Paper Code: 2101 Regd. No

SRI Y.N.COLLEGE (AUTONOMOUS)-NARSAPUR, W.G.Dt.

(Affiliated to Adikavi Nannaya University)

**I B.Sc.,Degree Examinations, Mar/Apr 2017**

(At the end of 2nd Semester)

**(For 2016-19 batch)**

Part – II **MATHAMATICS** Paper – I B

(Solid Geometry)

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Date: 04.04.2017 AN Duration: 3hrs **PART - I** Max Marks: 75

**Answer Any FIVE Questions .Each Question carries FIVE Marks** **5 x 5 = 25M**

1. Find the Equation of the plane through (4, 4, 0) and perpendicular to the planes $x + 2y + 2z = 5$ and $3x + 3y + 2z - 8 = 0$.
2. Prove that the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ ; $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$ are coplanar, Also find their point of intersection.
3. Find the Equation of the line through the point (1,1,1) and intersecting the lines $2x - y - z - 2 = 0 = x + y + z - 1$ ; $x - y - z - 3 = 0 = 2x + 4y - z - 4$ .
4. Find the equation to the sphere through O = (0, 0, 0) and making intercepts a, b, c on the axes.
5. Find the pole of the plane $x + 2y + 3z = 7$ w.r.t the sphere $x^2 + y^{2+} z^2 - 2x - 4y - 6z + 11 = 0$.
6. Find the equation to the sphere through the circle $x^2 + y^2 + z^2 - 2x + 3y - 4z + 6 = 0$, $3x - 4y + 5z - 15 = 0$ and cutting the sphere $x^2 + y^2 + z^2 + 2x + 4y - 6z + 11 = 0$ orthogonally .
7. Find the equation of the cone with vertex at (1, 1, 1) and whose guiding curve is $x^2 + y^2 = 4$ , $z = 2$ .
8. Show that the reciprocal cone of $ax^2 + by^2 + cz^2 = 0$ is the cone $\frac{x2}{a} + \frac{y2}{b} + \frac{z2}{c} = 0$ .

## PART –II

**Answer any FIVE questions choosing at least TWO questions from each section.**

**Each question carries 10 marks** **5 X 10 = 50M**

### SECTION -A

9. A variable plane is at a constant distance 3p from the origin and meets the axes in A , B , C. show that the locus of the centroid of the Δ ABC is $x^{-2} + y^{-2} + z^{-2} = p^{-2}$ .
10. Find the equations of the planes bisecting the angles between the planes $3x - 2y + 6z + 2 = 0$, $2x - y + 2z + 2 = 0$. Also point out which plane bisects the acute angle.
11. Find the image of the point (2, -1 , 3 ) in the plane $3x - 2y + z = 9$ .
12. Find the shortest distance between the lines $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ , $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ find also the equations and the points in which the S.D meets the given lines.
13. Find the equations of the spheres passing through the circle $x^2 + y^2 = 4$ , $z = 0$ and is intersected by the plane $x + 2y + 2z = 0$ is a circle of radius 3 .

## SECTION – B

14. If $r_1, r_2$ are the radii of two orthogonal spheres, then the radius of the circle of their intersection is $\frac{r_1 r_2}{\sqrt{r_1^2 + r_2^2}}$.

15. Find the limiting points of the co – axial system defined by the sphere $x^2 + y^2 + z^2 + 4x + 2y + 2z + 6 = 0$ and $x^2 + y^2 + z^2 + 2x - 4y - 2z + 6 = 0$.

16. Show that is a right circular cone has sets of three mutually perpendicular generators, its semi vertical angle must be $\tan^{-1}\sqrt{2}$.

17. Prove that the angle between the lines of intersection of the plane $x + y + z = 0$ with the cone $ayz + bzx + cxy = 0$ is $\frac{\pi}{3}$ if $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$.

18. Show that the general equation to a cone which touches the coordinate planes is $\sqrt{ax} \pm \sqrt{by} \pm \sqrt{cz} = 0$.

