In this video – Solid Geometry IGU/MDU/CDLU

SHAKUNTHA'S

B.Sc Pass Course/Hons. Maths – Regular/Re-appear – 1st Semester

- ✓ Complete Coverage of Sections (Section -1st and 2nd)
- ✓ Most Important Questions
- ✓ Detailed Analysis of Exam Pattern
- ✓ Previous Years Questions and PDFs
- ✓ Questions With Solutions
- ✓ Important Short Answer Type Questions
- ✓ Expected Questions
- ✓ Discussion Group
- ✓ Doubt Solving

Hello!

I am Sidharth (Founder Shakuntha's)

Welcome to Shakuntha's

SHAKUNTHA'S

Any questions?

Contact shakunthas.com for Notes and Assignments and Register yourself for Individual attention.

Discuss your problems/doubts in Telegram Group

Link is in description

Syllabus – Solid Geometry

SHAKUNTHA'S

1. General Equation of second degree
2. Tracing of conics
3. System of conics
4. Confocal Conics
5. Polar Equations of a conic
6. Sphere
7. Cone
8. Cylinder
9. The Conicoid
10. Plane Sections of Conicoids
11. Generating Lines
12. Confocal Conicoids
13. Reduction of Second Degree Equations

Section – 3
Chapter – 9 (The Conicoid)

SHAKUNTHA'S

DON'T FORGET TO SUBSCRIBE OUR CHANNEL – SHAKUNTHA'S

Example 2. *Find the equation of the tangent planes to $2x^2 - 6y^2 + 3z^2 = 5$ which pass through the lines $x + 9y - 3z = 0,\ 3x - 3y + 6z - 5 = 0$.* [K.U. 2017, 07; M.D.U. 2010]

Find the equations of the two tangent planes which contain the lines given by $7x + 10y = 30, 5y - 3z = 0$ and touch the ellipsoid $7x^2 + 5y^2 + 3z^2 = 60$. 6

Example 5. *Find the point of contact at which the plane $lx + my + nz = p$ touches the ellipsoid* $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1.$ [K.U. 2015, 14; M.D.U. 2011]

Example 7. *Prove that the sum of the squares of the reciprocals of any three mutually perpendicular diameters of an ellipsoid is constant.* IGU

To prove that there are six points on an ellipsoid, the normals at which pass through a given point (α, β, γ).

Or

To prove that six normals can be drawn from a given point to the ellipsoid.

Prove that the six normal's from a point to an ellipsoid lie on a curve of second degree. 6

To find the equation of the polar plane of a point (x_1, y_1, z_1) w.r.t. the conicoid $ax^2 + by^2 + cz^2 = 1$. [M.D.U. 2012]

Find the equations of the polar of the line $\frac{x-1}{5} = \frac{y-3}{7} = \frac{z+5}{2}$ w. r. t. the conicoid $x^2 + 3y^2 - 7z^2 - 21 = 0$ in symmetrical form. 6

Example 2. *Prove that the enveloping cylinder of the ellipsoid* $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$, *whose generators are parallel to the lines* $\frac{x}{0}=\frac{y}{\pm\sqrt{a^2-b^2}}=\frac{z}{c}$ *meet the plane* $z=0$ *in circles.*

Example 3. *Find the equation of the enveloping cylinder of the conicoid* $2x^2+y^2+3z^2=1$ *whose generators are parallel to the line* $\frac{x}{1}=\frac{y}{2}=\frac{z}{2}$. [M.D.U. 2015; K.U. 2012]

Find the centre of the conic given by the equations

$$2x - 2y - 5z + 5 = 0,\ 3x^2 + 2y^2 - 15z^2 = 4.$$

Prove that the normals from (α, β, γ) to the paraboloid $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 2z$ lie on the cone $\frac{\alpha}{x - \alpha} - \frac{\beta}{x - \beta} + \frac{a^2 - b^2}{z - \gamma} = 0.$ 6

Find the locus of the point of intersection of three mutually perpendicular tangent planes to the paraboloid $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{2z}{c}$. 6

Find the Chord through the point (2, 3, 4) which is bisected by diametric plane $10x-24y-21=0$ of the paraboloid $5x^2-6y^2=7z$. 6

Find the locus of chords of the ellipsoid $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$, which are bisected at (f, g, h). *[M.D.U. 2015; C.D.L.U. 2013]*

Show that the equations of the polar of the line $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ w.r.t. the quadric $x^2-2y^2+3z^2=4$ are $\frac{x+6}{3}=\frac{y-2}{3}=z-2$.

The normal at any point P of a central conicoid, meets the three principal planes at G_1, G_2, G_3. Show that $PG_1 : PG_2 : PG_3 = a^{-1} : b^{-1} : c^{-1}$.

Show that the equation of the plane which cuts the conicoid $x^2 + 4y^2 - 5z^2 = 1$ *in a conic with centre* (2, 3, 4) *is* $x + 6y - 10z + 20 = 0$.

Find the equations of the tangent planes to the surface $4x^2 - 5y^2 + 7z^2 + 13 = 0$ which are parallel to the plane $4x + 20y - 21z = 0$.

Section – 1
Chapter –1,2 &3

1. General Equation of second degree
2. Tracing of conics
3. Confocal Conics

DON'T FORGET TO SUBSCRIBE OUR CHANNEL – SHAKUNTHA'S

. **To find the co-ordinates of the centre of the conic section**

[GU-2018]

$$ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0.$$

Also to find the equation of the conic referred to centre as origin.

[*M.D.U. 2009, 01; K.U. 2003*]

Or

To find the equation of the conic referred to axes through the centre parallel to the original axes. [*M.D.U. 2007; K.U. 1995*]

EXAMPLE 1. *Find the length of the axes, the eccentricity and the equations of the axes of the conic* $5x^2 + 6xy + 5y^2 + 4x + 12y - 4 = 0$. IGU-2018 [K.U. 2014, 10]

✱ **EXAMPLE 3.** *Find the centre, lengths and the equations of the axes, eccentricity, foci and directrices of the conic* $x^2 + 12xy - 4y^2 - 6x + 4y + 9 = 0$. [K.U. 2011, 08, 04]

Trace the conic $9x^2 + 24xy + 16y^2 - 2x + 14y + 1 = 0$.

EXAMPLE 1. *Prove that the conics* $x^2 - y^2 - 4x + 2y + 2 = 0$ *and* $x^2 + 3y^2 - 4x - 6y + 4 = 0$ *are confocal.* [K.U. 2016, 15, 13, 10, 07, 06; M.D.U. 2016, 15, 11, 08, 05; C.D.L.U. 2016]

SHAKUNTHA'S

For Important Short Answer Type Questions

Download Short Answer Type Question from our website – www.shakunthas.com OR Join our Telegram Group (Link is in Description)

Don't Forget to Subscribe our Channel – Shakuntha's
Share it with your Friends and Support us