Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022

COURSE NAME	: STATISTICS I
COURSE CODE	: DAS 10503
PROGRAMME CODE	: DAU
EXAMINATION DATE	: JULY 2022
DURATION	: 3 HOURS
INSTRUCTION	: 1. ANSWERS **ALL** QUESTIONS.
	2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK**.
	3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

Q1 A general manager wants to determine how sales are influenced by capital and salary spending by companies. He proceeds randomly select 26 large companies and record the information (in RM millions). Based on the Excel output of the multiple linear regression analysis as shown in **Figure Q1**.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.830
R Square	0.689
Adjusted R Square	0.662
Standard Error	17501.643
Observations	26

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	**a**	15579777040	7789888520	**d**	0.0001
Residual	**b**	7045072780	**c**		
Total	25	22624849820			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	15800	6038.2999	2.617	0.0154
Capital	0.1245	0.2045	0.609	0.5485
Salary	7.0762	1.4729	4.804	0.0001

Figure Q1: Summary output

(a) Identify the dependent and independent variables.

(3 marks)

(b) Interpret the value of Multiple R and R square.

(4 marks)

(c) Write the multiple regression equation.

(1 mark)

(d) Interpret each regression coefficient stated in **Q1(c).**

(2 marks)

(e) Complete the ANOVA table.

(6 marks)

(f) Test the significance of regression at $\alpha = 0.01$.

(4 marks)

Q2 A psychologist did a research about tension level and life satisfaction. Ten participants are chosen and they have to measure on how tension they were (scale 1 to 30) and how satisfied they felt with their lives (measure 1 to 10 scale). **Table Q2** indicates the participants scores.

Table Q2: Participant score on tension level and life satisfaction

Participant	Tension level	Life satisfaction
1	11	7
2	25	1
3	19	4
4	7	9
5	23	2
6	6	8
7	11	8
8	22	3
9	25	3
10	10	6

(a) Identify the dependent and independent variables.

(2 marks)

(b) Sketch a scatter diagram and give a comment.

(3 marks)

(c) Calculate the correlation between tension level and life satisfaction by using

(i) Pearson product moment correlation coefficient.

(6 marks)

(ii) Spearman's rank correlation coefficient.

(7 marks)

(iii) Interpret the correlation value that get from **Q2 (c)(i)** and **Q2 (c)(ii).**

(2 marks)

Q3 Top Glove Sdn Bhd is a manufacturing company producing oil gaskets for automobile and small tractor engine. The factory is located in Johor Bahru. Presently the company employs 1000 employees. Four hundred of them are locals and have been working with the company since it started its operation in 2005. The rest of them are foreign workers from Bangladesh and Indonesia. Recently the management had been getting informal information that the employees are dissatisfied with the new policy that has been implemented last month and this situation seems to be affecting their productivity. The general manager requested a survey research to be conducted. Among the issues of concern is how much job satisfaction has been affected by the new policy. Other related factors include age, length of service, gender, opportunity for advancement and origin (local or immigrant). The sample size for this survey is 100. Based on the given information;

(a) Identify the target population and sample. Briefly explain how the sampling frame is acquired.

(4 marks)

(b) State the problem statement of the study.

(3 marks)

(c) State **three (3)** objectives of the study.

(3 marks)

(d) Describe a suitable research design for this study and the purpose.

(4 marks)

(e) Identify the dependent and independent variables in this study.

(4 marks)

(f) State **two (2)** suitable hypotheses for this study.

(2 marks)

Q4 A personnel manager is interested in determining the time taken by his employees to travel from home to work each day. A random sample of 100 employees is chosen and their travelling time (in minutes) is shown in **Table Q4**.

Table Q4 : Frequency of travelling time

Travelling time (in minutes)	Frequency
0 and less than 10	9
10 and less than 20	16
20 and less than 30	26
30 and less than 40	23
40 and less than 50	14
50 and less than 60	12

(a) Draw a less than ogive and from the ogive, estimate the median.

(5 marks)

(b) From the ogive, determine the number of employees whose travelling time is more than 35 minutes.

(2 marks)

(c) Calculate the mean travelling time and give a comment on the calculated value.

(3 marks)

(d) Calculate the standard deviation.

(5 marks)

(e) Calculate the Pearson's measure of skewness. Hence, determine the shape of the distribution.

(5 marks)

Q5 (a) State **one (1)** difference between descriptive statistics and inferential statistics by giving appropriate example.

(2 marks)

(b) Explain the two sources of data and give **one (1)** example for each source.

(6 marks)

(c) The faculty of accountancy wants to study the accountancy student's economic status. This includes finding out information such as parents occupation, the amount of money received monthly from their parents and the amount they spend last semester. A total of 400 students enrolled last semester and their names are alphabetically ordered. A sample of 50 students will be chosen and interviewed on campus.

(i) State the population of study.

(1 mark)

(ii) Identify the variable of interest.

(3 marks)

(iii) State the type of each variable.

(5 marks)

(iv) State the data collection method that has been used and give **one (1)** advantage and **one (1)** disadvantage of this method.

(3 marks)

- END OF QUESTIONS –

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Formula

$k = 1 + 3.3 \log n$

$\bar{x} = \frac{\sum x}{n}$ $\bar{x} = \frac{\sum fx}{\sum f}$

$M = L_M + C\left(\frac{\frac{n}{2} - F}{f_M}\right)$

$M_0 = L + C\left(\frac{d_b}{d_b + d_a}\right)$

$Q_1 = L_{Q1} + C\left(\frac{\frac{n}{4} - \sum f_{Q_1 - 1}}{f_{Q_1}}\right)$

$Q_3 = L_{Q3} + C\left(\frac{\frac{3n}{4} - \sum f_{Q_3 - 1}}{f_{Q_3}}\right)$

$P_k = L_{Pk} + C\left(\frac{\frac{kn}{100} - \sum f_{P_k - 1}}{f_{P_k}}\right)$

$Mean\ deviation = \frac{\sum |x_i - \bar{x}|}{n}$ $Mean\ deviation = \frac{\sum f|x - \bar{x}|}{n}$

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$$s^2 = \frac{1}{n-1}\left[\sum x^2 - \frac{(\sum x)^2}{n}\right] \qquad s^2 = \frac{1}{n-1}\left[\sum fx^2 - \frac{(\sum fx)^2}{n}\right]$$

$$r = \frac{mean - mode}{standard\ deviation}$$

$$r = \frac{\sum xy - \frac{\sum x \sum y}{n}}{\sqrt{\left[\sum x^2 - \frac{(\sum x)^2}{n}\right]\left[\sum y^2 - \frac{(\sum y)^2}{n}\right]}}$$

$$r_s = 1 - \frac{6\sum d^2}{n(n^2-1)}$$

$$b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2} \qquad b = (X'X)^{-1}X'y$$

$$a = \bar{y} - b\bar{x}$$

$$\sum y = nb_0 + b_1 \sum x_1 + b_2 \sum x_2$$
$$\sum x_1 y = b_0 \sum x_1 + b_1 \sum {x_1}^2 + b_2 \sum x_1 x_2$$
$$\sum x_2 y = b_0 \sum x_2 + b_1 \sum x_1 x_2 + b_2 \sum {x_2}^2$$

$$R^2 = \frac{SSR}{SST}$$