Roll No…….. **Total No. of Printed Pages: [01]**
Total No. of Questions: [09]

B.Sc (Hons Math) (Semester – 6th)
DISCRETE MATHEMATICS
Subject Code: BMAT1621
Paper ID: [18131229]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a. Determine C(5,2) by the recursive definition of binomial coefficient.
b. Find the generating sequence of the function $S_n = b^n$.
c. Show that $f(x) = x^2 + 2x + 1$ is $O(x^2)$.
d. Define Simple Graph and Complete graph.
e. Define Planner Graph.
f. Explain Binary tree and minimal spanning tree.
g. What is the value of post fix expression 7 2 3 * - 1 / 9 3 / +
h. State De Morgan's Law.
i. Define Boolean algebra and duality in Boolean algebra.
j. Use pigponhole principal to show that if seven numbers from 1 to 12 are choosen then two of them will add up to 13

Section – B **(5 marks each)**

Q2. Which sequence has the generating function $1/ (1 – z – z^2)$

Q3. Show that the maximum degree of any vertex in simple graph having n vertices is n(n-1)/2

Q4. Using Boolean Algebra show that

abc + abc' + ab'c + a'bc = ab + bc + ca .

Q5. In a group of 50 persons 14 drink tea but not coffee and 30 drink tea find (i) how many drink both tea and coffee. (ii) hoe many drink coffee but not tea.

Q6. Determine a * b ffor the following numeric functions

$a_r = 3r$; $r \geq 0$ and $b_r = 2r$; $r \geq 0$

Section – C **(10 marks each)**

Q7. Solve $s_n – 2s_{n-1} + s_{n-2} = 1$, $s_0 = 2$, $s_1 = 5.5$

Q8. State and prove Euler formula. Also explain travelling salesman problem.

Q9. Explain Disjunctive, Conjunctive , Converse, inverse , contradiction with example.