D125/P131/CMP501/EE/20190216

Time : 3 Hours **Marks : 80**

Instructions :

1. All Questions are Compulsory.
2. Each Sub-question carry 5 marks.
3. Each Sub-question should be answered between 75 to 100 words. Write every questions answer on separate page.
4. Question paper of 80 Marks, it will be converted in to your programme structure marks.

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1. Solve any **four** sub-questions.

   a) Explain Hamiltonian graph. 5

   b) Find $(4x^3 - 20x^2 + 17x - 4) / (x - 4)$ using synthetic division. 5

   c) Write down properties of cross product of vectors. 5

   d) Convert $(1515)_8$ in to decimal equivalent number. 5

   e) What are application of logarithms in complex calculations? 5

2. Solve any **four** sub-questions.

   a) Prove that $1^3 + 2^3 + 3^3 + ... + n^3 = \left[n^2 (n+1)^2 / 4 \right]$ for all natural numbers n. 5

   b) Define: 5

      i) Degree of a vertex

      ii) Self loop and parallel edges

      iii) Isolated vertex

      iv) Path in a graph

      v) Cycle in a graph

   c) What is the meaning of symmetric matrix? 5

   d) Explain logarithm and antilogarithm. 5

e) Define: 5

i) Polynomial

ii) Degree of polynomial

iii) Constant polynomial

iv) Zero poly

v) Equal polynomials

3. Solve any **four** sub-questions.

a) Explain subtraction of vectors. 5

b) Write down properties of set operations. 5

c) What are rules of operations with surds? 5

d) Find $(11100)_2 + (10011)_2$ 5

e) List all possible arrangements of the letters in the word "ONE" how many arrangements are possible? 5

4. Solve any **four** sub-questions.

a) Verify $p \rightarrow q = \sim p \vee q$ by truth table. 5

b) Define types of relation. 5

c) Define equality of sets and complement of a set. 5

d) Some computer monitors can display any of log 6 different shades of colours If only 12 shades of colours can be displayed at a time how many groups of 12 shades can be displayed? 5

e) If $B = \begin{bmatrix} 4 & 5 \\ 3 & 6 \end{bmatrix}_{2\times2}$ then find $B^{-1} = ?$ 5

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