

VCD - 30/9/15

Maths-II - FYBSc - Sem-II Marks-60 Hrs-2

OLD COURSE

Instruction: 1) All questions are compulsory.
2) Figures to the right indicate the marks.

1) Attempt any three

[5x3=15]

- Show that an equivalence relation on non-empty set X induces a partition of X .
- Solve the recurrence relation, $a_n = 5a_{n-1} - 6a_{n-2}$, $n \geq 3$, with $a_1=1$ and $a_2=5$.
- i) find the product $(1\ 2)(3\ 5)(1\ 4\ 3)(5\ 4\ 1)$
ii) find inverse of $(1\ 3\ 5)(2\ 4)$.
iii) write the cycle $(1\ 3\ 2)(4\ 5)$ of S_5 in standard form.
- Express the complex number $-\sqrt{3} - i$ in polar form.

2) Attempt any three

[5x3=15]

- If $S(n,k)$ denote number of partitions of an n -set X into the k -parts where $n \geq 1$ and $1 \leq k \leq n$ then prove that
i) $S(n, 1)=1$, $S(n,n)=1$
ii) $S(n,k) = S(n-1,k-1) + kS(n-1,k)$, $2 \leq k \leq n$.
- Prove that Any two equivalence classes of non-empty set X are equal or disjoint.
- Define the following terms
i) Countable set
ii) Equivalent set
iii) Cartesian product of two sets
- On Z , defined a relation R as aRb if and only if $a \leq b$. Verify that R is an equivalence relation on Z

3) Attempt any three

[5x3=15]

- Define Multinomial number. Evaluate $\binom{10}{5,3,2}$.
- Find the number of integers from 1 to 100 which are not divisible by 4,6,10.
- Define sign of permutation and find sign of $(1\ 3)(2\ 4)$.
- Write down all partitions of number 6.

4) Attempt any three

[5x3=15]

- Find quotient and remainder when $f(x) = x^3 - 4x^2 + x + 6$ is dividing by $g(x) = x^2 - 1$.
- State and prove factor theorem.
- Find GCD of two polynomial $x^3 + 1$ and $x - 1$.
- A polynomial of degree n over F has atmost n roots.