



Discrete Mathematics-MATH 150

ASSIGNMENT-3

2nd Semester 2016-17

Section-I

(1 mark for each)

State whether the following statements are true or false-

1. Mathematical induction, strong induction and well ordering are not equivalent principles.
2. $a_n = a_{n-1} + a_{n-2}^2$ is a linear homogeneous recurrence relation
3. $C(6,2) = \frac{P(6,2)}{2}$
4. The Basis Step in *Mathematical Induction* is “Show that $P(1)$ is true , $n \geq 1$. ”
5. If 16 objects are placed into 15 boxes, then there is at least one box containing 3 objects.
6. The first five Fibonacci numbers are: 1,1, 2,3,5,8.

1	2	3	4	5	6



Section-II

(1 mark for each)

Select one of the alternatives from the following questions as your answer-

1. permutations of the letters ***ABCD*** is equal
 - A. 24
 - B. 12
 - C. 4
 - D. 6
2. If f is defined recursively by $f_n = 2f_{n-1}$ with $f_0 = 3$ for positive integers n , then f_2 is
 - A. 12
 - B. 6
 - C. 3
 - D. 2
3. The coefficient of x^4y^3 in the expansion of $(x + y)^7$ is
 - A. 21
 - B. 30
 - C. 32
 - D. 35
4. If $P(5, r) = 5!$, then the value of r
 - A. 0
 - B. 1
 - C. 3
 - D. 5
5. The characteristic equation of the recurrence relation $a_n = c_1a_{n-1} + c_2a_{n-2}$ is obtained by substituting
 - A. $a_n = r^2$
 - B. $a_n = r^{-2}$



C. $a_n = r^{-1}$

D. $a_n = r$

6. The roots of a characteristic equation of a linear homogeneous recurrence relation are 1, 2, 3. The general solution of the recurrence relation is in the form

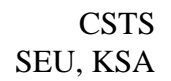
A. $a_n = c_1 2^n + c_2 3^n + c_3 2^n$

B. $a_n = c_1 2^{-n} + c_2 3^{-n} + c_3 2^{-n}$

C. $a_n = c_1 + c_2 2^n + c_3 3^n$

D. $a_n = c_1 + c_2 n \cdot 2^n + c_3 n^2 \cdot 3^n$

	1	2	3	4	5	6
ANSWER						



3. Find the first 3 terms in the expansion of $(3x + y)^5$.

4. Find the general solution of the recurrence relation $a_n = 5a_{n-1} - 6a_{n-2}$, with $a_0 = 2$, and $a_1 = 5$.



5. Find $f(1), f(2), f(3)$ and $f(4)$, if $f(n)$ is defined recursively by $f(0) = 1$ and for $n = 0, 1, 2, 3, \dots$

a. $f(n + 1) = f(n) + 2$

b. $f(n + 1) = 2^{f(n)}$.

6. Somebody can choose pictures from four lists. The four lists contain 18, 6, 12, 4 pictures respectively. There is no picture is on more than one list. How many possible ways can choose 4 pictures by select one picture from each list

Good luck