
UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2005/2006

November 2005

IUK 106E – Statistics for Technologist
[Statistik untuk Teknologis]

Duration: 3 hours
[Masa: 3 jam]

Please check that this examination paper consists of TUJUH (7) pages of printed material before you begin the examination.

Answer **FIVE (5)** questions. All questions can be answered either in Bahasa Malaysia or English.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi SEVEN (7) muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

*Jawab **LIMA (5)** soalan. Semua soalan boleh dijawab dalam Bahasa Malaysia atau Bahasa Inggeris].*

1. Select the correct answer
- (i) The number of absences per year that a worker has is an example of what type of data?
- (a) nominal
 - (b) discrete
 - (c) qualitative
 - (d) continuous
- (ii) What are the boundaries for 8.6-8.8?
- (a) 8-9
 - (b) 8.55-8.85
 - (c) 8.5-8.9
 - (d) 8.65-8.75
- (iii) When data are categorized as, for example, places of residence (rural, suburban, urban), the appropriate measure of central tendency is the
- (a) mean
 - (b) mode
 - (c) median
 - (d) midrange
- (iv) When a distribution is bell-shaped, approximately what percentage of data values will fall within 1 standard deviation of the mean?
- (a) 50%
 - (b) 68%
 - (c) 95%
 - (d) 99.7%
- (v) When a 99% confidence interval is calculated instead of a 95% confidence interval with n being the same, the maximum error of estimate will be
- (a) Larger
 - (b) Smaller
 - (c) The same
 - (d) It can not be determined

(20 marks)

2. (a) Which score has the highest relative position?

(i) $X = 12$ $\bar{X} = 10$ $S^2 = 16$

(ii) $X = 180$ $\bar{X} = 60$ $S^2 = 64$

- (b) Using the standard normal distribution, find $p(-1.87 < z < 0)$.

(20 marks)

3. (a) If approximately 2% of the people in a room of 200 people are left-handed, find the probability that exactly five people are left-handed.

- (b) Determine if the distribution represents a probability distribution, if not state why.

X	1	2	3	4	5
$P(X)$	$\frac{2}{7}$	$\frac{2}{7}$	$\frac{2}{7}$	$\frac{3}{7}$	$\frac{-2}{7}$

(20 marks)

4. (a) An irate patient complained that the cost of a doctor's visit was too high. She randomly surveyed 20 other patients and found that the mean amount of money they spent on each doctor's visit was \$ 44.8. the variance of the sample was \$ 12.4609. Find the 95% confidence interval of the population mean. Assume the variable is normally distributed.

- (b) An instructor wishes to see whether the variation in scores of the 23 students in her class is less than the variance of the population. The variance of the class is 198. Is there enough evidence to support the claim that the students is less than the population variance ($\sigma^2 = 225$) at $\alpha = 0.05$? Assume that the scores are normally distributed.

(20 marks)

5. (a) For the following data

Month x	1	3	6	8	10	12	15
No. of Items sold y	10	12	15	19	20	21	21

- 1- Draw the scatter plot for the data.
- 2- Find the equation of the regression line.
- 3- Coefficient of determination.

(b) A state employee wishes to see if there is a significant difference in the number of employees at the interchanges of three state toll roads. The data are shown. At $\alpha = 0.05$, can it be concluded that there is a significant difference in the average number of employees at each interchange?

Road 1	Road 2	Road 3
7	10	1
14	1	12
32	1	1
19	0	9
10	11	1
11	1	11

(20 marks)

5. (a) Persamaan am bagi suatu garis lurus di dalam satah ialah $ax+by+c=0$. Dua titik menentukan persamaan garis lurus. Cari persamaan garis lurus yang melalui titik-titik (1,2) dan (5,7).
[Jangan gunakan kaedah geometri koordinat. Guna fakta bahawa suatu sistem homogen mempunyai penyelesaian $\bar{x} = \bar{0}$ jika dan hanya jika $|A| = 0$]

(10 markah)

- (b) Sebuah syarikat mempunyai kilang di Penang dan Johor yang menghasilkan meja computer dan meja pencetak. Pengeluaran (dalam unit) pada bulan Januari dan Februari masing-masing diberikan di dalam matriks J dan F berikut:

$$J = \begin{bmatrix} \text{Penang} & \text{Johor} \\ 1500 & 1650 \\ 850 & 700 \end{bmatrix}$$

$$F = \begin{bmatrix} \text{Penang} & \text{Johor} \\ 1700 & 1810 \\ 930 & 740 \end{bmatrix}$$

- (i) Dapatkan purata pengeluaran pada bulan Januari dan Februari
(3 markah)
- (ii) Tentukan peningkatan pengeluaran daripada bulan Januari ke Februari
(3 markah)
- (iii) Tentukan $J = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ dan beri makna matriks yang dihasilkan.
(4 markah)