



UNIVERSITI SAINS ISLAM MALAYSIA

جامعة العلوم الإسلامية الماليزية
ISLAMIC SCIENCE UNIVERSITY OF MALAYSIAFINAL EXAMINATION
SEMESTER I, ACADEMIC SESSION 2007/2008

DATE : OCT-NOV 2007

DURATION : 3 HOURS

SAA 1043

STATISTICS
(STATISTIK)

INSTRUCTIONS TO CANDIDATES:

1. This paper contains **FIVE (5)** questions.
2. Answer **ALL** questions using the answer booklet provided.
3. All answers must be clearly written in English and readable.
4. Candidates are **not allowed** to bring any materials except stationeries and non-programmable calculator into the examination hall without prior permission.
5. Write down your particulars in the **Borang H**.
6. Candidates are **not allowed** to take question booklet out of the examination hall.

DO NOT OPEN THIS QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO

This question booklet has **FIVE (5)** printed pages excluding this cover page

1. a) Briefly describe the difference between descriptive statistics and inferential statistics. [4 Marks]
- b) Determine whether each of the following is discrete or continuous variable.
- i. Number of students in each program. [1 Marks]
 - ii. Number of children in a family. [1 Marks]
 - iii. Amount of sugar per can of drink. [1 Marks]
 - iv. Length of 20 newborn babies. [1 Marks]
 - v. Time taken by 50 students to study for the final examination. [1 Marks]
- c) Consider an experiment of tossing a biased coin three times. The probability of getting head is twice as likely as the tail.
- i. List down the elements of the sample space. [1 Marks]
 - ii. Construct a tree diagram for this experiment and attach its probability. [3 Marks]
 - iii. Find the probability that at most two heads occur? [3 Marks]
 - iv. What is the probability that the first tail occur on third toss? [2 Marks]

2. a) In how many ways different ways can a true-false test consisting of 10 questions to be answered. [2 Marks]
- b) A committee of 6 is to be selected randomly from 11 persons.
- Find the probability that the two oldest people will not be on the committee. [2 Marks]
 - If 5 of the 11 persons are men, find the probability that the committee will contain exactly 4 women and two men. [2 Marks]
- c) A department store manager wants to investigate whether the method of payment chosen by customers is related to the size of the purchases. The manager has cross-classified a sample of 250 customer purchases as shown in the following table. One of these customers is selected at random.

Size of purchase	Method of payment	
	Cash	Credit card
Under RM50	51	31
RM50 or more	65	103

- What is the probability that the customer selected paid by credit card? [3 Marks]
- What is the probability that the customer selected made a purchase under RM50? [3 Marks]
- Are the events “payment by credit card” and “purchase under RM50” mutually exclusive? [3 marks]
- Are the events “payment by credit card” and “purchase under RM50” independent? [3 Marks]

3. a) A tollbooth operator has observed that cars arrive randomly follow the Poisson distribution at an average rate of 360 cars per hour.
- Calculate the probability that only two cars will arrive during a specified 1- minute period. [3 Marks]
 - Find the probability that not more than three cars will arrive during a specified 2 - minute period. [3 Marks]
- b) The joint density X and Y given by

$$f(x,y) = \begin{cases} 6(1-y), & 0 \leq x \leq y \leq 1 \\ 0, & \text{elsewhere} \end{cases}$$

- Find the marginal density functions for X and Y . [6 Marks]
- Find $P(X \leq \frac{1}{2} | Y = \frac{3}{4})$. [3 Marks]
- Determine $E(X)$, $E(Y)$ and $E(XY)$. [6 Marks]
- Calculate $\text{Cov}(XY)$. [2 Marks]

4. a) A venture capital company feels that the profit (X) on a proposed investment is approximately normally distributed, with mean of 30,000 and a standard deviation of 10,000
- Find the probability that the profit will exceed 55,000. [3 Marks]
 - Find the probability that the profit will be less than 22,000. [3 Marks]
- b) The foreman of a bottling plant has observed that the amount of soda pop in each 32ml bottle is actually a normally distributed random variable, with mean of 32.2ml and a standard deviation of 0.3ml.
- Find the probability that if customer buys one bottle, that bottle will contain more than 32ml. [3 Marks]
 - Find the probability that if a customer buys a carton of four bottles, the mean of the four will be greater than 32ml. [4 Marks]
- c) The grades on a statistics exam as follows:

75	66	77	66	64	73	91	65	59	86	61
86	61	58	70	77	80	58	94	78	62	79
83	54	52	45	82	48	67	55			

- Construct a frequency distribution for these data, using 6 classes interval. The table should include class midpoint and relative frequency and percentage for the above data. [5 Marks]
- Draw a polygon based on the frequency distribution table:- [5 Marks]

5. a) The following table gives the frequency distribution of hourly earnings of 100 workers.

Hourly earnings	Number of workers
RM8 up to RM9	11
RM10 up to RM11	17
RM12 up to RM13	32
RM14 up to RM15	27
RM16 up to RM17	13

- i. Calculate the average hourly earnings of all these workers. [4 Marks]
- ii. Determine the variance and standard deviation of the average hourly earnings of all these workers. [5 Marks]
- b) Region Farm can breed goats that have weight distributes approximately to normal, with mean and standard deviation 80kg and 15kg respectively.
- i. Find the probability that a random sample of 30 goats will have less than 70kg of weight. [5 Marks]
- ii. What is the probability that the sample mean will lie between 90kg and 100kg of weight? [4 Marks]

Dicetak Oleh
Bahagian Akademik
Universiti Sains Islam Malaysia (USIM)
Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan.