



**UNIVERSITI TEKNOLOGI MARA
ASSESSMENT 1**

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| COURSE | : | STATISTICS FOR BUSINESS AND SOCIAL SCIENCES |
| COURSE CODE | : | STA404 |
| DATE | : | 1 DEC 2021 |
| TIME | : | 8.00 – 9.00 PM (1 HOUR) |

ANSWER SCHEME

(PLEASE CHECK THE SOLUTIONS BEFORE BEGIN MARKING)

| QUESTION | SOLUTION | MARKS |
|---------------|--|------------------------------|
| PART A | | |
| 1 a) | i) TRUE (T) ii) FALSE (F) iii) FALSE (F) iv) FALSE (F) v) TRUE (T) | 1 mark each (5 marks) |
| 1 b) | i) FALSE (F) ii) FALSE (F) iii) TRUE (T) iv) FALSE (F) v) FALSE (F) | 1 mark each (5 marks) |
| | TOTAL MARKS FOR QUESTION 1 (PART A) = 10 MARKS | |
| 2 a) | $\sum x = 107; \sum x^2 = 1619$ $\bar{x} = \frac{\sum x}{n} = \frac{107}{8} = 13.375$ $s = \sqrt{\frac{1}{n-1} \left[\sum x^2 - \frac{(\sum x)^2}{n} \right]} = \sqrt{\frac{1}{8-1} \left[1619 - \frac{107^2}{8} \right]} = 5.181$ | 5 marks |
| 2 b) | $PCS = \frac{3(mean - median)}{s} = \frac{3(13.375 - 14.5)}{5.181} = -0.651$ Negatively (left) skewed. | 2 marks |
| 2 c) | $CV_{Nov\ 2021} = \frac{s}{\bar{x}} \times 100 = \frac{5.181}{13.375} \times 100 = 38.7$ $CV_{Nov\ 2020} = \frac{\sqrt{10.79}}{7.25} \times 100 = 45.3$ Decision: Vegetables prices in November 2021 has a more consistent distribution. | 3 marks |
| | TOTAL MARKS FOR QUESTION 2 (PART A) = 10 MARKS | |
| | TOTAL MARKS FOR PART A = 20 MARKS | |

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| PART B 1 a) | $\text{Standard error} = \frac{s}{\sqrt{n}} = \frac{16.7128}{\sqrt{30}} = 3.0513$ | 2 marks |
| 1 b) | $\bar{x} \pm t_{\alpha/2} \frac{s}{\sqrt{n}}$ $53.6892 \pm t_{0.05/2, 29} \frac{16.7128}{\sqrt{30}}$ $53.6892 \pm (2.045) \frac{16.7128}{\sqrt{30}}$ $53.6892 \pm 2.045 (3.0513)$ 53.6892 ± 6.2399 $(47.4493, 59.9291)$ | 3 marks |
| | TOTAL MARKS FOR QUESTION 1 (PART B) = 5 MARKS | |
| 2 a) | H0 : Equal variances assumed H1 : Equal variances not assumed $\alpha=0.05$ p-value = 0.308 Since the p-value = 0.308 > $\alpha=0.05$, equal variances assumed. | 2 marks |
| 2 b) | Standard error difference = $Sp \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$ $Sp = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$ $= \sqrt{\frac{(13 - 1)7.0774^2 + (12 - 1)9.2846^2}{13 + 12 - 2}}$ $= 8.2074$ Standard error difference = $Sp \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$ $= 8.2074 \sqrt{\frac{1}{13} + \frac{1}{12}} = 3.2856$ <i>*Note: Student can use other ways to find standard error difference.</i> | 4 marks |
| 2 c) | $(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2} Sp \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$ | |

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| | $(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2} Sp \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$ $-1.3654 \pm t_{0.05/2,23} (3.2856)$ $-1.3654 \pm t_{0.025,23} (3.2856)$ $-1.3654 \pm 2.069 (3.2856)$ $-1.3654 \pm 2.069 (3.2856)$ -1.3654 ± 6.7979 $(-8.1633, 5.4325)$ | 3 marks |
| 2 d) | With 95% confident, there is no difference in Mathematics score between gender, because 0 value is included in the interval. | 1 mark |
| | TOTAL MARKS FOR QUESTION 2 (PART B) = 10 MARKS | |
| 3 a) | $A = 22.83 - 21.83 = 1.00$ (✓✓ 1M) $B = n-1 = 6 - 1 = 5$ (✓✓ 1 M) | 2 marks |
| 3 b) | $\bar{d} \pm t_{\alpha/2} \frac{s_d}{\sqrt{n}}$ $1.00 \pm (3.365) (0.683)$ 1.00 ± 2.298 $(-1.298, 3.298)$ (✓✓ 1M) One can be 98% confident that the mean difference between working hours lost due to the factory accidents before and after training program is between -1.298 and 3.298 hours. (✓✓ 1M) | 3 marks |
| | TOTAL MARKS FOR QUESTION 3 (PART B) = 5 MARKS | |
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| | TOTAL MARKS FOR QUESTION PART B = 20 MARKS | |