CONFIDENTIAL

Faculty of Computing

UNIVERSITI TEKNOLOGI MALAYSIA

TEST 2

SEMESTER I 2015/2016

SUBJECT CODE	**: SCSI1013**
SUBJECT NAME	**: DISCRETE STRUCTURE**
YEAR/COURSE	**: 1&2 SCSJ/SCSR/SCSB/SCSB**
TIME	**: 2 HOURS (8.00 PM – 10.00 PM)**
DATE	**: 16 NOVEMBER 2015**
VENUE	**: DK 7, N24**

INSTRUCTIONS TO THE STUDENTS:

Answer all questions in the answer booklet.

NAME	
IC NO	
SECTION	
LECTURER	

(This question paper consist of 6 pages including this pages)

QUESTION 1 [7 Marks]

(i) Given 3 sets of integers. $A = \{1,3,5\}, B = \{4,6\}, C = \{0,2,7,9\}$. How many ways are there to choose one integer from set *A, B,* or *C?* (1 mark)

(ii) A Thai restaurant offers 5 fish dishes, 3 meat dishes, 3 vegetables dishes and 2 rice dishes for dinner service.

a) How many different dinner meals of 5 dishes are possible if any dish can be chosen only once? (1 mark)

b) How many different dinner meals are possible if each meal can consists of 1 fish dish, 1 meat dish, 1 vegetable dish and 1 rice dish. (1 mark)

c) How many different dinner meals are possible if each meal can consists of 2 fish dishes, 2 meat dishes and 1 vegetable dish but each dish can be chosen only once? (1 mark)

d) How many different dinner meals of four dishes are possible if the meal must consists only 1 fish dish, 1 meat dish, 1 vegetable dish and 1 rice dish or the meals can consists only 1 fish dish, 1 meat dish, and 2 different vegetable dishes? (3 marks)

QUESTION 2 [18 Marks]

(i) The university attire code provides guideline for top attire, bottom attire and footwear as shown in Table 1.

Table 1: University dress code

Dress Code	Male	Female
Top wear	(i) collared T-shirt (ii) long sleeved shirt (iii) neck tie (iv) national outfit (v) uniform shirt (vi) vest	(i) blouse (ii) long sleeve shirt (iii) collared T-shirt (iv) national outfit (v) uniform shirt (vi) vest
Bottom wear	(i) slacks (ii) track bottom (iii) national outfit (iv) uniform pants	(i) slacks (ii) track bottom (iii) national outfit (iv) uniform pants (v) long skirt
Foot wear	(i) leather shoes (ii) sports shoes (iii) sandals (iv) covered shoes	(i) leather shoes (ii) sports shoes (iii) sandals (iv) covered shoes
Head covering (Optional)	Religion wear	(i) square scarf (ii) shawl (iii) mini telekung

a) How many different complete attire (top wear, bottom wear, foot wear) can a female student wear with **or** without head covering? (4 marks)

b) How many different complete attire can a female student wear if they wear a top with a vest, together with bottom wear and foot wear? (2 marks)

c) How many different complete attire (top wear, bottom wear, foot wear) can a male student or a female student wear if male students have to wear slack and both female and male have to wear covered shoes on Monday? (5 marks)

(ii) A bracelet is made from 5 alphabet beads as shown in Figure 1.

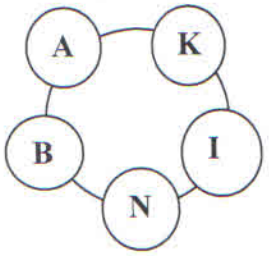

Figure 1

a) How many designs of the bracelet can be made from the 5 beads in any possible arrangement? (1 mark)

b) How many designs of the bracelet can be made if the bead with alphabet **A** and **N** should be side by side? (1 mark)

c) How many designs of the bracelet can be made if the bracelet should consists the sequence of beads **A**, **I**, **N** in any arrangement? (3 marks)

d) If the 5 beads are cut loose from the bracelet and rearranged in linear sequence, how many initials of 3 alphabet beads can be made? (2 marks)

QUESTION 3 [6 Marks]

(i) Mira is going to graduate from a computer science department in a university by the end of the semester. After being interviewed at two companies she likes, she assess that her probability of getting an offer from company A is 0.8, and her probability of getting an offer from company B is 0.6. If she believes that the probability that she will get offers from both companies is 0.5, what is the probability that she will get either from company A or company B (or both)? (2 marks)

(ii) It is common in many industrial areas to use filling machines to fill boxes full of product. However, these machines are not perfect, and indeed they may

A: fill to specification B: under fill C: overfill

Generally, the practice of under filling is that which one hopes to avoid. Let, $P(B) = 0.001$ while $P(A) = 0.990$. Assume that A, B and C are independent events.

a) Find $P(C)$ (1 mark)

b) What is the probability that the machine does not under fill? (1 mark)

c) What is the probability that the machine either overfills or under fills (or both)? (2 marks)

QUESTION 4 [10 Marks]

(i) The probability that a doctor correctly diagnose a particular illness is 0.7. Given that the doctor makes an incorrect diagnosis, the probability that the patient files a lawsuit is 0.9. What is the probability that the doctor makes an incorrect diagnosis and the patient sues? (3 marks)

(ii) The probability that a vehicle entering Johor Bahru has Singaporean licence plates is 0.12; the probability that it is a bus is 0.28; and the probability that it is a bus with Singaporean license plates is 0.09. What is the probability that,

a) a bus entering Johor Bahru has Singaporean license plates? (2 marks)

b) a vehicle with Singaporean license plates entering Johor Bahru is a bus? (2 marks)

c) a vehicle entering Johor Bahru does not have Singaporean license plates or not a bus? (3 marks)

Hint: $P(A' \cap B') = 1 - P(A \cup B)$

QUESTION 5 [9 Marks]

A paint-store chain produces and sells latex and semigloss paint. Based on long-range sales, the probability that a customer will purchase latex paint is 0.75. Of those that purchase latex paint, 60% purchase roller and 25% purchase paint tray. But only 30% of semigloss paint buyers purchase rollers and 5% purchase paint tray (see Table 2).

Table 2: Probability purchasing of paint with additional items

Paint type purchased	Additional item purchased with paint	
	Roller	Paint tray
Semigloss	0.30	0.05
Latex	0.60	0.25

(i) What is the probability that a person does not purchase a roller after he purchases a can of semigloss paint? (2 marks)

(ii) What is the probability that a person does not purchase a roller after he purchases a can of latex paint? (2 marks)

(iii) A buyer is randomly selected. What is the probability that the paint is latex, given that roller is purchased. (5 marks)

** End of Questions **
Good Luck!