C 43558 (Pages : 3) Name

Reg. No....................

FIRST SEMESTER B.C.A. DEGREE EXAMINATION, JULY 2013

(CCSS)

CA 1C 02—DISCRETE MATHEMATICS

Time : Three Hours Maximum : 30 Weightage

Part A (Objective Type questions)

Answer **all** *questions.*

1. The value of c (n, 0) is :

   (a) 1. (b) n.

   (c) 0. (d) n !.

2. What is the order of the recurrence relation $a_{r-2} - 8a_{r-1} + a_r = 0, r > 2$

   (a) 0. (b) 1.

   (c) 2. (d) 6.

3. Value of p $(n, n-1)$ *is* :

   (a) n. (b) n !.

   (c) 1. (d) n - 1.

4. The equivalent statement of $(p \; Q)$ n(Q $p)$ *is* :

   (a) p Q (b) $p \wedge$ Q.

   (c) $p \vee$ Q. (d) $\sim p \vee \sim$ Q.

5. If p = and g = then ________

6. The negation of V x, $p(x)$ is ________

7. The value of $\frac{n!}{(n-1)!}$ is ________

8. Formula for c (n, r) *is* ________

9. Can every group has a generator.

10. Every finite integral domain is a field. True *or* False.

Turn over

11. $p(n, r) = p(r, n)$. True *or* False.

12. Every group is commutative. True *or* false.

(12 x ¼ = 3 weightage)

Part B (Short Answer Questions)

Answer all questions.

13. Let $a_r = \begin{cases} 0 & 0 \le r \le 2 \\ 2 \cdot r + 5 & r > 3 \end{cases}$ and

$b_r = \begin{cases} 0 & 0 \le r \le 1 \\ r + 2 & r > 3 \end{cases}$. Find $a_r + b_r$

14. Translate the statement into symbolic form

"Jack and Jill went up the hill".

15. Distinguish between integral domain and a field.

16. Write the truth table for $(p \vee Q) \wedge Q$.

17. Write the predicate of "x is the father of the mother of y".

18. Let a be an arbitrary numeric function and *b* be the numeric function $c_r = \sum_{i=0} a_i b_r$

Find the generator of $c = a * b$.

19. Solve the recurrence relation $a_r = a_{r-1} + a_{r-2}$.

20. Evaluate $c(n, r)$ bar n = 8 and $r = 3$.

21. If $c(n, 9) = c(n, 8)$, what is $c(n, 15)$.

(9 x 1 = 9 weightage)

Part C (Short Essay Questions)

Answer any **five** *questions.*

22. Show **that** $p(n, r) = n(n-1)(n-2) \ldots x(n - r + 1)$.

23. **Show that** $c(n, r) + c(n, r-1) = c(n+1, r)$.

24. Find the truth table for $(p \quad Q) \vee - p \wedge (- p \wedge V Q)$.

25. Show that identity element and inverse element are unique in a group.

26. Let a = $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ & 2 & 5 & 3 & \end{pmatrix}$ and $\begin{pmatrix} & 2 & 3 & 4 & 5 \\ & 5 & 4 & 2 & 1 \end{pmatrix}$ ..Show that az $\neq$ $z\sigma$.

27. If $\frac{1}{\;} \quad \frac{1}{\;} = \frac{x}{10!}$. Find x.

28. Find the value of n such that $p(n, 5) = 42\, p(n, 3)$; n 4.

(5 x 2 = 10 weightage)

Part D (Essay Questions)

Answer any **two** *questions.*

29. Find the sum of $1^2 = 2^2 + \quad + r^2$; $r > 1$.

30. If G is a group with binary operation *, then show that left and right cancellation laws hold in G.

31. Solve the equation a_r $3\, a_{r-1} + 2\, b_{r-1}$ and $b_r = a_{r-1} + b_{r-1}$ with boundary conditions $a_0 = 1$ and $b_0 = 0$.

(2 x 4 = 8 weightage)