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SRI Y.N.COLLEGE (AUTONOMOUS)–NARSAPUR, W.G.Dt.

(Affiliated to Adikavi Nannaya University)

**I B.Sc.,Degree Examinations, Mar/Apr 2018**

(At the end of 2nd Semester)

**Regular (2017 batch), Supplementary (2016 batch)**

**MATHEMATICS** Paper – II

(Solid Geometry)

Date: 29.03.2018 AN Max Marks: 75

Duration: 3 hrs

## PART – I

Answer any **FIVE** questions. 5 X 5 = 25M

Each question carries **FIVE** marks.

1. Find the equation of the plane through (4, 4, 0) and perpendicular to the planes $x + 2y + 2z = 5$ and $3x + 3y + 2z - 8 = 0$.
2. Find the equations of the line through the point (1, 1, 1) and intersecting the lines $2x - y - z - 2 = 0 = x + y + z - 1, x - y - z - 3 = 0 = 2x + 4y - z - 4$
3. Find the distance of the point (1, –2, 3) from the plane $x - y + z = 5$ measured parallel to the line whose d.cs. are proportional to 2, 3, –6.
4. Find the equation to the sphere through O = (0, 0, 0) and making intercepts a, b, c on the axes.
5. Find the equation of the sphere which touches the sphere $x^2 + y^2 + z^2 + 2x - 6y + 1 = 0$ at the point (1, 2, –2) and passes through the origin.
6. Find the equation of the sphere through the circle $x^2 + y^2 + z^2 - 2x + 3y - 4z + 6 = 0$, $3x - 4y + 5z - 15 = 0$ and cutting sphere $x^2 + y^2 + z^2 + 2x + 4y - 6z + 11 = 0$ orthogonally.
7. Find the equation of the cone whose vertex is the origin and whose base curve is $x^2 + y^2 + z^2 + 2ux + d = 0$.
8. Find the equation of the cone which touches the three coordinate planes and the planes $x + 2y + 3z = 0, 2x + 3y + 4z = 0$..

## PART – II

Answer any FIVE questions. Choosing atleast TWO questions from each section.

Each question carries 10 marks. 5 X 10 = 50M

### SECTION - A

9. Prove that the equation $2x^2 - 6y^2 - 12z^2 + 18yz + 2zx + xy = 0$ represents a pair of planes and find the angle between them.
10. Find the bisecting plane of the acute angle between the planes $3x - 2y - 6z + 2 = 0$, $-2x + y - 2z - 2 = 0$.
11. Find the image of the line $\frac{x-1}{9} = \frac{y-2}{1} = \frac{z+3}{-3}$ in the plane $3x - 3y + 10z - 26 = 0$.
12. Find the4 S.D. between the lines $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}, \frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$. Find also the equations and the points in which the S.D. meets the given lines.
13. Show that the two circles $x^2 + y^2 + z^2 - y + 2z = 0$, $x - y + z = 2$; $x^2 + y^2 + z^2 + x - 3y + z - 5 = 0$, $2x - y + 4z - 1 = 0$ lie on the same sphere and find its equation.

### SECTION – B

14. If $r_1$, $r_2$ are the radii of two orthogonal spheres, then the radius of the circle of their intersection is $\frac{r_1 r_2}{\sqrt{r_1^2 + r_2^2}}$
15. Find the limiting points of the coaxal system defined by spheres $x^2 + y^2 + z^2 + 4x + 2y + 2z + 6 = 0$ and $x^2 + y^2 + z^2 + 2x - 4y - 2z + 6 = 0$
16. Find the angle between the lines of intersection of the plane $x - 3y + z = 0$ and the cone $x^2 - 5y^2 + z^2 = 0$.
17. Find the equation of the right circular cone with vertex at (2, 1, -3) and whose axis is parallel to OY and whose semi vertical angel is $45^0$.
18. Find the condition that the lines of the section of the plane $lx + my + nz = 0$ and the cones $ax^2 + by^2 + cz^2 = 0$ and $fyz + gzx + hxy = 0$ should be concident.

