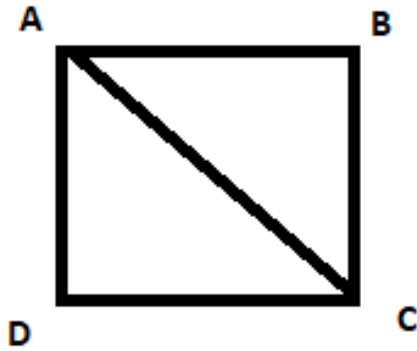


Time: 3 HRS

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

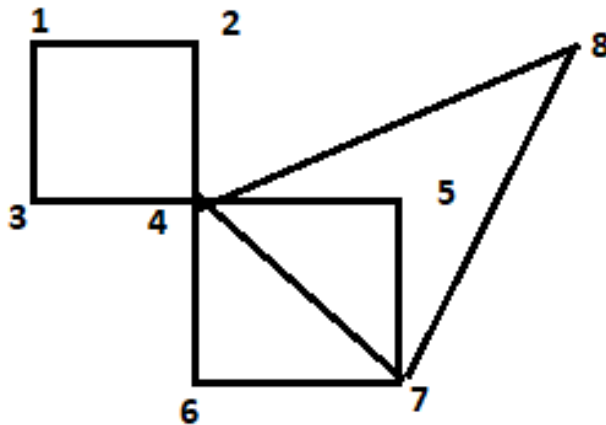
- Q.1 (a) Determine the validity of the following argument 20
 “If I study then I will pass examination. If I do not go to picnic, then I will study. But I failed examination. Therefore I went to picnic.”
 (b) find Hamiltonian path and circuit for following graph



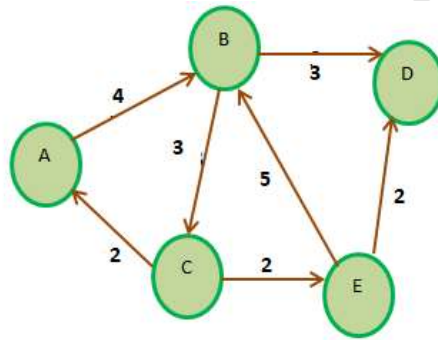
- (c) Explain with suitable example: (1) Predicate (2) Proposition
 (d) Using the truth table prove the following logical equivalence

$$p \rightarrow (q \wedge r) \equiv (p \wedge q)(p \rightarrow r)$$

- Q.2 (a) write converse, inverse and contrapositive of the following statement. 10
 “if weather will not be good then I will not travel”.
 (b) State the “Tower of Hanoi” problem and obtain the corresponding recurrence relation 10
 indicating the initial conditions.
 Q.3 (a) Find particular solution of $a_r - 5a_{r-1} + 6a_{r-2} = 1$ 10
 (b) Find Euler circuit for following graph 10



- Q.4 (a) Find solution of the recurrence relation $d_n = 4d_{n-1} - 4d_{n-2}$, with initial condition $d_1=1, d_2=7$ 10
- (b) Find the adjacency matrix and path for the following graph 10



- Q.5 (a) Using mathematical induction prove that the first n positive even integer is n^2+2 10
- (b) Derive an expression maximum number(L_n) of regions define by n lines in the plane. 10
- Q.6 (a) $A = \{1,2,3,4\}$ $R = \{(2,1),(3,1),(3,2),(4,1),(4,2),(4,3),(1,1),(2,2),(3,3),(4,4)\}$ is R is Partial order relation ? 10
- (b) Determine whether the sequence is $\{a_n\}$ is a solution to the recurrence relation, 10
- $a_n = 2a_{n-1} - a_{n-2}$ for $n=2,3,4,-----$ where $a_n=5$ for every non negative n .
