

Roll No.

91227

**B. A. 1st Semester
Examination – December, 2015**

MATHS - III (SOLID GEOMETRY)

Paper : BM-113

Time : Three Hours] [Maximum Marks : 26

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.
प्रश्नों के उत्तर देने से पहले परीक्षार्थी यह सुनिश्चित कर लें कि उनको पूर्ण एवं सही प्रश्न-पत्र मिला है। परीक्षा के उपरान्त इस सम्बन्ध में कोई भी शिकायत नहीं सुनी जायेगी।

Note : Attempt five questions in all, selecting one question from each Unit. UNIT – V is compulsory. All questions carry equal marks.

प्रत्येक इकाई से एक प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए। इकाई – V अनिवार्य है। सभी प्रश्नों के अंक समान हैं।

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Find the equation of evoloping cylinder of a sphere $x^2 + y^2 + z^2 = a^2$ whose generator are parallel to the line $\frac{x}{l} = \frac{y}{m} = \frac{z}{n}$. 2

$$\text{परवाने का गुणनांक } ax^2 + by^2 + cz^2 + 2axy + 2azc + 2bcz = 0$$

Prove that $ax^2 + by^2 + cz^2 + 2ux + 2vy + 2uz + d = 0$ represents a cone if $\frac{a}{u^2} + \frac{b}{v^2} + \frac{c}{w^2} = a$. 3

4) $x^2 + y^2 + z^2 + 2x + 4y + 6z - 11 = 0$ میں اسے حل کرو

Find the centre of the two spheres which touch the plane $x + 2y + 2z - 5 = 0$ at the point $(1, 1, 1)$ and lie sphere $x^2 + y^2 + z^2 + 2x + 4y + 6z - 11 = 0$. 2

A point moves such that the ratio of its distance from two fixed points is constant. Show that its locus is a sphere.

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$$\Delta Q_{SO} = \frac{Q_{SO}}{1 + \frac{Q_{SO}}{SP_{SO}}} = \frac{Q_{SO}}{SP_{SO} + Q_{SO}}$$

(b) If PSP , and QSQ be any two focal chords of a conic which are perpendicular, then prove it

$$\frac{1}{SP \cdot SP'} + \frac{1}{SQ \cdot SQ'} = \text{constant.}$$

$$x^2 - 4xy - 2y^2 + 10x + 4y = 0 \quad \text{का } 3\text{ त्रिवर्गीय}$$

2. (a) Trace the conic $x^2 - 4xy - 2y^2 + 10x + 4y = 0$.

如圖，若直線 $lx + my + n = 0$ ，則 $l^2x^2 + 2lhx + h^2y^2 + 2gyx + 2fy + c = 0$ 為對偶直線。

such the conic $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$

(b) Find the condition that line $lx + my + n = 0$ may

$$f(x) = f(x_0) + f'(x_0)(x - x_0) + \frac{1}{2}f''(c)(x - x_0)^2$$

$$\frac{d}{dt} \left(\frac{1}{2} \|x(t)\|^2 \right) = -\|Ax(t)\|^2 + \frac{1}{2} \|x(t)\|^2 \left(1 - n_1^2 + n_2^2 + n_3^2 + n_4^2 \right)$$

Value of λ ?

$$c_z^2 + 2xy + (1 + \alpha)y_z^2 + 2\alpha y - 1 = 0, \quad \text{for different}$$

What curves are represented by the equation

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$$\left(2, -1, \frac{3}{4}\right) \text{ არ კუთხის წილი}$$

$$\text{Hyperboloid } \frac{x^2}{4} + \frac{y^2}{9} - \frac{z^2}{16} = 1, \text{ passes through the point } (2, 3, -4) \text{ and } \left(2, -1, \frac{3}{4}\right).$$

8. (a) Find the equations to the generating lines of the

$$\text{અનુભાવ કરીએ તો } x^2 + 2y^2 + 6z^2 = 8 \text{ બિનાનાં } \text{ હશે}$$

(b) Find the real central circular section of the ellipsoid $x^2 + 2y^2 + 6z^2 = 8$.

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1 \quad \text{is the equation of an ellipsoid.}$$

7. (a) Find the locus of the centre of sections of the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ whose area is constant. 3

$$k^2 = \frac{p^2}{m^2} + \frac{q}{m} + \frac{u}{m}.$$

(b) Show that the centre of the conic $ax^2 + by^2 = 2z$,
 $lx + my + nz = p$ in the point $\left(\frac{an}{l}, \frac{bn}{m}, \frac{cn}{n} \right)$ where

Find the locus of the tangents drawn from a given point (a, B) to the conicoid $ax^2 + by^2 + cz^2 = 1$. 3

(b) Prove that six normals can be drawn from a given point to the ellipsoid.

$$d = zu + hv + xj \quad \text{မြတ် ရေးမှု များ ပါရေး ပို့ဆောင်ရန်}$$

Q. (a) If a , b , c are real numbers such that $ax^2 + by^2 + cz^2 = 1$, then abc coincides with

- (b) Reduce to standard form $2y^2 - 2yz + 2zx - 2xy - x - 2y + 3z - 2 = 0$ and state the nature of surface represented by the equations.
- (c) Show that the line $\frac{x}{l} = \frac{y}{m} = \frac{z}{n}$, where $l^2 + 2m^2 - 3n^2 = 0$, is a generator of the cone $x^2 + 2y^2 - 3z^2 = 0$.

- (d) Show that the line $\frac{x}{l} = \frac{y}{m} = \frac{z}{n}$, where $l^2 + 2m^2 - 3n^2 = 0$, is a generator of the cone $x^2 + 2y^2 - 3z^2 = 0$.
- (e) Define centre of a conic.
- (f) Find the nature of the conic $13x^2 - 18xy + 37y^2 + 2x + 14y - 2 = 0$.
- (g) Find the nature of the conic $13x^2 - 18xy + 37y^2 + 2x + 14y - 2 = 0$.

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- (h) Define director circle.
- (i) Define director circle of one sheet.

$$\text{Given } 2x^2 + 2y^2 + 2z^2 - 2x + 4y + 2z - 5 = 0 \text{ का } \\ 2x^2 + 2y^2 + 2z^2 - 2x + 4y + 2z - 5 = 0.$$

(d) Find the centre and radius of the sphere

प्रारंभिक गति की परिवर्तन अवलोकन।

(c) Define hyperboloid of one sheet.

प्रारंभिक गति की परिवर्तन अवलोकन।

(b) Find the nature of the conic $13x^2 - 18xy + 37y^2 + 2x + 14y - 2 = 0$.

प्रारंभिक गति की परिवर्तन अवलोकन।

9. (a) Define centre of a conic.

उत्तर - V

UNIT - V

प्रारंभिक गति की परिवर्तन अवलोकन।

the nature of surface represented by the equations.

$2y^2 - 2yz + 2zx - 2xy - x - 2y + 3z - 2 = 0$ का हिस्सा

(b) Reduce to standard form