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END OF SEMESTER EXAM

Session of 15 to 18 JUNE 2021

Course Tittle : DISCRETE MATHEMATICS

Duration : 1:30mins   Level : I   Branch : Software Engineering   ACADEMIC YEAR : 2020/2021

INSRUCTION : ANSWER ALL QUESTIONS FROM BOTH SECTIONS

SECTION A : MULTIPLE CHOICE QUESTIONS

Write down just the letter which corresponds to the correct answer in your answer booklet

1. Combinatorics is the branch of discrete mathematics concerned with ….
   A. abstract algebra
   B. derivative problems
   C. integrated problems
   D. counting problems
2. A ……. is a statement that is either true or false, but not both.
   A) Argument
   B) conclusion
   C) bi-conditional
   D) proposition
3. The set {x ∈ R: a < x < b is denoted by
   A) [a, b)
   B) (a, b]
   C) (a, b)
   D) {a, b}
4. P ∧ Q is called the ……. of P and Q.
   A) conditional
   B) conjunction
   C) bi-conditional
   D) disjunction
5. .In the implication P → Q, P is called the ……
   A) Consequent
   B) premise
   C) conditional
   D) statement
6. . If A = {2, 3, 5} and B = {4, 6, 9} then if R is defined as $R = \{(a,b) \in bAxB/a\}$ then the set R =
   A) {(2,4), (2,6), (3,4), 3,9)}

B) {(2,4), (2,6), (3,6), 3,9)}
C) {(2,4), (2,9), (3,6), 3,9)}
D) {(4,2), (2,6), (3,6), 3,9)}

7. . If R = {(2,1), (3,1), (5,1), (5,4)} then R^{-1} =
   A) {(2,1), (3,1), (5,1), (4,5)}
   B) {(2,1), (3,1), (5,1), (5,4)}
   C) {(1,2), (1,3), (1,5), (4,5)}
   D) {(2,1), (3,1), (5,1), (4,5)}
8. . A relation R on a set A is said to be symmetric if (a,b) ∈ R ⇒
   A) (b,a) ∈ R
   B) (b^2,a^2) ∈ R
   C) (x,y) ∈ R
   D) (y,x) Î R
9. Consider the set of all straight lines in a plane. If the relation R is defined as "parallel to" then R is
   A) reflexive
   B) symmetric
   C) transitive
   D) A), B) and C)
10. The proposition ~p v (p v q) is a
    A) Tautology
    B) Contradiction
    C) Logical equivalence
    D) None of the above

SECTION II: Show all the steps in calculations for questions in this section

1. . Using the truth table, show that the proposition $p \vee \neg (p \wedge q)$ is a tautology. {2mak}
2. construct the truth table for the following compound proposition
   $P \rightarrow \neg q \wedge \neg P \leftrightarrow \neg q$
   {1mk 1}
3. Give an indirect proof of the theorem "If $3n$+2 is odd, then n is odd {1mk}
4. Prove by induction that $n[P(A)] = 2^n$ {2mks}
5. Given P, Q and R 3 propositions.
   a) Show with the help of truth tables that $\neg(P \wedge Q)$ is equivalent to $(\neg P \vee \neg Q)$
   b) Show that $\neg(P \vee Q)$ is equivalent to $(\neg P \wedge \neg Q)$
   c) Show that $(P \Rightarrow Q)$ is equivalent to $(\neg P \Rightarrow \neg Q)$
   d) Show that $(P \Rightarrow Q) \wedge (Q \Rightarrow R) \Rightarrow (P \Rightarrow R)$ is a tautology.
   {4mks}

The end!!!!!!!

Course Master: Mr Ekiti