

UNIVERSITY OF EDUCATION  
"UEXAM" Semester-IV, 2019  
BS Mathematics Session:2017-21

Course Code: MATH2113  
Subject: Discrete Mathematics

Time Allowed: 100 Minutes.

Max. Marks: 42

Section II (Short Answer)

Q.2- Write short answers of the following.

6x3 = 18

- I. Find size of  $W_n$ ,  $n \geq 3$ .
- II. How many edges will be in a graph of 15 vertices each of degree four?
- III. Define the Hamiltonian path and find two Hamiltonian paths in  $K_{3,4}$ .
- IV. Let  $Q(x, y): x + y = 3$ , what are the truth values of  $\exists y \forall x Q(x, y)$ , and  $\forall x \exists y Q(x, y)$ , Justify your answer with example.
- V. State the Pigeonhole principle and how many students must be in a class to guarantee that at least two students receive the same score in the final exams? If exam is graded on a scale from 0 to 100 points.
- VI. How many ways are there to select five players from 10 members' team to make a trip to a match at another college?

Section III (Essay Type)

4x6 = 24

Answer the following Questions .

Q # 3: Prove that if  $n = ab$ , where  $a$  and  $b$  are positive integers, then  $a \leq \sqrt{n}$  or  $b \leq \sqrt{n}$ .

Q # 4: Prove that  $1^2 - 2^2 + 3^2 - 4^2 + \dots + (-1)^{n-1}n^2 = \frac{(-1)^{n-1}.n(n+1)}{2}$ .

Q # 5: Using rules of inference to show that the hypothesis, "It is not sunny this afternoon and it is colder than yesterday." "We will go swimming only if it is sunny." "If we do not go swimming, then we will take a canoe trip," and "if we take a canoe trip, then we will be home by sunset" lead to the conclusion "We will be home by sunset."

Q # 6: Define the following with examples.

- i. Complete Bi-partite graph
- ii. Complement of graph and incidence matrix.
- iii. Isomorphism of graphs.