UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2018/2019

COURSE NAME	:	DATA ANALYSIS
COURSE CODE	:	BWA 21003
PROGRAMME CODE	:	BWA
EXAMINATION DATE	:	JUNE / JULY 2019
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

Q1 (a) Explain the role of Cronbach alpha in a questionnaire development.

(2 marks)

(b) Define and give an example on
(i) anecdotal evidence
(ii) lurking variable

(6 marks)

(c) List four assumptions that are compulsory to follow in order to get a valid result of a Chi Square goodness of fit test.

(4 marks)

Q2 A cereal manufacturer wants to determine whether the box filling process is on target. The data was collected and the analysis was conducted. The result is obtained as in **Output 1**.

(a) Based on Minitab output, write the appropriate hypothesis testing, and draw your conclusion.

(5 marks)

(b) Briefly explain the pattern of probability plot.

(2 marks)

(c) Conduct a normality test and draw a conclusion.

(5 marks)

Q3 (a) A doctor believes that the proportions of births in Johor on each day of the week are equal. A simple random sample of 700 births from a recent year is selected, and the result is shown in **Table Q3(a)**. At a significance level of 0.01, is there enough evidence to support the doctor's claim?

(8 marks)

(b) The operation manager of tires manufacturing company conducts an investigation about the quality of tires. She randomly selects 496 tires and carefully inspects them. Each tire is either classified as perfect, satisfactorily, or defective, and the three daily shifts that the tires were produced, is also recorded. The two-way contingency table of two categorical variables of interest are: shift and condition of the tire produced is shown in **Table Q3(b)**. By using 0.05 significance level,

(i) determine if there is an association between quality of workmanship and the daily shift.

(10 marks)

(ii) determine whether the quality of workmanship distributed equally among the daily shifts.

(7 marks)

Q4 The manager of a company wishes to determine the important factors in predicting current salary of the company's employees. A statistical analysis was carried out on information obtained from 474 employees. The variables of interest are listed below.

Y = current salary (RM'000)
X_1 = beginning salary (RM'000)
X_2 = previous work experience (in months)
$X_3 = \begin{cases} 1 & \text{if female} \\ 0 & \text{if male} \end{cases}$

The results of the statistical analysis are shown in **Output 2**.

(a) Is it true that on the average, male employees earn more than female employees? If yes, by how much? Test by using the 5% level of significance.

(6 marks)

(b) Interpret the meaning of each of the estimated regression coefficients.

(6 marks)

(c) Estimate the mean current salary of a female employee with the following details:
Beginning Salary = RM 1040.00
Previous Work Experience = 12 months.

(4 marks)

Q5 An experiment was conducted to determine if any significant differences exist in the strength of parachutes woven from synthetic fibers from the different suppliers. The strength of parachutes is measured by placing them in a testing device that pulls on both ends of a parachute until it tears apart. The amount of force required to tear the parachute is measured on a tensile-strength scale where the larger the value the stronger the parachute. The results of this experiment (in terms of tensile strength) are displayed in **Table Q5**.

(a) Conduct a test whether the mean tensile strength is equal among four suppliers. Use $\alpha = 5\%$.

(17 marks)

(b) Determine which suppliers differ in mean tensile strength. Justify your answer.

(9 marks)

(c) Is there any evidence of a difference in the variation in tensile strength among the four suppliers? Refer to **Output 3** for the SPSS results. Use 0.05 significance level.

(5 marks)

(d) Which supplier(s) should you choose and which supplier(s) should you avoid? Explain.

(4 marks)

– **END OF QUESTIONS** –

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Output 1

Descriptive Statistics: Weight

Variable	N	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Weight	10	87.835	0.395	1.249	85.985	86.781	87.768	89.106	89.579

One-Sample T: Weight

Test of μ = 88 vs < 88

Variable	N	Mean	StDev	SE Mean	T	P
BoxWeight	10	87.835	1.249	0.395	-0.42	0.343

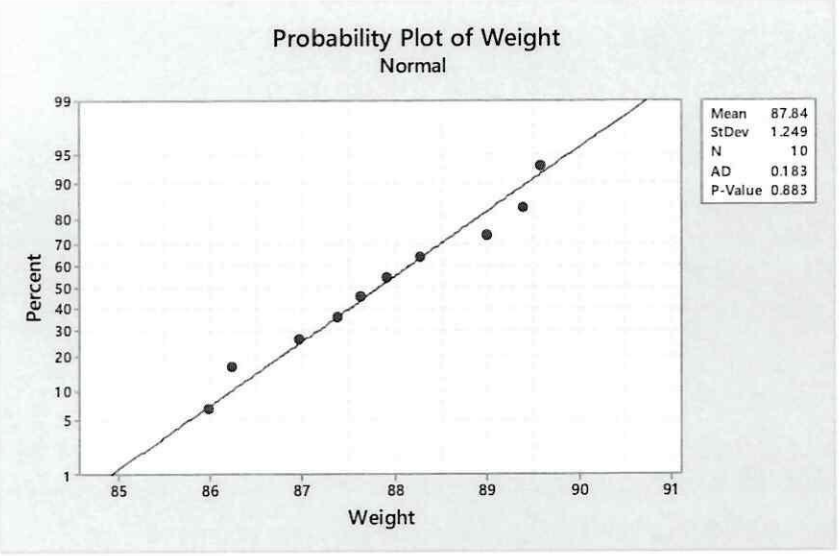

Table Q3(a)

Day	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Frequency	65	103	114	116	115	112	75

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Table Q3(b)

	Perfect	Satisfactory	Defective
Shift 1	102	118	11
Shift 2	65	82	6
Shift 3	33	50	29

Output 2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.894[a]	0.799	0.798	7671.590

[a] Predictors : (Constant), Gender, Previous Experience (Months), Beginning Salary

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.10+E11	3	3.675+E10	624.465	0.000[a]
	Residual	2.77+E10	470	58853291.39		
	Total	1.38+E11	473			

[a] Predictors: (Constant), Gender, Previous Experience (Months), Beginning Salary

[b] Dependent Variable : Current Salary

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		β	Std. Error	Beta		
1	(Constant)	6886.189	1203.343		5.723	0.000
	Beginning Salary	1.837	0.050	0.847	36.442	0.000
	Previous Experience	-24.622	3.422	0.150	-7.167	0.000
	Gender	-3014.517	805.979	-0.088	-3.740	0.000

[a] Dependent Variable : Current Salary

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Table Q5

Supplier 1	Supplier 2	Supplier 3	Supplier 4
18.5	26.3	20.6	25.4
24.0	25.3	25.2	19.9
17.2	24.0	20.8	22.6
19.9	21.2	24.7	17.5
18.0	24.5	22.9	20.4

Output 3

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Column 1	5	8.7	1.74	4.753
Column 2	5	6.4	1.28	1.707
Column 3	5	8.5	1.7	0.945
Column 4	5	10.6	2.12	4.007

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.77	3	0.59	0.2068	0.890189	3.238872
Within Groups	45.648	16	2.853			
Total	47.418	19				