PRINCE SULTAN UNIVERSITY

MATH 101 FINITE MATH

MAJOR EXAM 3 5th JUNE 2010

Start : **4:00 p.m.**
End: **5:15 p.m.**

Total Time: **75 minutes**

Name: _____

I.D. _____

Time : **Circle One** **(9 a.m.)** **(10 a.m.)** **(11 a.m.)**

1. Answer all questions.
2. This exam consists of 1 Cover Sheet & 3 Question Sheets with 13 questions.
3. You can use a calculator, **NOT** a mobile phone.
4. No talking during the test.
5. Show all working out in the space provided.

Question No.	Max. Points	Points Scored
1,2,3,4,5	26	
6,7,8	22	
9,10,11,12,13	24	
TOTAL	72	

1) [10 points] If $U = \text{universal set} = \{a,b,c,d,e,f,g\}$ and if $A = \{a,d,e,f\}$, $B = \{a,c,f\}$ and $C = \{c,d,e,f,g\}$ find:

a) $A \cup \overline{B}$

b) $\overline{A} \cap \overline{B}$

c) $\overline{A \cup B}$

d) $A \cup (B \cap C)$

e) $\overline{A \cap C}$

2) [4 points] If $c(A \cup B) = 40$, $c(A) = 28$ and $c(B) = 34$. find $c(A \cap B)$.

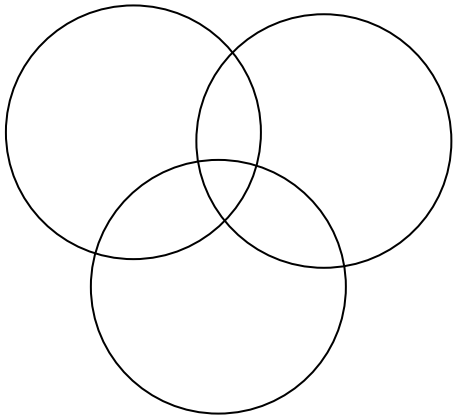
3) [4 points] An e-mail password consists of 6 characters. The first 3 characters can be a letter from A to J. The last 3 characters can be a digit from 2 to 7. How many passwords are possible if no repetition is allowed?

4) [4 points] A restaurant menu has 15 items. In how many ways can three items be chosen?

5) [4 points] In how many ways can students list, in order, their top three favourite football teams from the Barclays Premier League consisting of 20 teams?

6) [10 points] A survey of customers in a restaurant showed the following information about their lunch eating habits. Draw a Venn Diagram.

44 ate pizza
34 ate sandwiches
25 ate fruit
14 ate a pizza and a sandwich
15 ate a sandwich and fruit
12 ate a pizza and fruit
4 ate all three types
11 ate none of them



i) How many customers ate a sandwich but not a pizza nor fruit? ……..

ii) How many ate sandwiches and fruit but not pizza? ……

iii) How many ate only a pizza? .....

iv) How many ate neither a sandwich nor a pizza? ……

v) How many ate either fruit or pizza or both, but not a sandwich? ……

vi) How many customers were surveyed? ……..

7) [6 points] A bank allows customers to choose a 5-digit PIN for its cash machine. Find the number of 5-digit number codes:

a) With no repeated digits (a 0 at the beginning is allowed)?

b) With no repeated digits (a 0 at the beginning is **not** allowed)?

c) With repeated digits allowed including a 0 at the beginning?

8) [6 points] From eight women and five men a committee of four is to be formed. The committee must include at least one woman and at least one man. In how many ways can this be done?

9) [4 points] Five history books are to grouped together next to three English books, also grouped together on a shelf. In how many different ways can the books be arranged?

10) [4 points] In how many ways can two people each have different birthdays? Assume there are 365 days in the year.

11) [6 points] Four administrators, eight faculty members and twenty students are eligible to serve on a university committee.

a) How many different committees are possible if eight people are to serve on the committee?

b) The university insists that the eight people on the committee must consist of one administrator, two faculty members and five students. How many different committees are possible now?

12) [6 points] Use the Binomial Theorem to fully expand $(x+y)^6$.

13) [4 points] Find the **fifth** term in the expansion of $(2x+3y)^9$