

M-CA (Bridge course)

Date: 7/2/25

Months Feb-25

Winter-2024
Second Half-2024

Time: 3 HRS

Max. Marks: 80

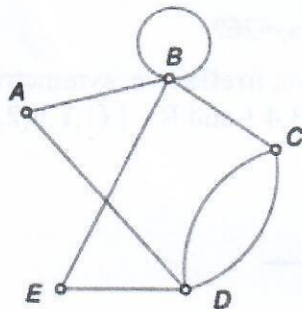
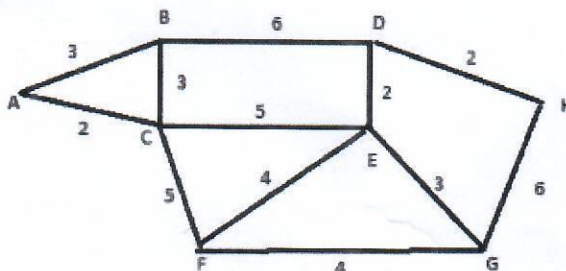
N.B.: 1) Question No.1 is **compulsory**.2) Attempt any **three** from the remaining **five** questions.

3) Figures to the right indicate full marks

Q.1 (a) Determine the validity of the following argument 20

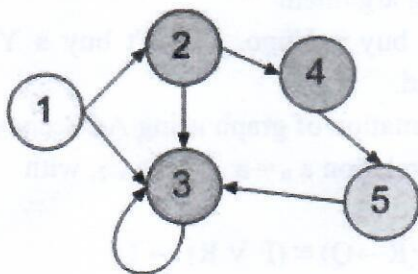
If I get a huge tax refund, then I'll buy a Yugo. I didn't buy a Yugo.
Therefore, I didn't get a huge tax refund.

(b) Explain with suitable example representation of graph using Adjacency list

(c) What is the solution of the recurrence relation $a_n = a_{n-1} + 2a_{n-2}$, with initial condition $a_0 = 2, a_1 = 7$ (d) Construct the truth table for $P \rightarrow Q \wedge (R \rightarrow Q) \equiv (P \vee R) \rightarrow Q$ Q.2 (a) Determine whether the given relation is reflexive, irreflexive, symmetric, asymmetric, antisymmetric and transitive. Also determines whether the relation is equivalent or not. 10 $R = \{ (4,5), (5,4), (7,6), (6,7) \}$ on $A = \{ 4,5,6,7 \}$ (b) Find all the Euler Path and Euler Circuit for the following graph 10Q.3 (a) Using mathematical induction prove that the $1+3+5+\dots+(2n-1)=n^2$ 10(b) Find Hamiltonian circuit of minimal weight for the following graph starting from F 10

Q.4 (a) $A = \{3, 5, 9, 15, 24, 45\}$ and relation R be defined on B by $x R y$ if and only if ' x divides y '. I. Draw the diagram and hasse diagram of R . II. Determine the minimal and maximal elements. 10

(b) Explain different storage representation of graph. Find the adjacency matrix for the following graph 10



Q.5 (a) Find the particular solution of $a_r + 5a_{r-1} + 6a_{r-2} = 3r^2$ 10

(b) Derive an expression maximum number(L_n) of regions define by n lines in the plane. 10

Q.6 (a) What is the solution of the recurrence relation 10

$$a_n = -a_{n-1} + 4a_{n-2} + 4a_{n-3} \text{ With } a_0=8, a_1=6 \text{ and } a_2=26?$$

(b) Determine whether the given relation is reflexive, irreflexive, symmetric, asymmetric, antisymmetric and transitive $A = \{1, 2, 3, 4\}$ and $R = \{(1, 1) (2, 2) (3, 3)\}$ 10