

ALLAMA IQBAN OPEN UNIVERSITY, ISLAMABAD
(Department of Mathematics)

1. PLAGIARISM OR HIRING OF GHOST WRITER(S) FOR SOLVING THE ASSIGNMENT(S) WILL DEBAR THE STUDENT FROM AWARD OF DEGREE/CERTIFICATE, IF FOUND AT ANY STAGE.
2. SUBMITTING ASSIGNMENT BORROWED OR STOLEN FROM OTHER(S) ONE'S WILL BE PENALIZED AS DEFINED IN "AIOU PLAGIARISM POLICY"

Course: Mathematics-1 (1307)
Level: Intermediate

Semester: Spring- 2026
Total Marks: 100
Pass Marks: 40

Note: Attempt all questions. Each question carries equal marks.

Assignment No. 01
(Unit: 1-5)

Question No. 1 **[20]**

- (a) Evaluate $(2 + \sqrt{3} i)^7$.
- (b) Let z_1, z_2 be two complex numbers, then prove that $|z_1 + z_2| \leq |z_1| + |z_2|$.

Question No. 2 **[20]**

- (a) Show that $(p \rightarrow q) \vee (q \rightarrow p)$ is a tautology.
- (b) Show that $(\mathbb{Z}, +)$ is an abelian group.

Question No. 3 **[20]**

- (a) Solve the equation $\sqrt{x+27} = 2 + \sqrt{x-7}$.
- (b) Solve for "x" the equation. $(100)^{3x+1} = \left(\frac{1}{1000}\right)^x$.

Question No. 4 **[20]**

- (a) Solve the system of equations. $x^2 + y^2 = 5$; $y = 3x - 7$.
- (b) Solve $6x^5 + x^4 - 43x^3 - 43x^2 + x + 6 = 0$.

Question No. 5 **[20]**

- (a) Resolve into partial fractions $\frac{4x^3+16x+7}{(x^2+3)^2}$.

Total Marks: 100
Pass Marks: 40

Note: Attempt all questions. Each question carries equal marks.

Assignment No. 02

(Unit: 6-9)

Question No. 1

[20]

(a) Let $A = \begin{bmatrix} -3 & 5 & 7 \\ 0 & -7 & 6 \\ -4 & 5 & 9 \end{bmatrix}$, find A^4 .

(b) Solve the system

$$\begin{cases} x_1 + 2x_2 + 3x_3 + 4x_4 = 0 \\ 5x_1 + 6x_2 + 7x_3 + 8x_4 = 0 \\ 9x_1 + 10x_2 + 11x_3 + 12x_4 = 0. \end{cases}$$

Question No. 2

[20]

- (a) An arithmetic sequence has $a_5 = 22$ and $a_{15} = 62$ find a_{99} .
- (b) A plant grows 1.67m in its first week. Each week it grows by 4% more than it did the week before. By how much does it grow in nine weeks, including the first week?

Question No. 3

[20]

- (a) What fraction does this decimal represent 0.358358358....? .
- (b) Find the number of words that can be formed with the letters of the word "SWIMMING"?

Question No. 4

[20]

- (a) A committee of 5 people is to be chosen from a group of 6 men and 4 women. How many committees are possible if :
- (i) There are to be 3 men and 2 women;
- (ii) There are to be men only.
- (iii) There is to be a majority of women.
- (b) Prove that, $1 \times 3 + 3 \times 5 + 5 \times 7 + \dots + (2n - 1) \times (2n + 1) = \frac{n(4n^2 + 6n - 1)}{3}$ by using the mathematical induction method

Question No. 5

[20]

- (a) Find the coefficient of the term " x^5y^8 " in the expansion of $(2x - y)^9$.
- (b) Expand $\frac{6x+3}{(1+x)(5x+2)}$.