A.T.K.T

Old

2015-16

VCD - 30/9/15 OLD COURSE

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

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

1) Attempt any three [5x3=15]

a) Show that an equivalence relation on non-empty set X induces a partition of X.
b) Solve the recurrence relation , $a_n = 5\,a_{n-1} - 6\,a_{n-2}$, $n \geq 3$, with $a_1=1$ and $a_2=5$.
c) 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.
d) Express the complex number $-\sqrt{3} - i$ in polar form.

2) Attempt any three [5x3=15]

a) 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)=i
ii) S (n,k)= S(n-1,k-1)+k S(n-1,k), $2 \leq k \leq n$.
b) Prove that Any two equivalence classes of non-empty set X are equal or disjoint.
c) Define the following terms
i) Countable set
ii) Equivalent set
iii) Cartesian product of two sets
d) 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]

a) Define Multinomial number. Evaluate $\binom{10}{5,3,2}$

b) Find the number of integers from 1 to 100 which are not divisible by 4,6,10.
c) Define sign of permutation and find sign of (1 3)(2 4).
d) Write down all partitions of number 6.

4) Attempt any three [5x3=15]

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