BAMS1613 PROBABILITY AND STATISTICS
ASSIGNMENT
SEMESTER 1, ACADEMIC YEAR 2023/24

Answer all questions.

Question 1

A restaurant manager wishes to assess the waiting time of a customer being served during weekend. The following frequency distribution shows the waiting times of a sample of 130 customers.

Waiting time (minutes)	Number of customers
Less than 20	16
20 − <24	19
24 − <28	25
28 − <32	35
32 − <40	18
40 − <48	9
48 or more	8

a) Compute the standard deviation. (5 marks)

b) Compute the first quartile and the third quartile. (7 marks)

c) Compute the mode. (3 marks)

Question 2

A hospital obtains 38% of vials of flu vaccines from Company X, 45% from Company Y, and 17% from Company Z. From past experience, it is known that 3% of vials of flu vaccines from Company X are ineffective, 1.2% from Y are ineffective, and 4.3% from Z are ineffective.

a) Suppose a vial of flu vaccine is selected at random, find the probability it is ineffective. (3 marks)

b) Suppose a randomly selected vial of flu vaccine is ineffective, find the probability that it is from Company Z. (2 marks)

Question 3

It is known that 8.2% of the refrigerators sold by a manufacturer will require repair work under the product's warranty period.

a) If the manufacturer has sold 12 refrigerators this week, find the probability that at least three refrigerators will require repair work under the product's warranty period. (3 marks)

Question 3 (Continued)

b) Suppose that the manufacturer has sold 75 refrigerators this week. By using a suitable approximation, find the probability that at least 13 refrigerators will require repair work under the product's warranty period. (4 marks)

Question 4

The weights of food packages produced by a manufacturer are normally distributed with a mean of 320 g and a standard deviation of 25 g.

a) Find the probability that a randomly selected food package from the production line will have weight between 324 g and 332 g. (3 marks)

b) 4.2% of the food packages produced are rejected as they are found to be under weight. Find the minimum acceptable weight for the food packages produced. (3 marks)

c) A sample of 40 food packages is chosen at random from the production line. Find the probability that the sample mean weight is less than 315 g. (3 marks)

Question 5

An insurance company pays out an average of 3.5 medical claims in a week. Find the probability that the insurance company pays out at most 3 medical claims in a period of two-week. (4 marks)

Question 6

A random sample of 60 cardholder accounts indicated a sample mean debt of RM925 and a sample standard deviation of RM38. Find and interpret a 96% confidence interval of the average debt of all cardholders. (5 marks)

Question 7

A sample of 120 cups of tea from a machine is collected, and the amount of tea in each cup is measured. Suppose that 27 cups contain less than the amount of tea specified on the machine. Construct a 92% confidence interval of the proportion of all cups that dispensed less than the specified amount of tea. (5 marks)