Paper Code: 2101 Regd. No

# SRI Y.N.COLLEGE (AUTONOMOUS)–NARSAPUR, W.G.Dt.

(Affiliated to Adikavi Nannaya University)

## I B.Sc., Degree Examinations, Mar/Apr 2019

(At the end of 2nd Semester)

Regular (2018 batch), Supplementary (2017,2016 batches)

## MATHEMATICS Paper – II

(Solid Geometry)

Date: 04.04.2019 AN Max Marks:75

Duration:3hr

### PART-I

Answer any "Five" questions, each question carries 5Marks. 5x5=25M

1. Find the equation of the plane through the point $(4, 4, 0)$ and perpendicular to each of the planes $x+2y+2z-5=0$ and $3x+3y+2z-8=0$.
2. Find the image of the point $(1, 3, 4)$ in the plane $2x-y+z+3=0$.
3. Find the angle between the lines $x-2y+z=0=x+y-z-3$, $x+2y+z-5=0=8x+12y+5z$.
4. A sphere of radius 'K' passes through the origin and meets the axes in $A,B,C$. show that the centroid of the triangle ABC lies on the sphere $9(x^2+y^2+z^2) = 4K^2$.
5. Find the pole of the plane $10x-2y-5z-2=0$. With respect to the sphere $x^2+y^2+z^2-6x+2y-3z+1=0$.
6. Find the plane of contact of the point $(3,-1,5)$ with respect to the sphere $x^2+y^2+z^2-2x+4y+6z-11=0$.
7. Find the equation to the cone whose vertex is $(1,1,0)$ and whose guiding curve is $y=0$, $x^2+z^2=4$.
8. Show that the reciprocal cone of $ax^2+by^2+c^2=0$ is the cone $\frac{x^2}{a}+\frac{y^2}{b}+\frac{z^2}{c}=0$.

### PART-II

Answer any five questions. Choosing at least two questions form each section. Each question carries 10Marks. 5x10=50M

### SECTION-A

9. Find the equations of the bisectors of the angles between the planes $3x-2y+6z+2=0$, $2x-y+2z+2=0$.
10. A variable plane is at a constant distance 3p from the origin and meets the axes in A,B and C. show that the locus of the centroid of the triangle ABC is $x^{-2}+y^{-2}+z^{-2}=p^{-2}$
11. Find the image of the line $\frac{x-1}{9}=\frac{y-2}{1}=\frac{z+3}{-3}$ in the plane $3x-3y+10z-26=0$.
12. Find the shortest distance and the equations of S.D lines between the lines $\frac{x-3}{3}=\frac{y-8}{-1}=\frac{z-3}{1}$, $\frac{x+3}{-3}=\frac{y+7}{2}=\frac{z-6}{4}$ find the points in which the S.D lines meets the given line.
13. Find the equations of the spheres passing through the circle $x^2+y^2=4$, $z=0$ and is intersected by the plane $x+2y+2z=0$ in a circle of radius 3.

## SECTION-B

14. Find the equation of the sphere which touches the plane. $3x+2y-z+2=0$ at $(1,-2,1)$ and cuts orthogonally the sphere $x^2+y^2+z^2-4x+6y+4=0$.
15. If $r_1, r_2$ are the radii of two orthogonal spheres, then show that the radius of the circle of their intersection is $\frac{r1r2}{\sqrt{(r1^2+r2)^2}}$
16. Find the enveloping cone of the sphere $x^2+y^2+z^2+2x-2y=2$ with vertex at $(1,1,1)$
17. Find the vertex of the cone $7x^2+2y^2+2z^2-10zx+10xy+26x-2y+2z-17=0$.
18. Find the equation to the right circular cone whose vertex is $P(2,-3,5)$ axis PQ which makes equal with the axes and which passes through $A(1,-2,3)$.

