

R09

Code: 9A05301

B.Tech II Year I Semester (R09) Supplementary Examinations June 2016

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(Common to CSS, IT & CSE)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

- 1 (a) Show that $\sim (p \vee (\sim p \wedge q))$ and $\sim p \wedge \sim q$ are logically equivalent .
(b) Check whether the following are well formed formulae or not.
(i) $\sim (p \wedge q)$. (ii). $\sim p \vee q$.
- 2 (a) How the validity of an argument can be checked by using truth table? Give an example.
(b) Show that $r \vee s$ follows logically from premises:
 $c \vee d$, $(c \vee d) \rightarrow \sim b$, $\sim b \rightarrow (a \wedge \sim b)$ and $(a \wedge \sim b) \rightarrow r \vee s$.
- 3 (a) What is a function? State the types of functions.
(b) What is an inverse function? Explain with an example.
(c) If $b : A \rightarrow B$ and $g : B \rightarrow C$ are Bijective functions then $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.
- 4 (a) Prove that "Every cyclic is abelian, but the converse is not true".
(b) Find the product of two permutations and show that it is not commutative.
$$f = \begin{vmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 3 \end{vmatrix} \quad g = \begin{vmatrix} 1 & 2 & 3 & 4 \\ 3 & 2 & 1 & 4 \end{vmatrix}$$
- 5 Solve the recurrence relation $a_n - 7a_{n-1} + 10a_{n-2} = 7 \cdot 3^n + 4^n$.
- 6 (a) How many three digit numbers are there which are even and have no repeated digits?
(b) Find the number of arrangement of the letters of MISSISSIPPI.
- 7 (a) Find the chromatic number of a graph with only n- isolated vertices.
(b) Let G be graph with 11 or more vertices. Show that G is non-planar.
- 8 (a) Give an example of a regular, connected graph of 6 vertices, which is not complete.
(b) Prove that C_5 is the only cycle graph isomorphic to its complement.
