



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

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

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

### 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.



**TAMIL NADU OPEN UNIVERSITY**  
**Chennai - 15**  
**Department of Physics**  
**School of Sciences**

**HOME / SPOT ASSIGNMENT**

Programme Code No	: 131/182
Programme Name	: B.Sc., Mathematics/B.Sc., Chemistry
Course Code & Name	: BPHYSA-11, ALLIED PHYSICS - I
Batch	: AY 2021-2022 (SEMESTER)
No.of Assignment	: One Assignment for Each 2 Credits
Maximum CIA marks	: 15 ( Average of Total No. of Assignments )

**ASSIGNMENT - 1**

Max : 15 marks

**Answer any one of the question not exceeding 1000 words**

1. Describe the construction and working of a piezo electric generator to produce ultrasonic waves? Give the application of ultrasonic waves
2. Explain Torsion Pendulum. Determination of Rigidity Modulus by Torsion Pendulum
3. Discuss Poiseuille's method for determining the coefficient of viscosity of a liquid.

**ASSIGNMENT - 2**

Max : 15 marks

**Answer any one of the question not exceeding 1000 words**

1. Explain the change of entropy in a reversible process. Obtain an expression for the change of entropy in an irreversible process
2. State and explain Biot and Savart law. Obtain the expression for the field along the axis of a current carrying circular coil.
3. Define dispersive power of a prism. Derive an expression for dispersive power of a prism. Explain dispersion without deviation, and (b) deviation without dispersion



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**Chennai - 15**  
**Department of Physics**  
**School of Sciences**

**HOME / SPOT ASSIGNMENT**

Programme Code No	: 131/182
Programme Name	: B.Sc., Mathematics/B.Sc., Chemistry
Course Code & Name	: BPHYSA-11, ALLIED PHYSICS - II
Batch	: AY 2021-2022 (SEMESTER)
No.of Assignment	: One Assignment for Each 2 Credits
Maximum CIA marks	: 15 ( Average of Total No. of Assignments )

**ASSIGNMENT - 1**

Max : 15 marks

**Answer any one of the question not exceeding 1000 words**

1. Explain the principle of air wedge. Explain how an air wedge can used to find the diameter of a thin wire.
2. Describe the vector model of the atom and explain the different quantum numbers associated with it. Write a note on coupling schemes
3. Describe a G.M. counter and explain its working as a particle detector.

**ASSIGNMENT - 2**

Max : 15 marks

**Answer any one of the question not exceeding 1000 words**

1. Derive Lorentz Transformation equations. Obtain Einstein's mass energy equivalence equation  $E=mc^2$ .
2. Derive the time dependent and time independent Schrödinger wave equation.
3. Describe the action of RC coupled amplifier. Draw the frequency response curve. What is the reason for obtaining reduced gain at high frequency in a R-C coupled amplifier?



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



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

**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  $1 - \frac{1}{2} \cos \theta + \frac{1.3}{2.4} \cos 2\theta - \frac{1.3.5}{2.4.6} \cos 3\theta + \dots \infty = \frac{\cos \frac{\theta}{4}}{\sqrt{2 \cos \frac{\theta}{2}}}$