



R20 Regulation

Subject code: 3B3EB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech III Semester Supplementary Examinations, February 2024

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(Common to CSE & IT)

Maximum Marks: 70

Date: 19.02.2024 Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	What are the symbolic representations and give its contra positive statement of "If it rains today, then I buy an umbrella".	CO1	L1
2	Explain about Tautology and Contradiction.	CO1	L2
3	Explain Quantifiers with one example	CO2	L2
4	Explain the rule of universal specification & Generalization	CO2	L2
5	Write the properties of Mathematical Induction	CO3	L1
6	Define recursive with one example	CO3	L1
7	Construct the Matrix of the relation $R = \{(1,1), (1,3), (2,1), (2,3), (2,4), (3,1), (3,2), (4,1)\}$ on the set $\{1,2,3,4\}$	CO4	L3
8	Give an example for the relation which is both transitive, symmetry.	CO4	L3
9	Write the axioms of the Group	CO5	L1
10	Define the Kernel of Homomorphism	CO5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)

11	Construct truth table for the following formula. (a) $(p \rightarrow r) \wedge (q \rightarrow r) \rightarrow ((p \vee q) \rightarrow r)$ (b) $(p \wedge q) \vee (\sim p \wedge q) \vee (p \wedge \sim q) \vee (\sim p \vee \sim q)$	5M 5M	CO1	L3
OR				
12	Obtain conjunctive normal form of given formula (a) $\sim(p \vee q) \leftrightarrow (p \wedge q)$ (b) $(p \rightarrow q) \wedge \sim q \rightarrow \sim p$	5M 5M	CO1	L3
13	Show that the following statements are contradiction (a) $(p \vee \sim q) \wedge q$ (b) $(p \vee q) \wedge (\sim p \wedge \sim q)$	5M 5M	CO2	L2
OR				

14	Show that the $R \wedge (P \vee Q)$ is valid conclusion from the premises $p \vee Q, Q \rightarrow R, P \rightarrow M, \sim M$	10M	CO2	L2
15	(a) prove the statement $P(n)$ for all sum of natural numbers by Mathematical Induction. (b) Explain about Euclidian Algorithm	5M 5M	CO3	L4 L2
OR				
16	Explain about the Fundamental theorem of arithmetic	10M	CO3	L2
17	(a) Explain Hasse Diagram Draw Hasse diagram If $X = \{2, 3, 6, 12, 24, 36\}$ and the relation $x \leq y$ be such that $x \leq y$ if x divides y (b) If $x = \{1, 2, \dots, 7\}$ & $R = \{(x, y) / x - y\}$ is divisible by 3 show that R is equivalence relation.	5M 5M	CO4	L2
OR				
18	If $f: A \rightarrow B$ and $g: B \rightarrow C$ are two functions such that $g \circ f = I_A$ and $f \circ g = I_B$ then $g = f^{-1}$ (i) Prove that f is one-one (ii) Prove that f is on to (iii) Prove that $g = f^{-1}$	3M 3M 4M	CO4	L4
19	(a) If G is an abelian group then for all $a, b \in G$ and all integers $n, (a.b)^n = a^n.b^n$ (b) Prove that any subgroup of a cyclic group is cyclic	5M 5M	CO5	L4
OR				
20	State and prove Lagrange's theorem on cosets.	10M	CO5	L5