**ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD**

**(Department of Science Education)**

**WARNING**

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

**Course: Mathematics V (8674) Semester: Spring, 2025**

**Level: B.Ed. (2.5years)**

## Please read the following instructions for writing your assignments. (AD, BS, B. Ed, MA/MSc, MEd) (ODL Mode).

1. All questions are compulsory and carry equal marks but within a question the marks are distributed according to its requirements.

2. Read the question carefully and then answer it according to the requirements of the questions.

3. Avoid irrelevant discussion/information and reproducing from books, study guide or allied material.

4. Handwritten scanned assignments are not acceptable.

5. Upload your typed (in Word or PDF format) assignments on or before the due date.

6. Your own analysis and synthesis will be appreciated.

7. Late assignments can’t be uploaded at LMS.

8. The students who attempt their assignments in Urdu/Arabic may upload a scanned copy of their handwritten assignments (in PDF format) on University LMS. The size of the file should not exceed 5MB.

**Total Marks: 100 Pass Marks: 40**

**ASSIGNMENT No. 1**

**(Unit 1-4)**

Q.1(a) For the Division Algorithm. Given positive integers a and b, b ≠ 0, there exist unique integers q and r, with 0 ≤ r < b such that a = bq + r. (10)

(b) Discuss integers and the properties of integers with examples. (10)

Q.2 (a) A person invests $1000 at 12 percent interest compounded annually. If An represents the amount at the end of n years, ﬁnd a recurrence relation and initial conditions that, deﬁne the sequence {An}. (10)

(b) Solve General and Second-order Homogenous linear recurrence relations.(10)

Q.3 (a) Solve the congruence equation 1092x ≡ 213 (mod 2295). (10)

 (b) Discuss the Chinese Remainder theorem. (10)

Q.4 Prove that the following recurrence can be used to compute Fibonacci numbers of the odd index, without computing those with even index:

 F2n+1 = 3F2n−1 −F2n−3 (20)

Q.5 Discuss Formula for the Fibonacci Numbers and prove that The Fibonacci numbers are given by the formula. (20)

Fn =



**Total Marks: 100 Pass Marks: 40**

**ASSIGNMENT No. 2**

**(Unit 5-9)**

Q.1 Explain the Binary search tree and represent the Binary search tree in memory. (20)

Q.2(a) Discuss the argument and show that the propositions ¬(p∧q) and ¬p∨¬q are logically equivalent. (20)

Q.3(a) Prove that = = 1- (b) - = =

 (10)

 (b) Discuss the Taylor series, Gregory Newton formula and Leibnitz rule (10)

Q.4 Discuss subgraphs, Isomorphic graphs, homomorphic graphs, Hamiltonian graphs and Euler’s formula with examples. (20)

Q.5 Let G be the directed graph with vertex set V (G) = (a, b, c, d, e, f, g} and edge set: E(G) = {(a, a),(b,e),(a,e),(e,b),(g,c),(a,e),(d,f),(d,b),(g,g)} (20)

(i) Identify any loops or parallel edges.

(ii) Are there any sources in G?

(iii) Are there any sinks in G?

(iv) Find the subgraph H of G determined by the vertex set V = {a, b, c,d}.