

ADMISSION NUMBER											

School of Basic Sciences
Bachelor of Science Honours in Mathematics
Mid Term Examination - May 2024

Duration : 90 Minutes
Max Marks : 50

Sem IV - C1UC405T - Discrete Structures

General Instructions

Answer to the specific question asked

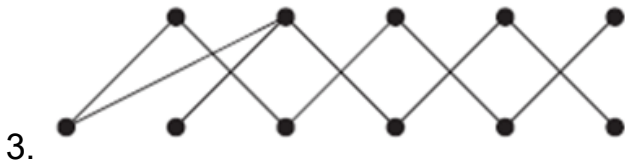
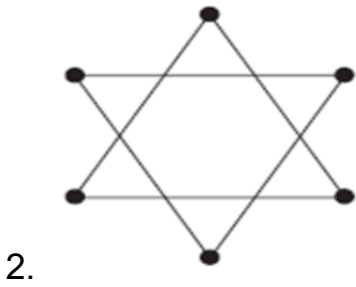
Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) Explain Strongly Connected and Weakly Connected graph with example K2 (2)
- 2) **Find** the truth value of each of these statements if the domain consists of all integers. K1 (3)
 a) $\forall n (n + 1 > n)$ b) $\exists n (2n = 3n)$
- 3) Show that the proposition $p \vee \neg(p \wedge q)$ is a tautology K2 (4)
- 4) Show that in a non-directed graph, the total number of odd degree vertices is even. K2 (6)
- 5) Suppose that a person deposits \$10,000 in a savings account at a bank yielding 11% per year with interest compounded annually. Solve, how much will be in the account after 30years? K3 (6)
- 6) Develop the Disjunctive normal form (DNF) of $(\neg p \rightarrow q) \wedge (p \leftrightarrow q)$. K3 (9)
- 7) Let p and q be the propositions K4 (8)
 p : I bought a lottery ticket this week.
 q : I won the million dollar jackpot
 Express each of these propositions as an English sentence.
 a) $\neg p$ b) $p \vee q$ c) $p \rightarrow q$
 d) $p \wedge q$ e) $p \leftrightarrow q$ f) $\neg p \rightarrow \neg q$
 g) $\neg p \wedge \neg q$ h) $\neg p \vee (p \wedge q)$

8) Classify whether the given graph are connected or not. How many connected components does each of the following graphs have? For each graph find each of its connected components.

K4 (12)



OR

Show that $\sqrt{2}$ is irrational by giving a proof by contradiction.

K4 (12)