UNIVERSITI TEKNOLOGI MARA
TEST

COURSE	**:**	**INTRODUCTION TO STATISTICS AND PROBABILITY**
COURSE CODE	**:**	**STA116**
DATE	**:**	**4 DEC 2022**
TIME	**:**	**1 HOUR 30 MINUTES**

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of **five (5) questions**
2. Answer ALL questions
3. Do not bring any material into the examination room unless the invigilator gives you permission to do so.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

This Exam Paper consists of 4 printed pages

Answer **ALL** questions.

QUESTION 1

A group of researchers is doing a survey about the demographic factors that influence the acceptance of covid-19 vaccine booster dose among local government staffs in town A. There are 2000 staffs and a sample of 200 will be chosen as respondents.

a) What is the sampling frame for the survey?

(1 mark)

b) Give two qualitative variables, one discrete quantitative variable and one continuous quantitative variable which are related to the survey.

(4 marks)

c) Identify one possible probability sampling technique to choose the 200 staffs as sample. State one advantage of the technique.

(2 marks)

d) Explain how to select the sample using the sampling technique chosen in c).

(3 marks)

QUESTION 2

a) The temperatures (in Celsius) were recorded in 40 randomly selected areas in east and west Malaysia on December 2020. The stem-and-leaf plot below shows its distribution.

Stem	Leaf
1	9
2	0 2 3 3 4 7 7 9 9 9
3	0 0 0 1 1 2 4 4 5 5 6 6 6 6 6 6 7 8 8
4	0 0 0 1 1 1 2 2 3 3

i) With reference to this table, find the mean, the median and the mode.

(4 marks)

ii) Determine the shape of distribution by comparing the three numerical measures in (i).

(1 mark)

b) A sample of 50 private hospitals in the northern region reveals the frequency distribution of daily costs (in RM hundreds) for double-occupancy hospital rooms.

Cost per day (RM'00)	Number of hospitals
1 and less than 2	1
2 and less than 3	9
3 and less than 4	20
4 and less than 5	12
5 and less than 6	5
6 and less than 7	3

i) Construct a 'less than' ogive for the above data.

(3 marks)

ii) Based on the ogive, how many hospitals where the cost of a hospital room is at least RM500?

(2 marks)

QUESTION 3

a) A number between 2000 and 3500 is formed using the digits 1, 2, 3 and 4, and no digit can be repeated.

i) How many ways the number can be formed?

(2 marks)

ii) If the number must be end by digit 1, find how many ways the number can be formed?

(2 marks)

b) An auto dealer has just received a shipment of 20 new cars which contain 15 sedans and 5 hatchbacks.

i) If two cars are sold at random, what is the probability that the two cars sold will be the same model?

(3 marks)

ii) If four cars are sold random, how ways that at least three cars sold will be sedan model?

(3 marks)

QUESTION 4

A shipment of grapefruit arrived containing the following proportions of types: 10% pink seedless, 20% white seedless, 30% pink with seeds, 40% white with seeds. A grapefruit is selected at random from the shipment.

a) Find the probability that

i) it is seedless (L).

(1 marks)

ii) it is pink (K), given that it is seedless (L).

(3 marks)

iii) it is pink (K) or seedless (L).

(3 marks)

b) Are the events L and K disjoint? Are they independent?

(3 marks)

QUESTION 5

A detergent company is planning to introduce a new dish-washing detergent into the market. In the past, 35% of the products introduced by the company have been successful and 65% of the products have not been successful. Before the product is actually marketed, market research is conducted and a report (favorable or unfavorable) must be prepared. In the past, 75% of the successful products received favorable reports and 25% of the unsuccessful products also received favorable reports.

a) Draw a tree diagram that summarizes this information.

(3 marks)

b) Calculate the probability that a randomly selected product, it will be succeed and received unfavorable reports.

(2 marks)

c) What is the probability that a randomly selected product will receive a favorable report?

(2 marks)

d) If the dish-washing detergent receives a favorable marketing report, what is the probability that it will indeed be successful?

(3 marks)

END OF QUESTION PAPER