UNIVERSITI TEKNOLOGI MARA
FINAL ASSESSMENT

COURSE	:	**STATISTICS FOR BUSINESS AND SOCIAL SCIENCES**
COURSE CODE	:	**STA404**
EXAMINATION	:	**14 FEBRUARY 2022**
TIME	:	**2 HOURS (1445 – 1645)**

SUGGESTED ANSWER SCHEME

INFORMATION FOR LECTURERS

FULL MARKS (FINAL ASSESSMENT)	60
WEIGHTED	40%

NOTE TO ALL EXAMINERS:

This suggested answer scheme illustrated suggested marks for each of the question. If the syndicated marking implementing by the examiners, please ensure the marks consistently given to the candidates.

© Hak Cipta Universiti Teknologi MARA

TOPIC	Cognitive Level	Question	Part	CLO (PLO)	Answer	Mark (s)
TOPIC 4: HYPOTHESIS TESTING (ANOVA)	C1	1	a	1 (1)	• Response variable must be normally distributed • (Or approximately normally distributed). • Samples are independent. • Variances of populations are equal. ANY TWO (2)	2
	C3		b		**P**=2865.271 **Q**= 2 **R**= 806.886 **S**= 3.379	4
	C4		c		Hypothesis Statement: $H_0 : \mu_1 = \mu_2 = \mu_3$; where 1=TA, 2=TB and 3=TC H_1: at least 2 means are differ	1
					Decision Rule: Reject H_0 if p-value ≤ α=0.05	1
					Decision: Since p-value=0.069 > α=0.05, hence Reject H_0	1
					Conclusion: The mean internet usage bills among university students are equal between three different telecommunication providers.	1

© Hak Cipta Universiti Teknologi MARA

TOPIC	Cognitive Level	Question	Part	CLO (PLO)	Answer	Mark (s)
TOPIC 5 : CORRELATION AND REGRESSION	C4	2	a	1 (1)	$\sum X = 47.5 \qquad \sum Y = 712$ $\sum X^2 = 204.25 \qquad \sum Y^2 = 45588$ $\sum XY = 3045.5 \qquad n = 12$ $r = \frac{3045.5 - \frac{(47.5)(712)}{12}}{\sqrt{\left[(204.25) - \frac{(47.5)^2}{12}\right]\left[(45588) - \frac{(712)^2}{12}\right]}}$ $= 0.975$	4
	C1		b		There is very strong positive relationship between age and mileage of the cars.	1
	C2		c		r^2=0.951 @ 95.1%.	1
	C1				95.1% of variation in mileage of the cars is explained by age of the cars, and the rest 4.9% is explained by other factors.	1
	C2		d		y=3.927+13.997x ; y= mileage and x= age	1
	C1		e		slope=13.997. For every 1-year increase in age of the car, the mileage of the car will increase by 13,997km.	1
	C2		f		$\hat{y} = 3.927 + 13.997(4.3) = 64.114('000\text{km})$	1

© Hak Cipta Universiti Teknologi MARA

TOPIC	Cognitive Level	Question	Part	CLO (PLO)	Answer	Mark (s)
TOPIC 1: INTRODUCTION TO STATTSITICS	C2	3	a	1 (1)	Population: All employees in the banking sector in Town A. Sampling frame: A list name of all employees in the banking sector in Town A.	2
	C2		b		Gender: Qualitative Length of service: Quantitative Continuous Type of welfare facilities: Qualitative Satisfaction towards welfare services provided by the employer: Qualitative ANY TWO (2)	2
	C2		c		Cluster sampling	1
	C1		d		Internet survey (Google form)/Electronic questionnaire	1
					Fast and short in time span to complete the questionnaire, cheaper. Any relevant answers.	1

	Cognitive Level	Question	Part	CLO (PLO)	Answer	Mark (s)
TOPIC 3: ESTIMATION	C3	4	a	1 (1)	$T = \frac{1.0551}{\sqrt{35}} = 0.1783$	2
	C4		b		$3.446 \pm Z_{\frac{0.05}{2}}(0.1783)$ $= 3.446 \pm (1.96)(0.1783)$ $= (3.0965, 3.7955)$	3
	C2		c		Yes, because 3.2 years is contained within the 95% confidence interval.	2

© Hak Cipta Universiti Teknologi MARA

TOPIC	Cognitive Level	Question	Part	CLO (PLO)	Answer	Mark (s)
TOPIC 4: HYPOTHESIS TESTING (TWO POPULATIONS MEAN – DEPENDENT SAMPLES)	C2	5	a	1 (1)	The data above used paired sampled test because the observations are on the same subjects or employees.	1
	C4		b		$T = \frac{2.7}{1.17426} = 2.299$(Shown)	3
	C4		c		Hypothesis Statement: H_0: $\mu_{AFTER} - \mu_{BEFORE} = 0$ (The average difference of customers between after and before attending the workshop are equal) H_1: $\mu_{AFTER} - \mu_{BEFORE} > 0$ (The average difference of customers after attending the workshop is greater than before attending the workshop)	1
					α=0.10	
					Test-statistic: t=2.299	
					Critical value: $t_{0.01,10-1} = t_{0.01,9} = 1.383$	1
					Decision: Reject H_0 if $t > t_{\alpha,\nu}$ Since t=2.299 > $t_{0.01,9} = 1.383$, hence Reject H_0.	1
					Conclusion: In other words, insurance manager can conclude that the workshop has increased the number of customers.	1

© Hak Cipta Universiti Teknologi MARA

TOPIC	Cognitive Level	Question	Part	CLO (PLO)	Answer	Mark (s)
TOPIC 2: DESCRIPTIVE STATISTICS	C3	6	a	1	$\bar{x} = \frac{1400}{16} = 87.5$	2
					$s = \sqrt{\frac{130564 - \frac{(1400)^2}{16}}{16-1}} = 23.1862$	2
	C3		b		$CV_{JAN} = \frac{23.1862}{87.5} x100 = 26.50\%$ $CV_{MAY} = \frac{19.637}{94.81} x100 = 20.71\%$ $CV_{JUL} = \frac{20.561}{91.42} x100 = 22.49\%$	3
	C2				Therefore, the number of cars sold in May is most consistent.	1

© Hak Cipta Universiti Teknologi MARA

TOPIC	Cognitive Level	Question	Part	CLO (PLO)	Answer	Mark (s)
TOPIC 4 : HYPOTHESIS TESTING (CHI SQUARE TEST OF INDEPENDENCE)	C1	7	a	1 (1)	The main purpose of using chi-square test of independence is to explore the association of two categorical variables.	1
	C3		b		A=50-28-5=17	2
	C5				$\chi^2 = \frac{(22-25)^2}{25} + \frac{(10-8)^2}{8} + \frac{(18-17)^2}{25} + \frac{(28-25)^2}{25} + \frac{(6-8)^2}{8} + \frac{(16-17)^2}{25} = 0.36 + 0.5 + 0.0588 + 0.36 + 0.5 + 0.0588 = 1.838$ B=1.838	3
	C4		c		H_0: There is no association between education level and place of residence H_1: There is association between education level and place of residence	1
					Critical Value: $\chi^2_{0.05,2} = 5.991$	1
					$\chi^2 = 1.838$	
					Decision: Reject H_o if $\chi^2 > \chi^2_\alpha$ Since $\chi^2 < 5.991$, we do not have enough evidence to reject H_o	1
					Conclusion: There is no association between education level and place of residence	1

END OF SUGGESTED ANSWER SCHEME

© Hak Cipta Universiti Teknologi MARA