Q.P. Code: **16CS507** **R16**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester (R16) Regular Examinations November 2017
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(CSE)

Time: 3 hours Max. Marks: 60

(Answer all Five Units 5 X 12 = 60 Marks)

UNIT-I

1) Without constructing the truth table show that (a) $(\sim P \wedge \sim Q \wedge R) \vee (Q \wedge R) \vee (P \wedge R) \leftrightarrow R$ and (b) $((P \to Q) \to Q) \to P \vee Q$ 12M

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OR

2) (a) Define NAND , NOR and XOR and give their truth tables. 6M
(b)Define Exclusive & inclusive disjunctions with an example 6M

UNIT-II

3) Let A be a given finite set and P(A) its power set. Let ⊆ be the inclusion relation on the elements of P(A). Draw the Hass diagram of (P(A), ⊆) for (i) A = {a} (ii) A ={a, b} (iii) A = {a, b, c} (iv) A = {a, b, c, d} 12M

OR

4) a) Show that every Homomorphic image of an Abelian group is Abelian. 6M
b) The necessary and sufficient condition for a non-empty sub-set H of a Group (G,*) to be a sub group is $a \in H, b \in H \Rightarrow a * b^{-1} \in H$ 6M

UNIT-III

5) a) How many numbers can be formed using the digits 1, 3, 4, 5, 6, 8 and 9 if no repetitions are allowed? 4M
b) What is the co-efficient of (i) x^3y^7 in $(x+y)^{10}$? (ii) x^2y^4 in $(x-2y)^6$ 8M

OR

6) a) Define product rule? State Binomial theorem? Define permutation? 6M
b) Prove that Inclusion – Exclusion principle for two sets A & B. 6M

UNIT-IV

7) a) Find the sequence generated by the following generating functions
(i) $(2x-3)^3$ (ii) $\frac{x^4}{1-x}$ 6M
b) Solve $a_n = a_{n-1} + 2a_{n-2},\ n > 2$ with the initial condition $a_0 = 0,\ a_1 = 1$. 6M

OR

8) a) Solve $a_n - 5a_{n-1} + 6a_{n-2} = 2n,\ n > 2$ with the initial condition $a_0 = a_1 = 1$ using the generating function . 6M
b) Solve $a_n - 4a_{n-1} + 4a_{n-2} = 2(n+1)$ given $a_0 = 0,\ a_1 = 1$. 6M

UNIT-V

9) a) Explain in – degree and out – degree of a graph. Also explain about the adjacency matrix representation of graphs. Illustrate with an example? 8M
b) Give an example of a graph that has neither an Eulerian nor a Hamiltonian circuits 4M

OR

10) a) A graph G has 21 edges, 3 vertices of degree4 and the other vertices are of degree 3. Find the number of vertices in G? 6M
b) Show that in any graph the number of odd degree vertices is even. 6M