

## Sample Exam 3 - Fall 1999 - CMSC 203 / Discrete Structures

- 1.** A restaurant's menu consists of 12 beverages, 6 appetizers, 5 salads, 15 entrees, 10 desserts, and 4 coffees. How many distinct dinners can they serve if each dinner contains:
- (a) a beverage, an appetizer, a salad, an entree, a dessert, and a coffee?
  - (b) a beverage, either an appetizer or a salad, an entree, and either a dessert or a coffee?

- 2.** Suppose I have a standard 52-card deck of cards.

- (a) How many 7-card poker hands do not contain the 3♥?
- (b) How many 7-card poker hands contain the 4♣ OR the 8♣?

- 3.** How many permutations are there of the words: (a) NETWORK (b) ETHERNET

- 4. (a)** How many 64-long binary strings have seven 1's?

- (b) How many 32-long binary strings have at least three 1's?

- 5.** A candy store sells 25 different types of candy.

- (a) How many ways can they fill a box with 100 pieces of candy?

- (b) How many ways can they fill a box with 100 pieces of candy if there must be at least 3 pieces of each type of candy in each box?

- 6.** Call the top apex of Pascal's Triangle the 0th row.

- (a) What is the sum of all the elements the 3rd row?

- (b) What is the sum of the elements of the 6th row?

- (c) What is the sum of the elements of the  $k$ -th row?

- 7.** Use the Iteration Method to solve the Recurrence Relation,  $s_n = 5s_{n-1} + 3$  with  $s_0 = 1$ .

- 8. (a)** Find the Characteristic Polynomial of the recurrence relation:

$$s_n + 13s_{n-1} - 42s_{n-2} - 51s_{n-3} + s_{n-4} = 0.$$

- (b) Find the general solution of :  $s_n = -s_{n-1} + 42s_{n-2}$ .

- (c) Find the particular solution of the recurrence relation whose general solution is:

$$s_n = A(6)^n + B(-7)^n, \text{ when } s_0 = 8 \text{ and } s_1 = 9 ?$$