

**CONFIDENTIAL**



**UNIVERSITI TEKNOLOGI MALAYSIA**

**TEST 2**

**SEMESTER I 2016/2017**

**SUBJECT CODE : SCSI 1013**  
**SUBJECT NAME : DISCRETE STRUCTURE**  
**YEAR/COURSE :**  
**TIME :**  
**DATE :**  
**VENUE :**

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**INSTRUCTIONS TO THE STUDENTS:**

Answer all questions in the answer booklet.

<b>NAME</b>	
<b>IC NO</b>	
<b>SECTION</b>	
<b>LECTURER</b>	

(This question paper consist of 4 pages including this page)

**QUESTION 1****[10 MARKS]**

- (a) A computer access password consists of from three to five letters chosen from the 26 in the alphabet with repetitions allowed. How many different passwords are possible?  
(2 marks)
- (b) Suppose there are three roads from city A to city B and five roads from city B to C.
- (i) How many ways is it possible to travel from city A to C via city B? (2 marks)
- (ii) How many different round-trip routes are there from city A to B to C to B and back to A?  
(3 marks)
- (iii) How many different routes are there from city A to B to C to B and back to A in which no road is traversed twice?  
(3 marks)

**QUESTION 2****[15 MARKS]**

- (a) There are six students from SCSJ, eight from SCSR and 7 from SCSV in a programming club. Find the number of orders in which the six students from this club can win the first six prizes if all students attend the competition and the winners are
- (i) all members of SCSJ (2 marks)
- (ii) all members of SCSR (2 marks)
- (iii) all members of SCSV (2 marks)
- (iv) all members of the same course. (1 mark)
- (b) A father with five children – Nabilah, Syahmi, Hazirah, Haris and Basyir, takes his three children at a time to the zoological garden, as often as he can without taking the same three children together more than once. Find the number of times
- (i) the father will go to the zoological garden. (2 marks)
- (ii) each child will go to the zoological garden. (2 marks)
- (iii) Hazirah will not go to the zoological garden. (1 mark)

- (c) There are two round tables with seating capacities of five for table 1 and four people for table 2. Nine people are considered to be seated around those two tables.
- (i) In how many ways people can be selected to seat around table 1? (½ mark)
  - (ii) In how many ways people can be arranged around table 1? (1 mark)
  - (iii) In how many ways people can be arranged around table 2? (1 mark)
  - (iv) In how many ways can nine people be seated around the two tables? (½ mark)

### QUESTION 3

[10 MARKS]

- (a) Let  $A$  and  $B$  are events in sample space  $S$  and  $|S| = 11$ . Given  $A$ , set of odd number =  $\{3,5,9\}$  and  $B$ , set of prime number =  $\{3,5,7,11\}$
- (i) What is  $P(A)$ . (1 mark)
  - (ii) What is probability of odd or prime number. (2 marks)
  - (iii) What is probability of  $P(B')$ . (1 mark)
- (b) A bag contains 3 red balls and 3 blue balls. Each red ball is valued as 4 and blue ball as 2.
- (i) What is probability of getting 4 balls with the total value is 10? (2 marks)
  - (ii) What is probability of getting total value of 6 with at most 3 balls? (4 marks)

### QUESTION 4

[5 MARKS]

Paediatric department researcher examines the medical records of toddlers that came to a particular paediatric clinic. He found that 20% of them came for flu treatment and 10% of mothers of the toddler that having flu are also having flu. 30% of the mothers that came to the clinic are found having flu.

- (a) What is the probability of the toddler having flu given that the mother having flu. (2 marks)
- ~~(b) What if the probability of the toddler having flu given that the mother is not having flu. (3 marks)~~

**Above question is cancelled.**

**QUESTION 5****[10 MARKS]**

In Apple County, 51% of the adults are males. One adult is randomly selected for a survey involving credit card usage.

- (a) Find the probability that the selected person is female. (2 marks)
- (b) It is later learned that the selected survey subject was from a rural area. Also, 9.5% of males from a rural area, whereas 1.7% of female from a rural area.
- (i) What is the probability of getting someone who is from a rural area, given that the person is a male? (1 mark)
- (ii) What is the probability that the selected subject is a male, given that he comes from a rural area? (4 marks)
- (iii) If the Apple County has 100,000 adult populations, find the number of females that come from an urban area. (3 marks)

**Hint:** Use the following notations

$M$  = Male;  $\bar{M}$  = female;  $R$  = from rural area;  $\bar{R}$  = from an urban area

**\*\* End of Questions \*\***  
**Good Luck!**