D 53554 (Pages : 3) Name..

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

FIRST SEMESTER B.C.A. DEGREE EXAMINATION, JANUARY 2014

(UG—CCSS)

Complementary Course

CA 1C02—DISCRETE MATHEMATICS

Time : Three Hours Maximum : 30 Weightage

Part A (Objective Type Questions)

Answer **all** *questions.*

1. Find the value of $p(n, 0)$:

   (a) 1. (b) n.

   (c) 0. (d) n!.

2. What is the order of the recurrence relation $a_r - 6a_{r-1} + 8a_{r-2} + a_{r-3} = 0$, r23.

   (a) 0. (b) 3.

   (c) 2. (d) 1.

3. The equivalent statement of (P Q) Q → P) is :

   (a) P Q. (b) P n Q.

   (c) P v Q. (d) P v ~ Q.

4. $\frac{P(n, r)}{c(n, r)}$:

   (a) n!. (b) r!

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

5. The negation of $\forall x, p(x)$ is

6. The value of $\frac{n!}{(n-3)!}$ is ————

7. Value of $c(n, 1)$ is ————

8. If p = T and q = F then ~ P → Q is ————

9. Every group is abelian. True or False.

Turn over

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

11. Every field is an integral domain. True or False.

12. Does $p(n, r)$ exist for $n < r$

(12 x ¼ = 3 weightage)

Part B (Short Answer Questions)

Answer **all** *questions.*

13. Evaluate $p(n, r)$ and $c(n, r)$ for $n = 6$ and $r = 4$.

14. Define skew field.

15. Write the truth table for $(P \vee Q) \rightarrow (P \wedge Q)$.

16. Write the following statement in symbolic form.

"If either Jerry takes calculus or Ken takes sociology, then Lassy will take English".

17. Define zero divisor of a ring.

18. Show that binary operator * defined on Q+ by $a * b = \frac{ab}{}$ is a group.

19. Solve the recurrence relation a,. $= a_{r-1}$ a,. -2.

20. **If** $c(n, 9) = c(n, 8)$. Find $c(n, 17)$.

21. Find the number of ways to point 12 offices so that 3 of them will be given, 2 of them pink, 2 of them Yellow and the remaining are white.

(9 x 1 = 9 weightage)

Part C (Short Essay Questions)

Answer any **five** *questions.*

22. Solve the recurrence relation

$a_r \quad a_{r-1} + 6 \quad = \; + r \qquad r > 2.$

23. Show that

$c(n, r) + c(n, r-1) = c(n +$,

24\. Let a = $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ & 2 & 5 & 3 & 1 \end{pmatrix}$ and

= $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ & 5 & 4 & 2 & 1 \end{pmatrix}$. Show that $\sigma\tau \neq \tau\sigma$.

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

26\. Show that every finite integral domain is a field.

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

28\. If $\frac{1}{[\text{illegible}]} + \frac{1}{9!} = \frac{x}{\;}$ Find x.

(5 x 2 = 10 weightage)

Part D (Essay Questions)

Answer any **two** *questions.*

29\. **If R** is a ring with additive identity 0, then for any a, b $\in$ G. We have

(a) $0 \cdot a = a \cdot 0 = 0$.

(b) $a(-b) = -(a)b = -(ab)$.

(c) $(-a)(-b) = ab$.

30\. Write the truth table for $\sim(p \wedge Q) \quad p \vee \sim Q$. And verify them.

31\. Find the sum of 12 $+2^2 + \ldots + r^2$.

(2 x 4 = 8 weightage)