Paper Code: 2101 Regd. No

# SRI Y.N.COLLEGE (AUTONOMOUS)–NARSAPUR,W.G.Dt.

(Affiliated to Adikavi Nannaya University)

## I B.Sc., Degree Examinations, October 2020

(At the end of 2nd Semester)

Regular (2019 batch), Supplementary (2018 batch)

**MATHEMATICS** Paper – II

(Solid Geometry)

Date: 03.11.2020 AN Max Marks:75

Duration:3hrs

**PART-I**

**SECTION-A**

**Answer any FIVE questions.** **5 X 5 = 25 M**

**Each section carries FIVE Marks.**

1. Find the angle between the planes $2x - y + z = 0, x + y + 2z = 7$.
2. Find K so that the lines $\frac{x-1}{-3} = \frac{y-2}{2k} = \frac{z-3}{2}$, $\frac{x-1}{3k} = \frac{y-5}{1} = \frac{z-6}{-5}$ may be perpendicular to each other.
3. Find the image of the point $p(1,3,4)$ in the plane $2x - y + z + 3 = 0$.
4. A plane passing through a fixed point (a,b,c) and intersects the axes in A,B,C. Show that the centre of the sphere OABC lies on $\frac{a}{x} + \frac{b}{y} + \frac{c}{z} = 2$.
5. Find the equation of the sphere through the circle $x^2 + y^2 + z^2 = 9, 2x + 3y + 4z = 5$ and the point (1,2,3).
6. Show that the plane $2x - 2y + z + 12 = 0$ touches the sphere $x^2 + y^2 + z^2 - 2x - 4y + 2z - 3 = 0$ and find the point of contact.
7. Find the equation to the cone with vertex (5,4,3) and guiding curve $3x^2 + 2y^2 = 6, y + z = 0$.
8. Find the enveloping cone of the sphere $x^2 + y^2 + z^2 + 2x - 2y = 2$ with vertex (1,1,1).

## SECTION-A

**Answer any FIVE questions.** **5 X 10 = 50 M**

**Choose TWO questions from each section. Each section carries 10 Marks.**

9. Find the equation of the plane through the points (2,2,1) and (9,3,6) and perpendicular to the plane 2x+6y+6z=9.

10. A variable plane is at a constant distance p from origin meets the axes in A,B,C. Show that the locus of the tetrahedron OABC is $x^{-2}+y^{-2}+Z^{-2}=16p^{-2}$.

11. Show that the lines $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$, $\frac{x-2}{3}=\frac{y-3}{4}=\frac{z-4}{5}$ are coplanar. Also find the point of contact and plane containing them.

12. Find the Shortest distance and equation to the line of shortest distance between the lines $\frac{x-3}{3}=\frac{y-8}{-1}=\frac{z-3}{1}$, $\frac{x+3}{-5}=\frac{y+7}{2}=\frac{z-6}{4}$

13. Show that the four points (-8,5,2),(-5,2,2),(-7,6,6), (-4,3,6) are concyclic.

## SECTION-B

14. Find the equation of the sphere through a circle $x^2+y^2+z^2-2x+3y-4z+6=0$ 3x-4y+5z-15=0 and cutting the sphere $x^2+y^2+z^2+2x+4y-6z+11=0$ orthogonally.

15. If two spheres of radius $r_1$ and $r_2$ cut orthogonally , show that the radius of the common circle is $\frac{r_1 r_2}{\sqrt{r_1^2+r_1^2}}$

16. Find the limiting points of the coaxial system defined by the spheres $x^2+y^2+z^2+3x-3y+6=0$ , $x^2+y^2+z^2-6y-6z+6=0$

17. Show that the semi vertical angle of a right circular cone having three mutually perpendicular (i) generators is $\tan^{-1}\sqrt{2}$ and (ii) tangent planes is $\tan^{-1}\frac{1}{\sqrt{2}}$

