}$, find a and b .

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24. The coordinates of the centre and of a vertex of an ellipse are (-2,-2) and (-2,4) and its eccentricity is $\frac{2}{3}$, find the equation of the ellipse .

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25. The vertices of an ellipse are (-1,2) and (9,2) . If the eccentricity of the ellipse be $\frac{4}{5}$, find its equation .

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26. Find the equation of the ellipse whose foci are (2,3) and (-2,3) and whose semi - minor axis is $\sqrt{5}$.

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27. The eccentricity of an ellipse is $\frac{2}{3}$ and the coordinates of its focus and the corresponding vertex are (1,2) and (2,2) respectively. Find the equation of the ellipse . Also find the coordinate of the point of intersection of its major axis and the directrix in the same direction .

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28. The distance of a point of the ellipse $x^2 + 3y^2 = 6$ from its centri is 2 , find the eccentric

angle of the point .

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29. PQ is any double ordinate of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, find the euqation to the locus of the point of trisection of PQ that is nearer to P .

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30. Show that the double ordinate of the auxiliary circle of an ellipse passing through the focus is equal to the minor axis of the ellipse .

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31. O is the centre of an ellipse whose semi-minor axis is b . The ordinate of a point P of the ellipse intersects its auxiliary circle at Q (when produced). The straight line through P drawn parallel to OQ cuts the major axis at G . Prove that , PG = b .

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32. If $(\alpha + \beta)$ and $(\alpha - \beta)$ are the eccentric angles of the points P and Q respectively on the ellipse

$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ show that the equation of the chord PQ is $\frac{x}{a}\cos\alpha + \frac{y}{b}\sin\alpha = \cos\beta.$

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33. If the θ and φ be the eccentric angles of the two ends of a focal chord of an ellipse then show that $\pm e\cos\frac{\theta+\varphi}{2} = \cos\frac{\theta-\varphi}{2}$.

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Short Answer Type Questios

1. Find (i) the lengths of axes (ii) the length of latus rectum (iii) coordinates of vertices (iv) eccentricity (v) coordinates of foci and (iv) equations of directrices of each of the following ellipses :

16x^(2) + 25y^(2) = 400

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2. Find (i) the lengths of axes (ii) the length of latus rectum (iii) coordinates of vertices (iv) eccentricity (v) coordinates of foci and (iv) equations of directrices of each of the following ellipses :

$9x^2 + 4y^2 = 36$

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3. Find (i) the lengths of axes (ii) the length of latus rectum (iii) coordinates of vertices (iv) eccentricity (v) coordinates of foci and (iv) equations of directrices of each of the following ellipses :

$x^2 + 4y^2 = 16$

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4. Find (i) the lengths of axes (ii) the length of latus rectum (iii) coordinates of vertices (iv) eccentricity (v) coordinates of foci and (iv) equations of directrices

of each of the following ellipses :

$4x^2 + 3y^2 = 1$

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5. Find the eccentricity and equations of the directrices of the ellipse $\frac{x^2}{100} + \frac{y^2}{36} = 1$. Show that the sum of the focal distances of any point on this ellipse is constant .

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6. Taking major and minor axes as x and y -axes respectively, find the equation of the ellipse whose lengths of major and minor axes are 6 and 5 respectively .

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7. Taking major and minor axes as x and y -axes respectively, find the equation of the ellipse whose lengths of minor axis and latus rectum are 4 and 2 .

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8. Taking major and minor axes as x and y-axes respectively , find the eqation of the ellipse Whose eccentricity is $\frac{3}{5}$ and coordinates of foci are $(\pm 3, 0)$

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9. Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse whose eccentricity is $\frac{1}{\sqrt{2}}$ and length of latus rectum 3 .

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10. Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse which passes through the point (1,3) and (2,1) .

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11. Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse whose eccentricity is $\sqrt{\frac{2}{5}}$ and passes through the point (-3, 1)

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12. Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse whose coordinates of vertices are $(\pm 4, 0)$ and the coordinates of the ends of monor axes are $(0, \pm 2)$.

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13. Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse whose coordinates of between the foci is 2 and the distance between the directrices is 4 .

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14. Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse whose eccentricity is $\frac{1}{\sqrt{2}}$ and the sum of the squares of major and minor axes is 24 .

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15. Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse whose coordinates of vertices are $(\pm 5, 0)$ and the coordinates of one focus are (4,0) .

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16. Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse whose length of latus rectum is $\frac{18}{5}$ unit and the coordinates of one focus are (4,0)

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17. Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse whose distance between the foci is $4\sqrt{3}$ unit and minor axis is of length 4 unit .

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18. Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse whose eccentricity is $\sqrt{\frac{2}{3}}$ and the length of semi-latus rectum is 2 unit

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19. Find the lengths of axes of the ellipse whose eccentricity is $\frac{3}{5}$ and the distance between focus and directrix is 16 .

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20. (1.3) and (4,-1) are two foci of an ellipse whose eccentricity is $\frac{1}{4}$. Find the length of the mojor axis .

