D 53554 (Pages : 3) Name.......................................

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

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

(UG—CCSS)

Complementary Course

CA IC02—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,. $- 6a_{,-1} + 8a_{,-2} + a_{,-3} = 0$, r23.

   (a) 0. (b) 3.

   (c) 2. (d) 1.

3. The equivalent statement of (P Q) Q $\rightarrow$ 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 $\rightarrow$ 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

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

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 $\frac{1}{8!} + \frac{1}{9!} = \frac{x}{[illegible]}$ 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 $\leftarrow$ 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 $\sim (p \; n \; Q) \quad p \; v \sim Q$. And verify them.

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

(2 x 4 = 8 weightage)