R20 Regulation

Subject code:3B3EB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Regular/Supplementary Examinations, March/April 2023

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(Common to Computer Science and Engineering & Information Technology)

Maximum Marks: 70 Date:29.03.2023 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)

1 What are the symbolic representations and give its contra positive statement of "If it rains today, then I buy an umbrella".
2 Compare about Tautology and Contradiction.
3 Write Quantifiers with one example?
4 Write the rule of universal specification& Generalization?
5 Write the properties of Mathematical Induction?
6 Define recursive.
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}
8 Give an example for the relation which is both transitive, symmetry but not Reflexive.
9 Write the axioms of the Group?
10 Define the Kennel of Homomophism.

Part-B

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

11 Construct truth table for the following formula.
(a) $((p\to r)\wedge(q\to r))\to((p\vee q)\to r)$ 5M
(b) $(p\wedge q)\vee(\sim p\wedge q)\vee(p\wedge\sim q)\vee(\sim p\vee\sim q)$ 5M

OR

12 Obtain conjective normal form of given formula
(a) $\sim(p\vee q)\leftrightarrow(p\wedge q)$ 5M
(b) $((p\to q)\wedge\sim q)\to\sim p$ 5M

13 Define the following:
1.Consistent and Inconsistent argument 5M
2. Valid and Invalid arguments 5M

OR

14 Show that the R is valid conclusion from the premises $P\vee Q$, $Q\to R$, $P\to M$, $\sim M$ 10M

15 (a) prove the statement $P(n) = 1+2+3+\ldots\ldots+n = (n(n+1))/2$ for all natural numbers n by Mathematical Induction. 5M

(b) Explain about Euclidian Algorithm to find gcd. 5M

OR

16 (a) Which of the following numbers can exactly divide 261.

(i) 3 3M

(ii) 4

(iii) 6

(b) State and Prove the Fundamental theorem of arithmetic. 7M

17 (a) Explain Hasse Diagram
Draw Hasse diagram if $X=\{2,3,6,12,24,36\}$ and the relation $x\leq$ be such that $x\leq y$ if x divides y 5M

(b) If $x=\{1,2,\ldots\ldots\ldots7\}$ & $R=\{(x,y)/x-y$ is divisible by $3\}$ show that R is equivalence relation. 5M

OR

18 If $f: A\rightarrow B$ and $g: B\rightarrow C$ are two functions such that $gof = I_A$ and $fog=I_B$ then 10M
(i) Prove that f is one-one
(ii) Prove that f is on to
(iii) Prove that $g = f^{-1}$

19 (a) If G is an abelian group then for all $a,b \in G$ and all integers n, $(a.b)^n = a^n.b^n$ 5M
(b) Prove that any subgroup of a cyclic group is cyclic 5M

OR

20 State and prove Lagranges theorem on cosets. 10M