

BACHELOR OF COMPUTER APPLICATIONS (BCA_NEW)

BCA_NEW /ASSIGN/SEMESTER-I

ASSIGNMENTS

(July-2025 & January 2026 Sessions)

BEVAE-181, BEGLA-136, BCS-111, BCSL-013, BCS-012



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

CONTENTS

Course Code	Assignment No.	Submission-Schedule		Page No.
		For July-December 2025 Session	For January-June 2026 Session	
BEVAE-181	BCA_NEW(I)-181/Assignment/2025	31st October, 2025	30th April, 2026	3
BEGLA-136	BCA_NEW(I)-136/Assignment/2025	31st October, 2025	30th April, 2026	5
BCS-111	BCA_NEW(I)-111/Assignment/2025	31st October, 2025	30th April, 2026	6
BCSL-013	BCA_NEW(I)-L-013/Assignment/2025	31st October, 2025	30th April, 2026	8
BCS-012	BCA_NEW(I)-012/Assignment/2025	31st October, 2025	30th April, 2026	11

Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to BCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the BCA Programme Guide.

Course Code	:	BCS-012
Course Title	:	Basic Mathematics
Assignment Number	:	BCA_NEW(I)-012/Assignment/2025-26
Maximum Marks	:	100
Weightage	:	30%
Last Date of Submission	:	31 st October, 2025 (For July 2025 Session) 30 th April, 2026 (For January 2026 Session)

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

Q1: (a) Show that $\begin{vmatrix} b+c & c+a & a+b \\ c+a & a+b & b+c \\ a+b & b+c & c+a \end{vmatrix} = 2 \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$ (2.5 Marks)

(b) If $A = \begin{bmatrix} 2 & -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ 3 \\ -1 \end{bmatrix}$ check
Whether $AB = BA$. (2.5 Marks)

(c) Use the principle of mathematical induction to show that $1+3+5+ \dots + (2n-1) = n^2$ for each $n \in \mathbb{N}$. (2.5 Marks)

(d) If α and β are roots of $x^2 - 3ax + a^2 = 0$ and $\alpha^2 + \beta^2 = \frac{7}{9}$, find the value of a . (2.5 Marks)

(e) If $y = ax + \frac{b}{x}$, show that $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} - y = 0$ (2.5 Marks)

(f) Evaluate the integral $\int e^x (e^x + 7)^5 dx$. (2.5 Marks)

(g) If $\vec{a} = 5\hat{i} - \hat{j} - 3\hat{k}$ and $\vec{b} = \hat{i} - 3\hat{j} - 5\hat{k}$, show that $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ are perpendicular to each other. (2.5 Marks)

(h) Find the angle between the lines $\frac{x-5}{2} = \frac{y-5}{1} = \frac{z+1}{-1}$ and $\frac{x}{3} = \frac{y-1}{2} = \frac{z+5}{3}$ (2.5 Marks)

Q2: (a) If $A = \begin{bmatrix} -1 & 2 & 0 \\ -1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$, show that $A^2 = A^{-1}$ (2.5 Marks)

(b) Show that $A = \begin{bmatrix} 3 & 4 & -5 \\ 1 & 1 & 0 \\ 1 & 1 & 5 \end{bmatrix}$ is row equivalent to I_3 , where I_3 is identity matrix of order 3. (2.5 Marks)

(c) If $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$, show that $A^2 - 4A + 7I_2 = 0_{2 \times 2}$. Use this result to find (2.5 Marks)

A⁵. Where $0_{2 \times 2}$ is null matrix of order 2×2 .

Q3: (a) Solve the inequality $\left| \frac{3x-1}{2} \right| \leq 5$. **(2.5 Marks)**

(b) Solve the equation $6x^3 - 11x^2 - 3x + 2 = 0$,
given that the roots are in H.P. **(5 Marks)**

(c) If $x + iy = \sqrt{\frac{a+ib}{c+id}}$, show that **(5 Marks)**
 $(x^2 + y^2)^2 = \frac{a^2 + b^2}{c^2 + d^2}$.

(d) If α and β be the roots of the equation **(5 Marks)**
 $3x^2 - 4x + 1 = 0$, find the equation whose roots are α^2/β and β^2/α

Q4: (a) Determine the intervals in which the **(5 Marks)**

function $f(x) = \frac{1+x+x^2}{1-x+x^2}$ $x \in \mathbf{R}$ is increasing or decreasing.

(b) Show that $f(x) = x^2 \ln\left(\frac{1}{x}\right)$, $x > 0$ has a local **(5 Marks)**
maximum at $x = \frac{1}{\sqrt{e}}$

(c) Evaluate $\int (x+1)e^x (xe^x + 5)^4 dx$. **(5 Marks)**

(d) Find the area bounded by $y = \sqrt{x}$ and $y = x$. **(5 Marks)**

Q5: (a) Find the vector and Cartesian equation of the line through the points (3, 0, -1)
and (5, 2, 3). **(5 Marks)**

(b) Show that $[\vec{a} \times \vec{b} \quad \vec{b} \times \vec{c} \quad \vec{c} \times \vec{a}] = [\vec{a} \quad \vec{b} \quad \vec{c}]^2$ **(5 Marks)**

(c) Two tailors A and B, earn ₹ 150 and ₹ 200 per day respectively. **(5 Marks)**
A can stitch 6 shirts and 4 pants while B can stitch 10 shirts and 4 pants per day.
How many days should each work to stitch (at least) 60 shirts and 32 pants at least
labour cost? Also calculate the least cost.