D 42205 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2007

IT 04 505—GRAPH THEORY AND COMBINATORICS

(2004 admissions)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

1. (a) Define Subgraph with an example.
   (b) Write a note on colouring of graph.
   (c) Define the weight of a graph and weighted trees.
   (d) Write a note on bipartite matching.
   (e) State the fundamental principle of counting.
   (f) Prove that $n(A - B) \geq n(A) - n(B)$
   (g) What do you mean by summation operator.
   (h) Find the generating function of $2a, 4a^2, 6a^3, \ldots$

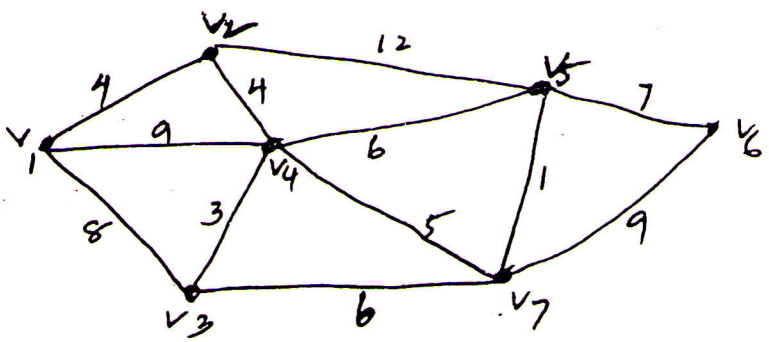
(8 × 5 = 40 marks)

2. (a) State and prove five colour theorem for planar graphs.

Or

   (b) Define Hamiltonian graph. State the rules for constructing Hamiltonian paths and cycles.

3. (a) Find the minimal spanning tree using Prim's algorithm.



Or

   (b) Explain the Floyed-Warshall algorithm.

Turn over

4. (a) Show that ${}_rC_r + {}_{r+1}C_r + \ldots + {}_nC_r = {}_{n+1}C_{r+1}$.

Or

(b) In how many ways can 10 boys and 10 girls be seated around a circular table, if boys and girls are to sit in alternate seats ?

5. (a) Solve the recurrence relation $a_n - 8a_{n-1} - 9a_{n-2} = 0$, $a_0 = 11$, $a_1 = 10$.

Or

(b) Find the generating function of Fibonacci sequence.

(4 × 15 = 60 marks)