Course Code	**:**	**BCS-012**
Course Title	**:**	**Basic Mathematics**
Assignment Number	**:**	**BCA(I)012/Assignment/2024-25**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**31st October, 2024 (For July Session)** **30th April, 2025 (For January Session)**

Note: There are 16 questions in the following assignment carrying a total of 80 marks (each question carries 5 marks), Rest 20 marks are for viva-voce. Answer all the questions.

Q1: For what value of 'k' the points (-k + 1, 2k), (k, 2 - 2k) and (- 4 - k, 6 - 2k) are collinear.

Q2: Solve the following system of equations by using Matrix Inverse Method.

$3x+ 4y+ 7z= 14$
$2x-y+ 3z= 4$
$2x + 2y - 3z = 0$

Q3: Use principle of Mathematical Induction to prove that:

$$\frac{1}{1*2}+\frac{1}{2*3}+\ldots\ldots\ldots\ldots+\frac{1}{n(n+1)}=\frac{n}{n+1}$$

Q4: How many terms of G.P $\sqrt{3}$, 3 , $3\sqrt{3}$, …….. Add upto 39 + 13

Q5: If $y = ae^{mx} + be^{-mx}$, Prove that $d^2y/dx^2 = m^2 y$

Q6: Integrate function $f(x) = x/[(x+1)(2x-1)]$ w.r.t x

Q7: If 1, w, w^2 are Cube Roots of unity show that $(1+ w)^2 - (1 + w)^3 + w^2 = 0$.

Q8: If α, β are roots of equation $2x^2-3x-5=0$, them find a Quadratic equation whose roots are α^2, β^2

Q9: Solve the inequality $\frac{3}{5}(x-2) \leq \frac{5}{3}(2-x)$ and graph the solution set.

Q10: If a positive number exceeds its positive square root by 12, then find the number.

Q11: Find the area bounded by the curves $x^2 = y$ and $y=x$.

Q12: Find the inverse of the matrix A = $\begin{pmatrix} 1 & 6 & 4 \\ 2 & 4 & -1 \\ -1 & 2 & 5 \end{pmatrix}$, if it exists,

Q13: If m times the m^{th} term of an A.P. is n times its n^{th} term, show that $(m + n)^{th}$ term of the A.P. is zero.

Q14: Show that

i) $\lim_{n\to 0}\frac{|x|}{x}$ does not exist ii) $f(x) = |x|$ is continuous at $x = 0$.

Q15: Suriti wants to Invest at most 12000 in saving certificates and National Saving Bonds. She has to invest at least 2000 in Saving certificates and at least 4000 in National Saving Bonds. If Rate of

Interest on saving certificates is 8% per annum and rate of interest on national saving bond is 10% per annum. How much money should she invest to earn maximum yearly income? Find also the maximum yearly income.

Q16: A spherical balloon is being Inflated at the rate of 900 cm^3/sec. How fast is the Radius of the balloon Increasing when the Radius is15 cm.