King Fahd University of Petroleum and Minerals

College of Computer Science and Engineering
Information and Computer Science Department

ICS 253-01: Discrete Structures I
Summer 2012-2013
Quiz#5, Sunday July 21, 2013.

Name:

ID#:

1. (5 points) How many subsets with an odd number of elements does a set with 10 elements have?

$\binom{10}{1}+\binom{10}{3}+\binom{10}{5}+\binom{10}{7}+\binom{10}{9}$

2. (5 points) A coin is flipped 10 times where each flip comes up either heads or tails. How many possible outcomes contain at least 2 heads?

Total # outcomes $= 2^{10}$.

outcomes with at most 1H $= \binom{10}{0}+\binom{10}{1} = 1+10 = 11$.

$\therefore$ Answer $= 2^{10}-11$

3. (5 points) Find the coefficient of x^3y^8 in $(x-y)^{11}$.

$\binom{11}{3} x^3 (-y)^8 = \binom{11}{3} x^3 y^8$

$\therefore$ Coefficient $= \binom{11}{3}$.

4. (5 points) Find $\sum_{k=0}^{n} 2^k \binom{n}{k}$.

$\sum_{k=0}^{n} \binom{n}{k} 2^k \cdot 1^{n-k} = (2+1)^n = 3^n$