FACULTY OF ENGINEE...

BE (CSE) III – Semester (AICTE)(Main & Backlog) Exami...

March / April 2022

Subject: Discrete Mathematics

Time: 3 Hours

Max Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

(10 x 2 = 20 Marks)

Note: Answer all questions.

1. If the domain is the set of integers then what is the truth value of the statement $\forall n\ (n+1) > n$
2. Express gcd (252, 198) =18 as a linear combination of 252 and 198
3. Using mathematical induction show that $1+2+2^2+\ldots\ldots+2^n=2^{n+1}-1$
4. How many permutations of the letters ABCDEFGH contains the string ABC?
5. Find the solution to the Recurrence relation $a_n=6a_{n-1}-11a_{n-2}+6a_{n-3}$, $a_0=2$, $a_1=5$, $a_2=15$
6. What is recurrence relation? Write different methods to solve recurrence relations?
7. Is the "divides" relation on the sets of positive integers symmetric? Is it Anti symmetric?
8. A= {1, 2, 3, 4}, write a relation on A such that it is both Asymmetric and Anti symmetric?
9. List applications of Trees?
10. Define Spanning trees?

PART – B

Note: Answer any five questions. (5 x 10 = 50 Marks)

11. a) Show that $(P\rightarrow Q)\ \wedge(Q\rightarrow R) <-> (PVQ)\rightarrow R$
    b) Show that $(P\rightarrow Q) <-> \sim PVQ$

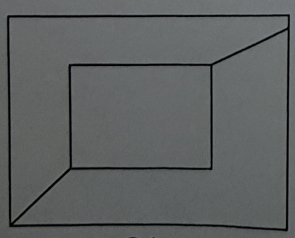
12. a) What is the minimum number of students ,each of whom comes from one of the 50 states ,who must be enrolled in a university to guarantee that there are at least 100 who came from the same state?
    b) How many solutions does the equation $x_1+x_2+x_3=11$ have where x_1,x_2,x_3 are non negative integers?

13. Find all solutions of the Recurrence relation $an=5a_{n-1}-6a_{n-2}+7^n$

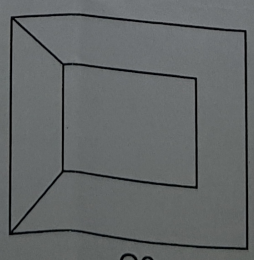
14. Draw the Hassae diagram representing the
    a) Partial ordering {{a,b}| a divides b} on a set of { 1,2,3,4,6,8,12}
    b) Determine the POSETS { {1,2,3,4,5},|} and {{1,2,4,8,16},|} are Lattices?

15. Explain tree traversals with examples?

16. a) The following graphs are isomorphic or not?



G1



G2

    b) Show that sum of degrees of all the vertices is equals to 2 *|E|

17. a) Write the applications of number theory?
    b) Find the GCD of 414 and 662 using EUCLIDEAN algorithm

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