

13717

MCA (Revised)

Term-End Examination

December, 2010

**MCS-033 : ADVANCED DISCRETE
MATHEMATICS**

Time : 2 hours

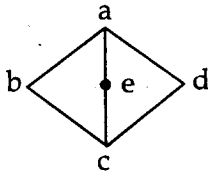
Maximum Marks : 50

Note : Question no. 1 is compulsory. Attempt any three questions from the rest.

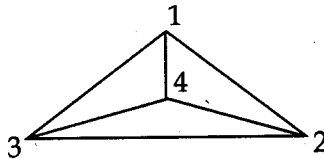
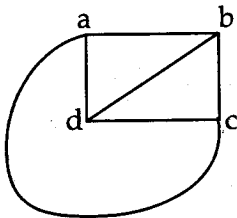
1. (a) Find the order and degree of the following 6
recurrences. Also, state whether they are
homogeneous or non-homogeneous.
- (i) $a_n = a_{n-1}^2 + a_{n-2} a_{n-3} a_{n-4}$
- (ii) $a_n = \sqrt{a_{n-1}} + a_{n-2}^2$
- (b) State and prove the Handshaking theorem. 4
- (c) Define r-regular graph. Give an example 3
of 3-regular graph.
- (d) Solve the recurrence relation $a_{n+1} = 5a_n$ for 3
 $n \geq 0$, given that $a_0 = 2$.

- (e) Find the generating function for the sequence given as follows : 2
 $0, 1, -2, 3, -4, \dots$
- (f) Define bridge in a graph. Also give an example of it. 2
2. (a) Show that for a Subgraph H of graph G 5
 $\Delta(H) \leq \Delta(G)$
- (b) Solve the recurrence relation 5
 $a_n = a_{n-1} + 2, n \geq 2$
 Subject to initial condition $a_1 = 3$.
3. (a) Solve the following recurrence relation : 5
 $a_n = a_{n-1} + 5^n, a_0 = 1$
- (b) Solve the recurrence relation 5
 $a_n = a_{n-1} + n, a_0 = 2$
 using Substitution method.
4. (a) Using generating function solve the following 3
 $a_n - 4a_{n-1} = 0, n \geq 1, a_0 = 1$
- (b) Solve the recurrence 4
 $a_n - 9a_{n-1} + 26a_{n-2} - 24a_{n-3} = 0$ for $n \geq 3$

- (c) Find Euler Path in the following graph systematically : 3



5. (a) Give an example of graph having Euler's circuit and Hamiltonian Circuit both. 3
- (b) Are the following graph are isomorphic ? 4
If yes, Justify your answer.



- (c) Construct a graph with chromatic number 5. 3
