

U.G. 4th Semester Examination - 2020

MATHEMATICS

[PROGRAMME]

Skill Enhancement Course (SEC)

Course Code : MTMP-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

MTMP-SEC-T-2A

1. Answer any **five** questions: 2×5=10
- Define degree of a vertex of a graph G. What is the degree of an isolated vertex of a graph G?
 - What is pendant vertex?
 - What are finite and infinite graphs?
 - Define Trail.
 - When do we say that two graphs are isomorphic? Give an example.

- What is Hamiltonian cycle?
- Define Tree.
- What do you mean by a travelling salesman problem?

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

- Differentiate with example, a simple graph and a multigraph. Show that the maximum number of edges in a simple graph with n vertices is $\frac{n(n-1)}{2}$. 3+2
- Show that the sum of the degrees of all vertices of a graph is twice the number of edges. 5
- Prove that in a graph the number of the vertices with odd degree is even. 5
- Prove that if in a graph G there is one and only one path between every pair of vertices is a tree. 5

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

- Define Eulerian graph. Is a graph G with only one vertex having no edges is Eulerian? Prove that if a connected graph G is Eulerian then every vertex of G has even degree. 2+1+7

- b) Let G be a connected planar graph with p vertices and q edges where $p \geq 3$. Show that $q \geq 3p - 6$. Prove that the graph K_5 is not a planar graph. 6+4
- c) What is spanning tree? Write the names of two algorithms for finding a minimal spanning tree for a graph. Write one of the algorithms in details. 2+2+6
- d) Write short notes on any **two**: 5+5
- i) Complete graph
 - ii) Hamiltonian graph
 - iii) Bipartite graph

OPTION-B
MTMP-SEC-T-2B

1. Answer any **five** questions: 2×5=10
- a) What is the role of uptime command in Linux?
 - b) What is the difference between setUID and setGID?
 - c) What is the role of init process?
 - d) What is the difference between KDE and GNOME?
 - e) What is the role of cron program?
 - f) What will be the output of the command `rm*i*`?
 - g) Describe the structure of inode table.
 - h) Differentiate the inetd and xinetd processes.
2. Answer any **three** questions: 5×3=15
- a) What is the purpose of Disk Druid? Explain the different parameters when a new partition is added.
 - b) Write any five features of Linux operating system.
 - c) Explain the features of GNOME Configuration Tool.
 - d) Differentiate between Linux Kernel and Distribution.
 - e) Define environment variables. Explain its types.
 - f) Write a note on emacs editor.