Code No. : **6030/S**

FACULTY OF INFORMATICS
B.E. 2/4 (IT) I Semester (Suppl.) Examination, July 2014
DISCRETE MATHEMATICS

Time : 3 Hours] [Max. Marks : 70

***Note** : Answer **all** questions from Part **A**. Answer **any five** questions from Part **B**.*

PART – A **(10×2= 20 Marks)**

1. Write the converse, the opposite to the following :
   "If triangle ABC is a right angle, then $|AB|^2 + |BC|^2 = |AC|^2$. **3**
2. Define contra positive with an example. **2**
3. Define absurdity with an example. **2**
4. Construct truth table for $[(p \vee q) \wedge (\sim r)] \leftrightarrow q$. **3**
5. Define existential quantifier with an example. **2**
6. Give an example of a predicate p(x, y) such that $\exists x \, \forall y \, p(x,y)$ and $\forall y \exists x \, p(x,y)$ have different truth values. **3**
7. Disprove the statement that every positive integer is the sum of the cubes of eight non-negative integers. **3**
8. Show that if f(x) is O(x) then f(x) is $O(x^2)$. **3**
9. Define totally ordered set. **2**
10. Define chromatic number of a graph with an example. **2**

PART – B **(5×10=50 Marks)**

11. a) Construct truth table for $(p \vee \sim Q) \rightarrow (p \wedge Q)$. **5**
    b) Show that the following statements are logically equivalent without using truth table
    $p(V(Q \wedge R)) \Leftrightarrow (p \vee Q) \wedge (p \vee R)$. **5**
12. a) Show that the following statements are logically equivalent
    $(P \rightarrow Q) \Leftrightarrow (p \wedge Q) \vee (\sim p \wedge \sim Q)$. **5**
    b) Show that $\sim (P \leftrightarrow Q) \leftrightarrow (p \wedge \sim Q) \vee (\sim p \vee Q)$. **5**

13. a) How many positive integers 'n' can be found using 3, 4, 4, 5, 5, 6, 7, if 'n' has to exceed 5 00 0000 ? **5**

    b) For which real numbers x and y is it true that [x + y] = [x + 5] ? **5**

14. a) Prove that 3 divides $n^3 + 2n$ whenever 'n' is a positive integer. **4**

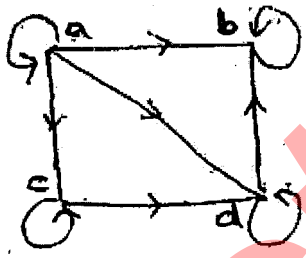
    b) If x > 2, y > 0, z > 0 then find the number of solutions of x + y + z + w = 21. **6**

15. a) Solve $y_{n+2} - y_{n+1} - 6y_n = 0$ with $y_1 = 1$, $y_0 = 2$. **5**

    b) Find the co-efficient of x^9 in
    $(x^3 + x^5 + x^6)(x^3 + x^4)(x + x^2 + x^3 + x^4 + ...)$ **5**

16. a) Show that the relation R on a set 'A' is reflexive if and only if the inverse relation R^{-1} is reflexive. **5**

    b) Is the relation given in directed graph shown is a partial order. **5**



17. a) State Euler's formula for a connected planar graph. **2**

    b) Determine all six possible spanning trees from the graph. **8**