



Code No. : 6206

FACULTY OF ENGINEERING
B.E. 2/4 (CSE) I Semester (Supplementary) Examination, July 2010
DISCRETE STRUCTURES

Time : 3 Hours]

[Max. Marks : 75

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

PART – A

25

1. Write the following statement in symbolic form. 2
 - a) Atleast one integer is even.
 - b) Crops will be destroyed, if there is a flood.
2. Show that $P \vee (\overline{p \wedge q})$ is a tautology. 3
3. If $A = \{a, b, c, d\}$ and $B = \{1, 2, 3\}$. How many onto functions are possible from A to B. 2
4. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ and $g : \mathbb{R} \rightarrow \mathbb{R}$ where $f(x) = x^2, g(x) = x + 5$.
Show that $f \circ g \neq g \circ f$. 3
5. Determine the coefficient of x^{15} in $(x^2 + x^3 + x^4 + \dots)^4$. 3
6. Define first order homogeneous recurrence relation. 2
7. Define a Ring. 2
8. What is an Algebraic system ? 3
9. Give an example of a Graph and its complement. 2
10. What is a rooted tree ? Give an example. 3

PART - B

50

11. Show that $\neg P$ is a valid conclusion from premises
 $P \rightarrow r, r \rightarrow s, tv \neg s, \neg tvu, \neg u.$ 10
12. a) A what of fortune has 1 to 36 painted on it in a random manner. Show that three consecutive numbers total 55 or more (regardless of order of numbers). 5
 b) Let $n \in Z^+$, prove that $g(d(n, n+2)) = 1$ or 2. 5
13. a) In how many ways can the 26 letters of alphabet be permuted so that none patterns car, dog, pun or byte occurs. 5
 b) Find the co-efficient of x^5 in $(1 - 3x)^{-7}$. 5
14. a) Solve the recurrence relation
 $2a_{n+3} = a_{n+2} + 2a_{n+1} - a_n, n \geq 0$
 and $a_0 = 0, a_1 = 1, a_2 = 2.$ 6
 b) Define Derangement. Give an example. 4
15. a) Show that if a, b are any two elements of a group G, then $(ab)^2 = a^2.b^2$ if and only if G is abelian. 5
 b) What is a Group ? Explain Group homomorphism ? 5
16. a) Show that a complete bipartite graph $K_{m,n}$ is planar when $m \leq 2$ & $n \leq 2.$ 5
 b) Let $G(V, E)$ be a directed graph then prove that $\sum \deg^-(v) = \sum \deg^+(v) = |E|.$ 5
17. a) Solve Recurrence relation of Fibonacci sequence. 5
 b) Find transitive closure of a graph given by relation
 $R = \{(a, d) (b, a) (b, c) (c, a) (cd)(dc)\}$ on set $A = \{a, b, c, d\}.$ 5

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