Bachelor of Computer Application (B.C.A.-II) (CBCS) Third Semester CBCS

UBCAT305 - Discrete Mathematics Paper - V

P. Pages : 2 **GUG/W/18/11761**

Time : Three Hours * 3 8 3 7 * Max. Marks : 40

Notes : 1. All the questions are compulsory and carry equal marks.
2. Draw neat and labelled diagram wherever necessary.
3. Avoid vague answers and write the answers relevant and specific to questions only.

1. Either

a) Let $A = \{a, b, c, d, e\}$ **4**
$B = \{c, e, f, h, k, m\}$
verify $|A \cup B| = |A| + |B| - |A \cap B|$

b) Let a, b and c be integers - **4**
i) If a/b and a/c then a/(b + c)
ii) If a/b or a/c then a/bc

OR

c) Prove the following Demorgan's law using truth table - **4**
i) $\sim (p \vee q) \equiv \sim p \wedge \sim q$
ii) $\sim (p \wedge q) \equiv \sim p \vee \sim q$

d) If $\begin{bmatrix} a+b & c+d \\ c-d & a-b \end{bmatrix} = \begin{bmatrix} 4 & 6 \\ 10 & 2 \end{bmatrix}$ **4**
find a, b, c and d.

2. Either

a) Prove that, $p(n, r) = n.p(n-1, r-1)$ **4**

b) Determine whether the following permutation is odd or even **4**
$P = \begin{pmatrix} a & b & c & d & e & f & g & h \\ b & c & a & e & f & d & h & g \end{pmatrix}$

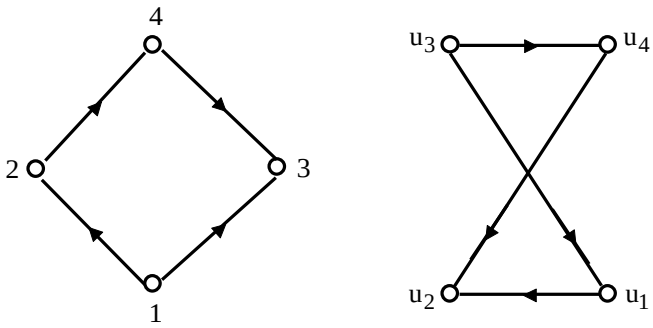
OR

c) Determine the value of 'n' **4**
i) ${}^{n}C_4 = {}^{n}C_3$
ii) ${}^{n}C_{n-2} = 10$

d) Explain various types of functions, with example. **4**

3. **Either**

a) Show that following graph are isomorphic. **4**



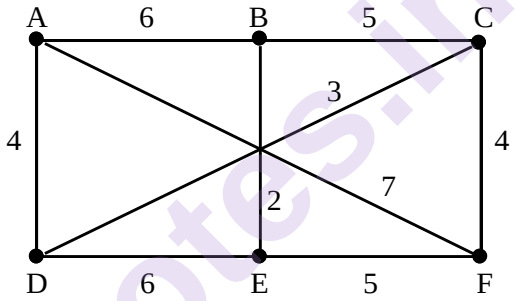
b) Construct the tree **4**

$((3*(1-x))\div((4+(7-(y+2)))*(7+(z\div y))$

OR

c) What is Hamiltonian paths and circuits ? Explain with example. **4**

d) Determine the minimum spanning tree of the weighted graph given below. **4**



4. **Either**

a) Let $(A, *)$ be semigroup. Show that for a, b, c in A, if $a*c=c*a$ and $b*c=c*b$ then $(a*b)*c=c*(a*b)$ **4**

b) Let G is the set of all non-zero real numbers and $*$ is a binary operation defined by $a*b=\frac{ab}{4}$ show that $(G, *)$ is an abelian group. **4**

OR

c) Define the following : **4**

i) Semigroup ii) Subgroup

iii) Monoid iv) Isomorphism

d) Write and explain any 2 properties of binary operation. **4**

5. Solve all the questions :

a) Let A = {a, b, c, d} and B = {a, c, e, f, g} find $A\oplus B$ and $A-B$. **2**

b) Find the value of $^{10}C_6$ **2**

c) Define Euler path and circuit. **2**

d) Write in short about normal subgroup. **2**

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