**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 $a_{r-2} - 8\,a_{r-1} + a_r = 0$, 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) $p\ v$ 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

$b_r = \begin{cases} 9 \quad or & 0 \le r \le 1 \\ r + 2 & r > 3 \end{cases}$. 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 $(p \vee Q) n$ Q.

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

18. Let a be an arbitrary numeric funciton 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,. $= a_{r-1} + a_{r-2}$.

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

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

(9 x 1 = 9 weightage)

**Part C (Short Essay Questions)**

*Answer any* **five** *questions.*

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

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

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

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 $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ & 5 & 4 & 2 & 1 \end{pmatrix}$..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 $\quad$ 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)