Daffodil International University
Department of Computer Science and Engineering
Faculty of Science and Information Technology
Mid-Term Examination, Semester: Fall-2017

Course Code: CSE-131
Section All

Course Title: Discrete Mathematics
Course Teacher: All

Time: 1:30 Hours

Total Marks: 25

[[**Answer any five questions.** The figure in square brace at the right side of a question indicates the marks allocated to the questions. The symbols and notations used carry their usual meanings.]

Q.N.01 (a) State the **converse, contrapositive** and **inverse** of the following compound proposition: [3]

"If I study attentively, I will cut a good figure in the exam."

(b) Translate the following using predicates and quantifiers: [2]

(i) Humans make mistakes. ii) Some people are creative but none understand that.

Q.N.02 Find out whether the biconditional statement $(\neg p \lor q) \leftrightarrow (p \rightarrow r)$ is tautology, contradiction or contingency through truth table. [5]

Q.N.03 (a) Determine if the conclusion is valid: [3]
Statements: "If I did not learn programming then I will not get a good job." "If I do not get a good job then I cannot buy a good house." "If I did not buy a good house, then my parents would not be happy." "My parents are happy."
Conclusion: I learnt programming.

(b) Let f: $Z \rightarrow Z$ be such that $f(x) = x + 1$. Is f invertible, and if it is, what is its inverse? [2]

Q.N.04 (a) What is the conclusion of these statements? [3]
"If I am absent in class, it either rains or snows." "I was absent on Tuesday or I was absent on Thursday." "It was sunny on Tuesday." "It did not snow on Thursday."

(b) Find of *fog* and *gof* for $f(x) = x^2+3$ and $g(x) = x-1$. [2]

Q.N.05 (a) Use mathematical induction to prove that $3 + 3 \cdot 5 + 3 \cdot 5^2 + \cdots + 3 \cdot 5^n = 3(5^{n+1} - 1)/4$ whenever n is a nonnegative integer.

$h = 1$

(b) Find out the properties of the following functions with ...

[1.5]
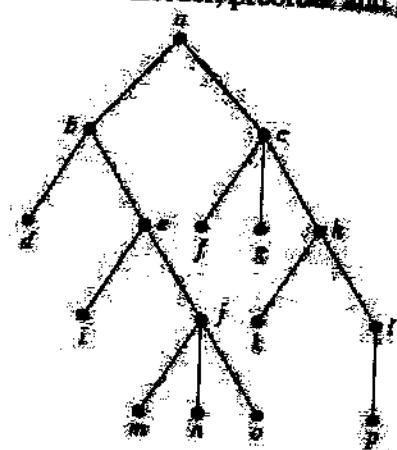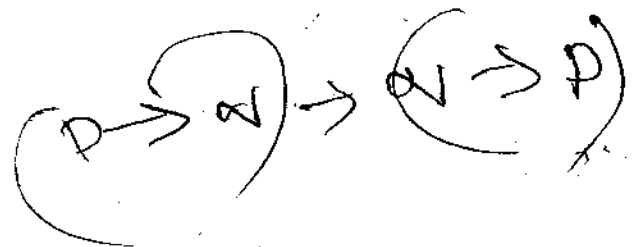

(a) nothing

(b) one to one injective

(c) onto conjunctive
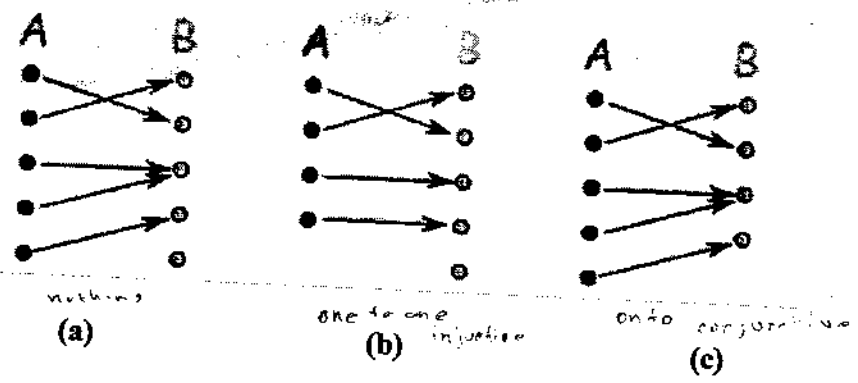
Q.N.06 (a) Prove that there are at most m^h leaves in an m-ary tree of height h.

(b) Find the inorder, preorder and postorder traversal for the following tree:

[2]
[3]

$h = 4$