DIPLOMA IN INFORMATION TECHNOLOGY

ASSIGNMENT

Subject: **PROBABILITY AND STATISTICS**
Subject code: **DIT 1213**
Due Date: **7 OCTOBER 2021**

INSTRUCTIONS TO CANDIDATES

- This assignment will contribute 30% to your final grade.
- This is an **individual assignment** to be submitted in class on the due date mentioned above.

SLO-Assessments/Questions Mapping Table

No.	Subject Learning Outcomes	Assessments / Questions
1	Compute probabilities of interest with different types of distribution.	Q2, Q3, Q7
2	Apply probability and statistics to quantify uncertainty.	Q1
3	Select a suitable model for phenomenon containing uncertainty and use it in decision making.	Q4, Q5, Q6

QUESTION 1 (9 marks)

The stem-and-leaf diagram below shows the Statistics test results of 50 students.

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

Determine

(a) the range of the data. (2 marks)

(b) the median of the data. (2 marks)

(c) the interquartile range of the data. (5 marks)

QUESTION 2 (9 marks)

A ferry sails once each day from Port Moresby to Port Botany. The ferry departs from Port Moresby on time or late but never early. However, the ferry can arrive at Port Botany early, on time or late.

(a) The probabilities for some combined events of departing from Port Moresby and arriving at Port Botany are shown in the table below. Complete it. (3 marks)

		Arrive at Port Botany			
		Early	**On time**	**Late**	**Total**
Depart from Port Moresby	**On time**	0.16	0.56	0.08	
	Late				
	Total	0.22	0.65		1.00

(b) Find the probability that, on a particular day, the ferry:

(i) arrive late, given that it departed late. (3 marks)

(ii) Does not arrive late, given that it departed on time. (3 marks)

QUESTION 3 (8 marks)

Answer the following questions.

(a) There are 1 purple cube, 2 blue cubes, 3 red cubes, 4 orange cubes, 1 green cube and 2 yellow cubes. Calculate the number of possible arrangements when all the cubes are arranged in a straight line. (3 marks)

(b) In a toy fair, you win the chance of choosing 3 out of 50 different models of Iron Man action figures. What is the number of possible selections? (2 marks)

(c) All the letters in the word PALLADIUM are randomly arranged in a line. How many of the arrangements are with two L's together at the end of the arrangement? (3 marks)

QUESTION 4 (12 marks)

A discrete random variable Y has a **cumulative** probability distribution as shown below.

$Y = y$	0	1	2	3
$P(Y \leq y)$	$5k$	$10k$	$11k$	$12k$

(a) Determine the value of k. (2 marks)

(b) Calculate expected value of Y. (5 marks)

(c) Calculate variance and standard deviation of Y. (5 marks)

QUESTION 5 (5 marks)

In Malaysia, 22% of families own a dishwasher. Find the probability that, of 15 families chosen at random from Malaysia, between 4 and 6 inclusive own a dishwasher.

(5 marks)

QUESTION 6 (6 marks)

The average number of motorcycles which stop at a petrol station is 5.2 per hour. By assuming that the number of motorcycles which stop at the petrol station follows a Poisson distribution, find the probability that

(a) 10 motorcycles stop at the petrol station in an interval of 60 minutes. (2 marks)

(b) more than 3 motorcycles stop at the petrol station in an interval of 10 minutes. (4 marks)

QUESTION 7 (11 marks)

The monthly saving of 500 students is normally distributed with mean RM 200 and standard deviation RM 150.

(a) Find the number of students has saving between RM 180 and RM 281 a month. (6 marks)

(b) Determine the value of x given that 85% of the students have saving more than RM x a month. (5 marks)

END OF QUESTION PAPER