U.G. 4th Semester Examination - 2020

MATHEMATICS

[HONOURS]

Skill Enhancement Course (SEC)

Course Code : MTMH-SEC-T-2A&B

Full Marks : Option-A : 40 Time : 2 Hours
Option-B : 25

The figures in the right-hand margin indicate marks.

The symbols and notations have their usual meanings.

Answer all the questions from selected Option.

OPTION-A

MTMH-SEC-T-2A

1. Answer any **five** questions: 2×5=10

   a) What is the maximum number of edges of an undirected simple graph with n vertices?

   b) DefineWalk, Path and Circuit.

   c) What is null graph? Give an example of it.

   d) What are the different properties when a graph G with n vertices is called a tree?

   e) Give an example of a graph having both Euler's circuit and Hamiltonian circuit.

   f) Define complete graph with example.

   g) Is K_5 planar or non-planar? Justify your answer.

   h) Draw the graph of G represented by the given adjacency matrix.

$$A_G = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 0 & 1 \\ 2 & 1 & 0 \end{bmatrix}$$

2. Answer any **two** questions: 5×2=10

   a) Define the degree of a vertex in a graph. Prove that the sum of the degrees of all vertices of a graph is twice the number of edges in the graph. 1+4

   b) Show that the number of vertices of odd degree in a graph is always even. 5

   c) Define a planar graph. State and prove the Euler's formula for planar graph. 1+4

   d) If G is a tree with n vertices then prove that it has exactly n-1 edges. 5

3. Answer any **two** questions: 10×2=20

a) Define a bipartite graph. Show that the complement of a bipartite graph need not to be a bipartite. Show that the graph $K_{3,3}$ is not a planer graph. 2+3+5

b) Define the shortest path in a weighted graph. Write Dijkstra's algorithm to find out the shortest path from a to z. 2+8

c) What is minimal spanning tree? Write Prime's algorithm to find minimal spanning tree. 2+8

d) Write short notes on any **two**: 5+5

i) Eulerian graph

ii) Hamiltonian graph

iii) Travelling sales man problem

OPTION-B

MTMH-SEC-T-2B

1. Answer any **five** questions: 2×5=10

a) What do you mean by Bourne Shell?

b) Dene the terms RPM and DEB.

c) What is the purpose of chmod command?

d) Define dual booting.

e) What is the difference between KDE and GNOME?

f) What is the difference between internal command and external command?

g) Describe the structure of inode table.

h) Differentiate the inetd and xinetd processes.

2. Answer any **three** questions: 5×3=15

a) Write any five features of Linux operating system.

b) Explain the features of GNOME Configuration Tool.

c) Explain the activities carried by shutdown process in Linux.

d) Discuss File attributes in Linux.

e) What are the uses of root user in Linux system?

f) Explain if-then and advanced if-then features in Linux.

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