18. Find the vertex of cone $7x^2+2y^2+2z^2-10zx+10xy+26x-2y+2z-17=0$

Paper Code: 2101 Regd. No

# SRI Y.N.COLLEGE (AUTONOMOUS)–NARSAPUR, W.G.Dt.

(Affiliated to Adikavi Nannaya University)

**I B.Sc/B.Com/B.B.A/B.A., Degree Examinations, June 2022**

(At the end of 2nd Semester)

Supplementary (2019,2018,2017 batches)

## MATHEMATICS

Paper – II

(Solid Geometry)

Date: 29.06.2022 AN Max Marks:75

Duration: 3 hrs

### PART - I

**Answer any FIVE Questions, each question carries FIVE marks 5×5=25M**

1. Prove that the equation of the plane through the points (1,-2,4) and (3,-4,5) and parallel to x- axis is y+2z=6.
2. Find the equations of the straight line passing through the point (1,0,-1) and intersecting the lines 4x-y-13=0 = 3y-4z-1; y-2z+2=0=x-5.
3. Prove that lines $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$ ; $\frac{x-2}{3}=\frac{y-3}{4}=\frac{z-4}{5}$ are coplanar, also find their point of intersection.
4. Find the equation of Sphere passing through (0,0,0) (a,0,0) (0,b,0) (0,0,c)
5. Find the pole of the plane x+2y+3z=7 w.r.t.the sphere. $x^2+y^2+z^2-2x-4y-6z+11=0$
6. Find the equation of the sphere through the circle $x^2+y^2+z^2-2x+3y-4z+6=0$ , 3x-4y+5z-15=0 and cutting the sphere $x^2+y^2+z^2+2x+4y-6z+11=0$. Orthogonally.
7. Find the equation to the cone whose vertex is (1,1,0) and whose guiding curve is y=0, $x^2+z^2=4$.
8. Show that the reciprocal cone of $ax^2+by^2+c^2=0$ is the cone $\frac{x^2}{a}+\frac{y^2}{b}+\frac{z^2}{c}=0$

### PART - II

**Answer any FIVE questions. Choosing atleast TWO questions from each section. Each question carries 10 marks. 5×10=50M**

### SECTION - A

9. Find the equations of the planes bisecting the angles between the planes 3x-6y+2z+5=0 , 4x-12y+3z-3=0 also point out which the plane bisects the acute angle.

10. A variable plane is at a constant distance 3p from the origin and meets the axes in A,B,C. Show that the locus of the centroid of $\Delta ABC$ is $x^{-2}+y^{-2}+z^{-2} = p^{-2}$

11. Find the image of the line $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ in the plane x+y+z=1

12. Find the shortest distance and equations of the line S.D between the lines 3x-9y+5z=0 =x+y-z and 6x+8y+3z-10=0=x+2y+z-3.

13. Find the equations of the spheres passing through the circle $x^2+y^2=4$, z=0 and is intersected by the plane x+2y+2z=0 in a circle of radius 3.

## SECTION - B

14. Show that the two $x^2+y^2+z^2-y+2z=0$ , x-y+z=2 and $x^2+y^2+z^2+x-3y+z-5 =0$ , 2x-y+4z-1=0 lie on the same sphere and find its equation.

15. If $r_1, r_2$ are the radii of two orthogonal spheres, then show that the radius of the circle of their intersection is $\frac{r_1 r_2}{\sqrt{(r_1^2+r_2^2)}}$.

16. Prove that the angle between the lines of intersection of the plane x+y+z=0 with the cone ayz+bzx+cxy=0 is $\frac{\pi}{3}$ $if$ $\frac{1}{a}+\frac{1}{b}+\frac{1}{c} = 0$.

17. Show that the equation of quadric cone which contains the three coordinate axes and the lines in which the plane x-5y-3z=0 cuts the cone $7x^2+5y^2-3z^2=0$ is yz+10zx+18xy =0

18. Find the equation of the right circular cone whose vertex is the origin, axis as the line x=t, y=2t , z=3t and whose semi – vertical angle is $60^0$.