2411001102040001

EXAMINATION MARCH-APRIL 2024

B. SC. (I. T.) (M. SC. (I. T.) 5 YEAR INTEGRATED COURSE) (SECOND SEMESTER) (NEP)

MDC-MATHEMATICS - II - LEVEL 4

[**Time: As Per Schedule]** **[Max. Marks:50]**

Instructions:

1. Fill up strictly the following details on your answer book

a. Name of the Examination : **B. SC. (I. T.) (M. SC. (I. T.) 5 YEAR INTEGRATED COURSE) (SECOND SEMESTER) (NEP)**

b. Name of the Subject : **MDC-MATHEMATICS - II - LEVEL 4**

c. Subject Code No : **2411001102040001**

2. Sketch neat and labelled diagram wherever necessary.

3. Figures to the right indicate full marks of the question.

4. All questions are compulsory.

5. there are five questions in this questions paper

Seat No:

Student's Signature

Q.1 Attempt any seven. **10**

1. Eccentricity
2. Finite graph
3. Pendent Vertex
4. Complete graph
5. Circuit
6. Branch
7. Walk
8. Non-planar graph

Q.2 (a) Prove that a given connected graph G is an Euler graph iff all vertices of G Are of even degree. **4**

OR

(a) Prove that in a complete graph with n($\geq$ 3) vertices, there are (n - 1)/2 edge Disjoint Hamiltonian circuits where n is an odd number.

(b) Attempt any Two. **6**

1. State the necessary conditions for two graphs to be isomorphic.

2. Discuss utilities problem.

3. Using an example prove that intersection of graphs is commutative.

Q.3 (a) What is the minimum possible height of an n- vertex binary tree? **4**

OR

(a) Can you construct a graph if you are given all its spanning trees? How?

(b) Attempt any Two. **6**

1. Show that the distance between vertices of a connected graph is a metric.

2. Prove that if a tree has two centers then those two centers must be adjacent.

3. Prove that any circuit in a graph G must have at least one edge in common

With a chord set.

Q.4 (a) Prove that a simple graph with n vertices and $k$components can have at Most $(n-k)(n-k+1)/2$ edges. **4**

OR

(a) State and prove Euler's formula.

(b) Attempt any Two. **6**

1. Discuss the Seating Problem.

2. Draw simple graph with one, two, three and four vertices.

3. Draw and discuss the Kuratowski's graphs.

Q.5 (a) Prove that Kuratowski's second graph is non-planar. **4**

OR

(a) Prove that Kuratowski's first graph is non-planar.

(b) Attempt any Two. **6**

1. Sketch all the spanning tree of the following graph. Also for one of them, show that rank and nullity theorem holds.

2. Discuss observations about path matrix.

3. Discuss observations about adjacency matrix.

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