

DURATION : 2.5 HRS

FCSDMKT II

MARKS: 75

Q.1. solve any four

[20]

- 1) $A = \{a, b\}$, $B = \{c, d\}$, $C = \{e, f, g\}$ then find 1] $A \times (B \cup C)$ 2] $(A \times B) \cup (A \times C)$
- 2) Solve the recurrence relation $a_n = 2a_{n-1} - a_{n-2}$ for $n \geq 3$ and $a_1 = 0$, $a_2 = 2$
- 3) Determine whether R is an equivalence relation on $A = \{1, 2, 3, 4\}$
 $R = \{(1, 1), (1, 2), (2, 1), (2, 2), (3, 4), (4, 3), (3, 3), (4, 4)\}$
- 4) Check whether the following relation is : a] Reflexive b] Symmetric c] Transitive
 X : Set of all integers Z , R : for all $a, b \in Z$, aRb iff $2a + b$ is divisible by 3
- 5) Let $A = \{1, 2, 3\}$ Find $S(n, k)$ for $1 \leq k \leq 3$
- 6) X : Set of all integers Z , R : for all $a, b \in Z$, aRb iff $2a + b$ is divisible by 3. Check whether it is equivalence relation
- 7) Solve the recurrence relation $a_n = 3a_{n-1} - 2a_{n-2}$ for $n \geq 3$ and $a_1 = 1$, $a_2 = 3$
- 8) Check whether the following relation is : a] Reflexive b] Symmetric c] Transitive, X : Set of all integers Z , R : for all $a, b \in Z$, aRb iff $a - b$ is divisible by 4.

Q.2. solve any two

[20]

- 1) Find the product of following: 1] $(2\ 1)(5\ 3)(3\ 4\ 1)(1\ 4\ 5)$ 2] $(3\ 4\ 1\ 2)(3\ 5)(1\ 4\ 3)(5\ 4\ 1)$
- 2) Evaluate the multinomial numbers: 1] $\binom{12}{5\ 7\ 2}$ 2] $\binom{13}{8\ 3\ 1}$
- 3) Find the inverse of following function 1] $(1\ 3)(1\ 2)(1\ 5)(1\ 4)$ 2] $(2\ 3\ 1)(4\ 3)(2\ 5\ 1)$
- 4) Write down following cyclic permutation in complete form and state the partitioned of $(1\ 2\ 4\ 5\ 3)$ and also write following partitioned $(1)(2)(3)(6)$ in permutation form.

Q.3. solve any two

[20]

- 1) Find the multiplicity of each root of, $f(x) = x^4 - x^3 - 3x^2 + 5x - 2$
- 2) By dividing $f(x)$ by $g(x)$ find the Quotient and remainder $f(x) = x^4 - 13x^2 + 36$ and $g(x) = x^2 + x - 6$
- 3) Find modulus, amplitude and polar representation of $z = -2 - 2i$
- 4) Find g.c.d of following pair of polynomials: $f(x) = x^2 - 1$ and $g(x) = x^3 + 2x^2 + 4x + 21$

Q.4. solve any three

[15]

- 1) Find the inverse of following: $(2\ 1\ 3\ 4)(5\ 3)(3\ 4\ 1)(1\ 5\ 4)$
- 2) find the remainder of $x^4 - 3x^2 + 4x + 8$ and $x^2 + 2$
- 3) Find the product of following function : $(3\ 1)(2\ 1)(5\ 1)(4\ 1)$
- 4) R : for all $a, b \in Z$, aRb iff $a - b$ is divisible by 2 show that it is antisymmetric and transitive
- 5) Solve each of the following recurrence: $a_n = 3a_{n-1} - 2a_{n-2}$, $n \geq 3$, $a_1 = 5$, $a_2 = 7$
- 6) Find the product of following function : $(1\ 3\ 2)(3\ 4)(1\ 5\ 2)$