UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
(ONLINE)
SEMESTER II
SESSION 2019/2020

COURSE NAME	:	STATISTICS
COURSE CODE	:	BIC 10603
PROGRAMME CODE	:	BIS /BIP /BIW /BIM
EXAMINATION DATE	:	JULY 2020
DURATION	:	3 HOURS
INSTRUCTION	:	1. ANSWER **ALL** QUESTIONS. 2. THE STUDENTS SHOULD UPLOAD THE ANSWER BOOKLET (PDF/ WORD FORMAT) WITHIN 30 MINUTES AFTER EXAMINATION PERIOD.

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

Q1 (a) During any eight-hour shift, the proportion of time, X and the density function of a sheet- metal stamping machine being down for maintenance or repairs is given as follows:

$$f(x) = \begin{cases} 2(1-x), & 0 \leq x \leq 1 \\ 0, & elsewhere \end{cases}$$

The cost (in hundreds of P) of this downtime, due to lost production and cost of maintenance and repair, is given by $C - 10 + 20X + 4X^2$. Find the mean and variance of C.

(6 marks)

(b) During peak hours, the arrival of customers at a fast food restaurant is random with an average rate of 90 customers per hour.

(i) Calculate the probability that exactly two customers will arrive at the restaurant within a specified one-minute during peak hours.

(4 marks)

(ii) Calculate the probability that at least for customers will arrive within a specified two-minute period during peak hours.

(4 marks)

Q2 (a) A random sample of 50 cars was taken from the population of 5000. The average commuting time for the population is 45 minutes with standard deviation of 15 minutes.

(i) Determine the probability that the sample mean is within 5 minutes from the population mean.

(6 marks)

(ii) Determine the probability in **Q2(a)(i)** by using the sample size of 200.

(6 marks)

(b) The height of adult females are normally distributed with mean 160 cm and standard deviation 8 cm. Any adult female whose height is greater than 170 cm is defined as tall. An adult female is chosen at random. Given that she is tall, find the probability that she has height greater than 180 cm.

(4 marks)

Q3 The mean yield of a chemical process is being research by an engineer. From previous experience with this process the standard deviation of yield is known to be 3. He would like to be 99% confident that the estimate point should be accurate within yield point with the value of one.

(a) Determine the error and the sample size for this research.

(5 marks)

(b) Suppose that an engineer reduced the sample size to 20. If it was found that the sample mean is 10 and a standard deviation of 1.6, find a 99% confidence interval for the mean yield.

(5 marks)

Q4 A test of the hypothesis that eating Supplement A makes one stronger where the reading will be greater than 100 is done. A random sample of 12 persons take Supplement A for two years and then are given a fitness test. Here are the results:

116	111	101	120	99	94	106	115	107	101	110	92

(a) Write the hypothesis for the given scenario.

(2 marks)

(b) Test the hypothesis using a 0.05 significance level.

(9 marks)

Q5 **Table Q5** represents the years of experience X and salary Y (in thousand dollars) of a random sample of professional engineers.

Table Q5

X	13	17	9	18	16	18	13	16
Y	21.6	25.8	15.9	48.3	38.2	56.4	28.4	43.3

(a) Calculate sample mean, sample variances and sample covariance.

(5 marks)

(b) Compute the coefficient of correlation.

(3 marks)

(c) Is it sufficient evidence to indicate that there is linear correlation between the years of experience and salary?

(2 marks)

(d) Write the equation for estimated regression line.

(4 marks)

-END OF QUESTIONS-