

U.G. 4th Semester Examination - 2021

MATHEMATICS

[PROGRAMME]

Skill Enhancement Course (SEC)

Course Code : MATH-G-SEC-T-2A&B

Full Marks : 20

Time : 1 Hour

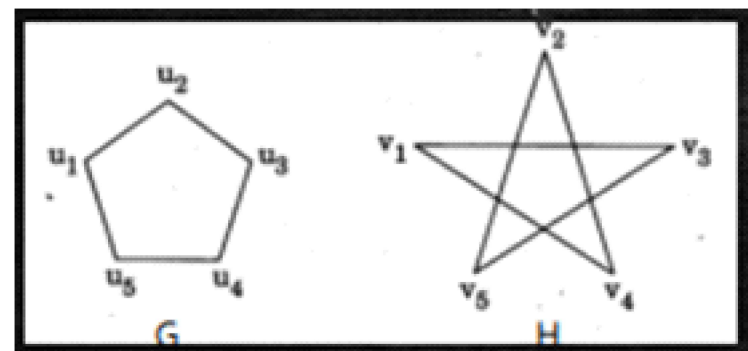
*The figures in the right-hand margin indicate marks.**The symbols and notations have their usual meanings.***Answer all the questions from selected Option.**

OPTION-A

MATH-G-SEC-T-2A

1. Answer any **five** questions: $1 \times 5 = 5$
- Define adjacent and degree.
 - Define pendent vertex.
 - Define connected graph.
 - What is the Diameter in a tree?
 - Define complement of tree.
 - Define degree-constrained shortest spanning tree.

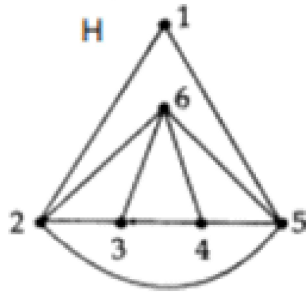
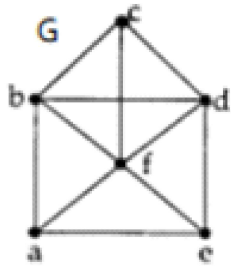
- Define cut sets.
 - Define non-separable graph.
2. Answer any **one** question: $5 \times 1 = 5$
- Can a simple graph have 5 vertices and 12 edges? If so, draw it; if not, explain why it is not possible to have such a graph.
 - Define isomorphism. Determine whether the following pair of graphs are isomorphic.



- A non-directed graph G has 8 edges. Find the number of vertices, if the degree of each vertex in G is 2.
3. Answer any **one** question: $10 \times 1 = 10$
- Show that for a subgraph H of a graph G $\Delta(H) \leq \Delta(G)$

[Turn Over]

- b) Are the following graphs isomorphic? If Yes or No justify.



- ii) a) A finite tree T has at least one vertex v of degree 4, and at least one vertex w of degree 3. Prove that T has at least 5 leaves.
- b) Let G be a Hamiltonian graph that is not a cycle. Prove that G has at least 2 vertices of degree ≥ 3 .
- iii) a) Let G be a graph of order $n \geq 2$ such that each vertex has degree $\geq (n - 1)/2$. Prove that G has a Hamiltonian path.
- b) Prove that a tree of order $n \geq 2$ is a bipartite graph.

OPTION-B

MATH-G-SEC-T-2B

1. Answer any **five** questions: 1×5=5
- What is the use of Kernel?
 - What do you mean by load sharing ?
 - What are the differences between KDE and GNOME?
 - Describe the structure of inode table.
 - Briefly describe system calls for memory in Linux.
 - What is the outcome of SetGID command?
 - What do you mean by Korn Shell?
 - What are the various editors available in Linux?
2. Answer any **one** question: 5×1=5
- Explain booting and shutting down mechanisms of Linux. 5
 - How are packages installed, uninstalled and configured in Linux? Give suitable examples. 5
 - Briefly describe the architecture of Linux operating system. 5

3. Answer any **one** question: 10×1=10
- a) Write down the names of the various command line shells in Linux OS. List and define various file handling commands in Linux OS by taking suitable examples. 4+6
 - b) Discuss the concept of trouble shooting Linux operating system in GRUB mode. Write a short note on Linux security. 5+5
 - c) Explain the directory structure of Linux OS. How files and directory permissions can be changed in Linux? 5+5
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