DEPARTMENT OF SCIENCE & HUMANITIES

CONTINUOUS ASSESSMENT TEST-II

Year: II YEAR

Branch: CSE

Subject code/Subject Name: MA8351 / Discrete Mathematics

Date: 14.09.2020

Time: 1.30hrs

Total marks: 50

Part A (5 x 2 = 10)

1. How many positive integers not exceeding 100 that are not divisible by 5? (CO2) (A)
2. Write an explicit formula for a_n if $a_n = 3a_{n-1}$ and $a_1 = 2$. (CO2) (E)

3. Show that $2^n < n!$ for all $n \geq 4$ (CO2) (A)
4. State the Pigeonhole principle (CO2) (A)
5. State the principle of strong induction. (CO2) (E)

PART-B(2X13=26)

6. (a) Using mathematical induction, show that for all positive integers n, $3^{2n+1} + 2^{n+2}$ is divisible by 7.

   (R) (CO2)

   (b) In how many ways can be the letters in the word MISSISSIPPI be arranged
   - (i)   If there is no restriction
   - (ii)   If P's are always together
   - (iii) If the two P's are must separated
   - (iv)   If the first and last word starting in the same word. (CO2) (A)

   (OR)

   (c) Prove by mathematical induction that $1^2 + 2^2 + 3^2 + \ldots n^2 = \frac{n(n+1)(2n+1)}{6}$ (CO2) (E)

   (d) Determine the number of positive integers n, $1 \leq n \leq 2000$ that are not divisible by 2,3,5 but are divisible by 7. (CO2) (R)

7. (a) Using method of generating function to solve the recurrence relation
   $a_{n+1} - 8a_n + 16a_{n-1} = 4^n; n \geq 1$, given that $a_0 = 1 \ and \ a_1 = 8$. (CO2) (A)

   (b) Solve the Recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = 8n^2$; given that $a_0 = 4 \ and \ a_1 = 7$.

   (CO2) (E)

   (OR)

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(c) Solve the Recurrence relation $a_{n+2} - 6a_{n+1}9a_n = 3(2)^n + 7(3)^n; n \geq 0,$ given that
$a_0 = 1$ and $a_1 = 4$ (CO2) (E)

(*d*) Use the method of generating function to Solve: $a_n = 4a_{n-1} + 3n.2^n, \ n \geq 1$ with $a_0 = 4$. (CO2) (A)

Part – C (1 x 14 = 14)

8. (a) How many bit strings of length 12 contain i) Exactly three 1's? ii) almost three 1's? iii) an equal number if 0'1 and1's? (CO2) (A)

(b) From a club consisting of 6 men and 7 women, in how many ways we select a committee of
(i) 3 men and 4 women (ii) 4 persons which has at least one women (iii) 4 persons that has at most one man (iv) 4 persons that have both genders. (CO2) (A)

********************************** ALL THE BEST **********************************

R2017	MA8351	DISCRETE MATHEMATICS
C01		Apply the knowledge of the concepts needed to test the logic of a program.
C02		Introduce the core ideas of combinatorial mathematics and apply these ideas to practical problems.
C03		Explain basic concepts in Graph theory and Define how graphs serve as models for many standard problems
C04		Create an awareness of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science and Analyze the concepts and properties of algebraic structures such as groups, rings and fields.
C05		Define the basic ideas of posets and develop the concepts of lattices which has application in finite state machines.
C06		Introduce the concepts of discrete objects and relationships that bind them and create an ability to deal with abstraction, combinatorics, algorithms and graphs.