



TAMIL NADU OPEN UNIVERSITY
Chennai-25.
B.Sc Maths – First Year
HOME ASSIGNMENT

Programme Code No	: 131
Programme Name	: B.Sc (Maths)
Course Code & Name	: BMSS- 11 & ALGEBRA
Batch	: AY2021-2022
No. of Assignment	: 02
Maximum CIA Marks	: 15 Marks (Average of total no. of Assignments)

ASSIGNMENT -1

Max: 15 Marks

Answer any ONE of the following three questions.

1. Solve the equation $8x^5 - 22x^4 - 55x^3 + 55x^2 + 22x - 8 = 0$.
2. Verify Caley Hamilton for $\begin{pmatrix} 1 & 2 & 3 \\ 0 & -1 & 2 \\ 1 & 0 & 2 \end{pmatrix}$.
3. Sum the series $\frac{1.4}{5.10} - \frac{1.4.7}{5.10.15} + \frac{1.4.7.10}{5.10.15.20} - \dots$

ASSIGNMENT -2

Max: 15 Marks

Answer any ONE of the following three questions.

1. Solve the equation $27x^3 + 42x^2 - 28x - 8 = 0$ whose roots are in G.P..
2. Find by Horner's method, the root of the equation $x^3 - 3x + 1 = 0$ which lies between 1 and 2 correct to two decimal places.
3. Find the smallest number with 18 divisors.



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B.Sc Maths – First Year HOME ASSIGNMENT

Programme Code No	: 131
Programme Name	: B.Sc (Maths)
Course Code & Name	: BMSS- EL2 & ANALYTICAL GEOMETRY
Batch	: AY2021-2022
No. of Assignment	: 02
Maximum CIA Marks	: 15 Marks (Average of total no. of Assignments)

ASSIGNMENT -1

Max: 15 Marks

Answer any ONE of the following three questions.

- (i) Show that the locus of the midpoint of the chords of the ellipse subtending a triangle at the centre is $\left(\frac{x^2}{a^2} + \frac{y^2}{b^2}\right)^2 \left(\frac{1}{a^2} + \frac{1}{b^2}\right) = \left(\frac{x^2}{a^4} + \frac{y^2}{b^4}\right)$.

(ii) Find the equation of tangent at (x_1, y_1) to the hyperbola $xy = c^2$
- (i) Show that the sum of the square of the normal at the ends of a pair of conjugate semi-diameter terminated by major axis $a^2(1 - e^2)(2 - e^2)$.

(ii) Find the condition that $y = m_1x$ and $y = m_2x$ may be conjugate diameter of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$.
- (i) Find the shortest distance and the equation of the line of shortest distance between the two given lines $\frac{x+7}{3} = \frac{y+4}{4} = \frac{z+3}{-2}$ and $\frac{x-21}{6} = \frac{y+5}{-4} = \frac{z-2}{-1}$

(ii) Find the equations of the image of the line $\frac{x-1}{2} = \frac{y+2}{-5} = \frac{z-3}{2}$ in the plane $2x - 3y + 2z + 3 = 0$.

ASSIGNMENT -2

Max: 15 Marks

Answer any ONE of the following three questions.

- (i) The chords of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ touches another ellipse $\frac{x^2}{\alpha^2} + \frac{y^2}{\beta^2} = 1$ / Show that the locus of the poles of these chords with respect to ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is $\frac{\alpha^2 x^2}{a^4} + \frac{\beta^2 y^2}{b^4} = 1$.

(ii) Prove that the orthocentre of the triangle formed by three tangents to the Parabola lies on the directrix

2. Find the angle between two conjugate semi – diameters of an ellipse and show that it is minimum when they are equal and find minimum value.
3. Find the equation of the sphere having the circle $x^2 + y^2 + z^2 = 5$, $x - 2y + 2z = 5$ for a great circle. Find its centre and radius.



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B.Sc Maths – First Year
HOME ASSIGNMENT

Programme Code No	: 131
Programme Name	: B.Sc (Maths)
Course Code & Name	: BMSS- 21 & DIFFERENTIAL CALCULUS
Batch	: AY2021-2022
No. of Assignment	: 02
Maximum CIA Marks	: 15 Marks (Average of total no. of Assignments)

ASSIGNMENT -1

Max: 15 Marks

Answer any ONE of the following three questions.

- (i) If $y = a \cos(\log x) + b \sin(\log x)$, Prove that
$$x^2 y_{n+2} + (2n + 1)xy_{n+1} + (n^2 + 1)y_n = 0.$$

(ii) Find three positive numbers such that their sum is a constant and their product is a maximum.
- Show that the evolute of the cycloid $x = a(\theta - \sin\theta)$; $y = a(1 - \cos\theta)$ is another cycloid
- Find all the asymptotes of the curve
$$3x^2 + 2x^2y - 7xy^2 + 2y^3 - 14xy + 7y^2 - 14x + 5y = 0$$

ASSIGNMENT -2

Max: 15 Marks

Answer any ONE of the following three questions.

- (i) If $y = (x + \sqrt{1 + x^2})^m$ Prove that
$$(1 + x^2)y_{n+2} + (2n + 1)xy_{n+1} + (n^2 - m^2)y_n = 0$$

(ii) Show that the maximum value of $x^2y^2z^2$ subject to the constraint $x^2 + y^2 + z^2 = a^2$ is $\left(\frac{a^2}{3}\right)^3$
- (i) Find ρ at any point of the cycloid $x = a(\theta + \sin\theta)$; $y = a(1 - \cos\theta)$
(ii) Show that the evolute of $x = a\left(\cos t + \log \tan \frac{t}{2}\right)$,
$$y = a \sin t \quad \text{is} \quad y = a \cosh \frac{x}{a}.$$
- Find all the asymptotes of the curve $y^3 - 6xy^2 + 11x^2y - 6x^3 + x + y = 0$.



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Programme Code No	: 131
Programme Name	: B.Sc (Maths)
Course Code & Name	: BMSS- EL1 & TRIGONOMETRY
Batch	: AY2021-2022
No. of Assignment	: 02
Maximum CIA Marks	: 15 Marks (Average of total no. of Assignments)

ASSIGNMENT -1

Max: 15 Marks

Answer any ONE of the following three questions.

1. Prove that $\cos 8\theta = 1 - 32\sin^2\theta + 160\sin^4\theta - 256\sin^6\theta + 128\sin^8\theta$ Verify
2. If $\cos(x + iy) = r(\cos \alpha + i \sin \alpha)$, prove that $y = \frac{1}{2} \log \frac{\sin(x - \alpha)}{\sin(x + \alpha)}$
3. (i) Express $\log \log(x + iy)$ in the form $a + ib$.
(ii) Separate real and imaginary parts of $\tan(x + iy)$.

ASSIGNMENT -2

Max: 15 Marks

Answer any ONE of the following three questions.

1. Prove that $\sin^3\theta \cos^4\theta = \frac{-1}{2^6} [\sin 7\theta + \sin 5\theta - 3\sin 3\theta - 3\sin \theta]$
2. (i) Show that $\cosh^6 x = \frac{1}{2} [\cosh 6x + 6 \cosh 4x + 15 \cosh 2x + 20]$.
(ii) Prove that $\sinh(x + y) = \sinh x \cosh y + \cosh x \sinh y$
3. Prove that $1 - \frac{1}{2} \cos \theta + \frac{1.3}{2.4} \cos 2\theta - \frac{1.3.5}{2.4.6} \cos 3\theta + \dots \infty = \frac{\cos \frac{\theta}{4}}{\sqrt{2 \cos \frac{\theta}{2}}}$