CPE313

DISCRETE STRUCTURES

TUTORIAL QUESTIONS

TOPIC 1&2: SET THEORY, Relations and Functions

1) What is Set.
2) What is a universal set.
3) State De Morgan's First and Second Law
4) A n B = (B n A) reps which law
   (A U B) U C = A U (B U C)
   A^c U B^c = (A n B)^C

5) State explain the methods used to denote set

6) Prove: (AUB)^C = A^C n B (ii) (AnB)^C = A^C U B^c

7) Explain what domain and of a relation R is.

8) Given A = {1,2,3,4} and B = {x,y,z}, consider the following relations from A to B. R = {(1,y),(1,x), (3,y),(4,x),(4,z)}. Find the matrix, domain, range and inverse of R.

Topic 3,4,5: Propositional Logic, Predicate Logic and Graph Theory

1) Explain what Logic is.

2) What is proposition

3) Explain with the aid of truth table:

- Conjunction
- Disjunction
- Implication
- Bi-conditional
- Negation

4) Explain what Tautology and Contradiction is.

5) Explain the law of syllogism, law of detachment, law of negative inference, law of disjunctive inference.

6) Show by using a truth table that p->q and its inverse (~p)->(~q) are not logically equivalent.

7) Prove that ~(p v q) is equivalent to (~p) ^ (~q).

8) Determine the validity of the statement: If Dotun works, he cannot study. Either Dotun works or he passes his examination. Dotun passed his examination. Therefore, Dotun studied.

9) What is Predicate Logic?

10) Explain the two types of quantifiers

11) Explain Graph theory

12) Explain Network, Cycle, Tree, Forest.

13) Explain the different ways of representing graph.

TOPIC 6: BOOLEAN LOGIC

1. Prove that:

- X + X Z = X
- X (X + Y) = X

- X + X’ Y = X + Y
- AB +AC + ABC= AB+AC
- XY + YZ’ + Y’ Z – = XY + Z

2. Simplify using De Morgan’s Theorem

- (A+(B+C)’D)’
- ((M+N’) (M’+N))’

3. Explain Sum of Products and Products of Sum.

4. Explain K-Map

5. Simplify the expressions using K-Map:

- X = AB + A’B + BC
- X = B’C + B’D + AB + AD + AC + C’D
- X = A ‘C D + A’ B ‘C D + A’B’D+ A’ B CD
- X = AB + A’C + B’C’

Predicate Logic