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21. The length of the latus rectum of an ellipse is 8 unit and that of the mojor axis , which lies along the x -axis, is 18 unit. Find its equation in the standard form . Determine the coordinates of the foci and the eqations of its directrices .

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22. Taking major and minor axes along y and x-axes, find the equation of the ellipse whose coordinates of foci are $(0, \pm 1)$ and the length of minor axis is 2 .

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23. Taking major and minor axes along y and x-axes, find the equation of the ellipse whose eccentricity $\sqrt{\frac{3}{7}}$ and the length of latus rectum $\frac{8}{\sqrt{7}}$

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24. Taking major and minor axes along y and x-axes, find the equation of the ellipse whose length of minor axis is 2 and the distance between the foci is $\sqrt{5}$

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25. Taking major and minor axes along y and x-axes, find the equation of the ellipse whose coordinates of one vertex are (0,-5) and the coordiantes of one end of minor axis are (-3,0) .

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26. Taking major and minor axes along y and x-axes, find the equation of the ellipse whose coordinates of foci are $(0, \pm 8)$ and the eccentricity is $\frac{4}{5}$

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27. Find the equation of the ellipse whose eccentricity is $\frac{1}{2}$, focus is (2,0) anddirectix is $x - 8 = 0$

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28. Find the equation of the ellipse whose eccentricity is $\frac{\sqrt{7}}{4}$, focus is $(0, -\sqrt{7})$ and directrix is $\sqrt{7}y + 16 = 0$

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29. Find the equation of the ellipse whose eccentricity is $\frac{1}{2}$, focus is (-1,1) , directrix is x - y + 3 = 0 .

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30. Find the equation of the ellipse whose focus is $(3, 4)$, directrix is $3x + 4y = 5$ and eccentricity is $\frac{2}{3}$

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31. A point moves so that its distance from (0,-3) is $\frac{1}{\sqrt{2}}$ times its distance from the line $3x - 4y + 1 = 0$. Show that the locus of the moving point is an ellipse whose equation you are to determine .

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32. Find the equation of the ellipse whose major axis is parallel to x - axis and centre is (-3,2) , eccentricity is $\frac{\sqrt{7}}{4}$ and the length of latus rectum is $\frac{9}{2}$.

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33. Find the equation of the ellipse whose major axis is parallel to x - axis and centre is (-2,1) , length of major axis $2\sqrt{3}$ and the coordinates of foci are (-1,1) and (-3,1)

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34. Find the equation of the ellipse, for which the foci are (0,1) and (0,-1) and length of the minor axis is 1 unit .

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35. The eccentricity of an ellipse is $\frac{1}{2}$, focus is S (0,0) and the major axis and directrix intersect at Z (-1,-1) . Find the coordinates of the centre of the ellipse .

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36. The lengths of major and minor axes of an ellipse are 8 and 6 and their equations are y - 1 = 0 and x + 3 = 0 respectively . Find the equation of the ellipse .

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37. Show that the point $\left(2, \frac{2}{\sqrt{5}}\right)$ lies on the ellipse $4x^2 + 5y^2 = 20$. Show further that the sum of its distances from the two foci is equal to the length of its major axis .

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38. Prove that SP + S'P = 20 for the ellipse $\frac{x^2}{100}+\frac{y^2}{36}=1, S$ and S' are the two foci of the ellipse and P is any point on the ellipse

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39. If t be a variable parameter, show that the point $x=a\frac{1-t^2}{1+t^2}, y=b\frac{2t}{1+t^2}$ always lies on an ellipse

.

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40. A point moves on a plane is such a manner that the sum of its istances from the points (5,0) and (-5,0) is always constant and equal to 26 . Show that the locus of the moving point is the ellipse $\frac{x^2}{169}+\frac{y^2}{144}=1$.

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41. Find the locus of the point , the ratio of whose distances from the line x - 8 = 0 and from the point (2,0) is 2:1 .

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42. The lengths of the major and minor axes of an ellipse are 2 a and 2b and N is the foot of the perpendicular drawn from a point P of the ellipse on the major axis . Show that $\frac{PN^2}{\overline{AN} \cdot \overline{A'N}} = \frac{b^2}{a^2}$ where A and A' are the two vertices of the ellipse.

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43. Show that for an ellipse the straight line joining the upper end of one latus rectum and the lower end of the other latus rectum passes through the centre of the ellipse .

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44. Find the equation of the auxiliary circle of the ellipse $16x^2 + 25y^2 + 32x - 100y = 284$.

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45. If the eccentric angles of the two points on the ellipse $\frac{x^2}{a^2} = \frac{y^2}{b^2} = 1\left(a^2 > b^2\right)$ and θ_1 and θ_2 then prove that the equation of chord passing through these two point is $\frac{x}{a}\cos\frac{\theta_1 + \theta_2}{2} + \frac{y}{b}\sin\frac{\theta_1 + \theta_2}{2} = \cos\frac{\theta_1 - \theta_2}{2}$.

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46. Show that equations $x = 5 \cdot \frac{1 - t^2}{1 + t^2}, y = 6 \cdot \frac{t}{1 + t^2}$ where t is a variable parameter, define an ellipse . Find its eccentricity .

