Code: 20215 **B.Sc. (IT) Semester – 1 CBCS (NEW)**

Core Course CC-104: Computer Oriented Mathematics

Time: 2 ½ Hours Oct-NOV- 2017, **Total Marks: 70**

Q.1 (a) Let U be a set of alphabets A to U. Let A be a set of letters of the word 'BOUTIQUE' and B be a set of letters of the word 'BEAUTIFUL'. Find [7]

$(i)\ (A - B)$ $(ii)\ (A \cup B)'$ $(iii)\ (A \cup B) - A$.

(b) If $f(x) = x^3$ and $g(x) = 2x$ then find $(i)\ f(-2)$ $(ii)\ g(4)$ [7]
$(iii)\ f(g(3))$ $(iv)\ g(f(-1))$.

OR

Q.1 Explain with example: (i) Subset (ii) One-one function (iii) Inverse function (iv) De'Morgan's Law (v) Co-domain. [14]

Q.2 (a) If $\bar{a} = (2, -3, 0)$, $\bar{b} = (0, 1, -1)$ and $\bar{c} = (1, 4, -2)$ then find [7]

$(i)\ (\bar{a} \times \bar{b}) \cdot \bar{c}$ $(ii)\ \bar{a} \cdot (\bar{b} + \bar{c})$ $(iii)\ 2\bar{a} + 3\bar{b}$

(b) Let $A = \begin{bmatrix} 1 & 2 \\ -2 & 0 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 2 \\ -2 & -4 \end{bmatrix}$. [7]

Show that $(A + B)^2 = A^2 + 2AB + B^2$.

OR

Q.2 Solve following equations using matrix inversion method: [14]

$(i)\ 15x + 17y - 241 = 0\,,\quad 25x + 13y - 279 = 0$

$(ii)\ x + 2y - 8 = 0\,,\quad 3x + 4y - 14 = 0$

Q.3 (a) How many different even numbers of 3 digits can be formed using digits 0 to 5. [7]

(b) Write an algorithm to find cross product of two vectors. [7]

OR

Q.3 (a) Explain with example: (i) Permutation (ii) Combination. [7]

(b) Write an algorithm to find multiplication of two matrices. [7]

Q.4 (a) Find the sum of all natural numbers between 200 and 400 which are divisible by 7. [7]

(b) Find the value of $72 + 70 + 68 + \ldots\ldots + 40$. [7]

OR

Q.4 (a) If 7^{th} term of an AP is 5 and 11^{th} term is –3, find the sum of first 17 terms of the series. [7]

(b) Find the sum of first n terms of the series: $3 + 33 + 303 + 3003 + \ldots\ldots$ [7]

Q.5 Define the following terms and give one example of each: [14]

(i) Loop (ii) Simple graph (iii) Parallel edges (iv) Pendant vertex

(v) Circuit (vi) Rooted tree (vii) Disconnected graph

OR

Q.5 Explain: (i) Union of graphs (ii) Complement of a graph [14]
(iii) Isomorphism of graphs
