

Code No: E-5649/N/AICTE

FACULTY OF ENGINEERING
B.E. (CSE) III – Semester (AICTE) (Main & Backlog) (New) Examination,
February/ March 2023

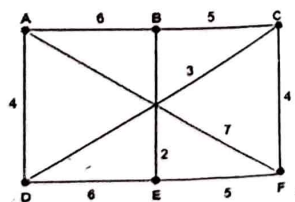
Subject: Discrete Mathematics

Time 3 Hours

Max. Marks: 70

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1. a) Construct the truth table for $[(P \wedge Q) \vee (\neg P \wedge R)] \vee (Q \wedge R)$.
b) Define group.
c) Find the number of ways of selecting a card which is either a spade or diamond?
d) Find the sequences generated by the following function. $(3 + x)^3$
e) Explain about composite relation
f) Solve the Recurrence relation $F_{n+2} = F_{n+1} + F_n$ where $n \geq 0$ and $f_0 = 0; f_1 = 1$
g) List different types of graph.
2. a) Obtain the principle disjunctive normal form $(p \wedge q) \vee (\neg p \wedge r) \vee (q \wedge r)$.
b) Consider f, g, h all function on integer by $f(n) = n^2, g(n) = n+1, h(n) = n-1$. Determine
(i) $h \circ g \circ f$ (ii) $g \circ f \circ h$ (iii) $f \circ g \circ h$
3. a) If A and B are two subset of any set then, prove $|A \cup B| = |A| + |B| - |A \cap B|$
b) Let $\langle G, * \rangle$ and $\langle G^1, (\text{mod } 3) \rangle$ are two groups. Where $G = \{1, w, w^2\}$ and $G^1 = \{0, 1, 2\}$ show that $G \cong G^1$ (Isomorphism)
4. a) Define lattice. let $L = \{1, 2, 3, 6, 9, 18\}$ and R be the Relation "is divisible by". prove L is lattice or not?
b) Find the binomial coefficient of the following $(1 - x + x^2)^4$
5. a) Find the number of ways in which 5 of the letters in "ENGINE" be arranged.
b) Solve the Recurrence Relation $a_n - 7a_{n-1} + 10a_{n-2} = 0$ for $n \geq 2$ with initial condition $a_0 = 10, a_1 = 41$.
6. a) What is isomorphic graphs? Explain various condition for proving the given graphs are isomorphic.
b) Determine the minimum spanning tree of the weighted graph shown in fig:



7. a) Translate each of the following statement into symbols, using quantifiers, variables and predicate symbols
- (i) All birds can fly
 - (ii) Some babies are illogical
 - (iii) Some men's are giants
 - (iv) There is a student who like mathematics but not history.
- b) Draw and explain BFS and DFS algorithm for the following graph