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47. Show tht the locus of the middle points of chords of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ drawn through an extremity of the minor axis is $\frac{x^2}{a^2} + \frac{y^2}{b^2} = \pm \frac{y}{b}$

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48. If

$P(x, y), F_1(3, 0), F_2(-3, 0)$ and $16x^2 + 25y^2 = 400$

then show that $PF_1 + PF_2 = 10$

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Sample Questions For Competitive Exams A M C Q

1. Find the equation of the ellipse whose length of major axis is 4 and length of latus rectum is 2.

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2. If the distance between two foci of an ellipse is equal to the length of latus rectum of that ellipse , then the value of eccentricity will be equal to _

A. $\frac{\sqrt{5}+1}{2}$

B. $\frac{\sqrt{5}-1}{2}$

C. $\frac{\sqrt{5}-2}{2}$

D. $\frac{2}{\sqrt{5}+1}$

Answer: B::D

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3. Let P be a point on the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$. If the distance of P from centre of the ellipse be equal with the average value of semi major axis and semi minor axis, then the coordinates of P is _

A. $\left(\frac{2\sqrt{91}}{7},\frac{3\sqrt{105}}{14}\right)$

B. $\left(\frac{2\sqrt{91}}{7},\frac{3\sqrt{105}}{14}\right)$

C. $\left(-\frac{2\sqrt{105}}{7},-\frac{3\sqrt{91}}{14}\right)$

D. $\left(-\frac{2\sqrt{105}}{7},\frac{3\sqrt{91}}{14}\right)$

Answer: A::B

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4. $P(x_1, y_1)$ and $Q(x_2, y_2)$ are two ends of a latus rectum of the ellipse $x^2 + 4y^2 = 4$, where $y_1, y_2 < 0$. The equation of parabola with latus rectum PQ is _

A. $x^2 + 2\sqrt{3}y = 3 + \sqrt{3}$

B. $x^2 - 2\sqrt{3}y = 3 + \sqrt{3}$

C. $x^2 + 2\sqrt{3}y = -\sqrt{3}$

D. $x^2 - 2\sqrt{3}y = 3 - \sqrt{3}$

Answer: B::C

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5. $\frac{x^2}{r^2-r-6}+\frac{y^2}{r^2-6r+5}=1$ will represents an ellipse if r lies in the interval _

A. $(-\infty,-2)$

B. $(3,\infty)$

C. $(5,\infty)$

D. $(1,\infty)$

Answer: A::C

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Sample Qusettions For Competitive Exams B Integer Answer Type

1. P (2 , k) is on the ellipse $x^2 + 2y^2 = 6$. For what value of k the point P is nearest to the line x + y = 7 ?

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2. B and C are the vertex of a triangle ABC with coordinate (2 , 0) and (8 , 0) respectively. Another vertex A moves in such a way that it satisfies the relation $4 \tan\frac{B}{2}\tan\frac{C}{2} = 1$. If the equation of locus of A is $\frac{(x-5)^2}{5^2} + \frac{y^2}{k^2} = 1$, then the value fo k is _

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3. The straigth line $y = 2t^2$ intesects the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ at a real points if $|t| \leq k$ then the value of k is _

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4. Find the equation of the ellipse whose length of minor axis is 10 and length of latus rectum is 6.

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5. S , T are two foci of an ellipse and B is a one end point of minor axis . If STB be a equilateral triangle

and eccentricity of the ellipse be $\frac{1}{\lambda}$, then the value of λ is _

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Sample Questions For Competitive Exams D Comprehension Type

1. Find the length of mejor and minor axis of the ellipse $25(x+1)^2+9(y+2)^2=225$.

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2. If the distance between two latus rectum of a ellipse is 10 unit and length of major axis 12unit then find its eccentricity.

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3. Find the length of the latus rectum of the ellipse $5x^2 + 3y^2 = 15$.

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4. Find the length of the latus rectum of the ellipse $x^2 + 2y^2 = 2$.

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5. S_1, S_2 are two foci of the ellipse $x^2 + 2y^2 = 2$. P be any point on the ellipse

The locus incentre of the triangle PSS_1 is a conic where length of its latus rectum is _

A. $3 + 2\sqrt{3}$

B. $5 - 2\sqrt{3}$

C. $6 - 4\sqrt{3}$

D. $4 + 2\sqrt{2}$

Answer: C

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6. Statement - I : The all chords passing through focus of an ellipse , the latus rectum will be the minimum in length .

Statement - II : The sum of the reciprocals of the segments of any focal chord of an ellipse Is half of latus rectum .

A. Statement - I is true, Statement - II is true and statement - (ii) is a correct explantion for Statement - I .

B. Statement - I s true, Statement - II is true but Statement - II is not a correct explanation of Statement - I .

C. Statement - I is true, Statement - II is false .

D. Statement - I false, Statement - II is true.

Answer: A

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7. If the distance between two latus rectum of a ellipse is $4\sqrt{3}$ unit and length of minor axis is 4unit then find its eccentricity.

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