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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015**

COURSE NAME : STATISTICS
COURSE CODE : BIC 10603
PROGRAMME : 1 BIS / 1 BIP / 1 BIW / 1 BIM
EXAMINATION DATE : JUNE 2015 / JULY 2015
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

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Q1 (a) Explain the difference between interval data and ratio data. Give one example each of the data. (4 marks)

(b) Describe the following sampling techniques :

(i) Systematic sampling (2 marks)

(ii) Stratified sampling (2 marks)

(c) Differentiate between descriptive and inferential statistics. (2 marks)

(d) The scores of two bowling players are given in Table 1.

Table 1 : Bowling Scores

Player	Game 1	Game 2	Game 3	Game 4	Game 5
Ahmad	189	146	200	241	231
Laiju	235	201	217	168	186

Analyze whether the performance of both players are equivalent. (10 marks)

- Q2 (a)** The reliability of a system is the probability that a system is consistently performs according to its specifications. The reliability of a series system consisting of n independent components is given by,

$$R_s = \prod_{i=1}^n R_i$$

The reliability of a parallel system consisting of n independent components is given by ,

$$R_p = 1 - \prod_{i=1}^n (1 - R_i)$$

where R_i is the reliability of the i^{th} component and,

$$\prod_{i=1}^n x_i = x_1 * x_2 * \dots * x_n .$$

Consider a home computer has two 3.5 inch disk drives and other components with reliability as shown in Figure **Q2(a)**.

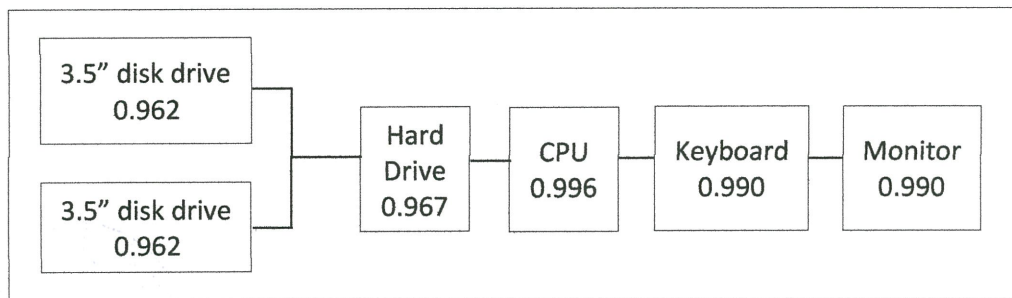


FIGURE Q2(a)

Find the reliability of the system.

(6 marks)

- (b) A system consists of seven databases that to be accessed by user's transaction. A transaction can successfully update databases when the transaction obtain majority locked from seven databases. Assume that the probability of obtaining lock from each database is, $p = 0.8$. Find the probability of a transaction that fail to update databases from the system.

(6 marks)

- (c) In a normal distribution with a standard deviation of 5.0, the probability that an observation selected at random exceeds 21 is 0.14.

(i) Find the mean of the distribution.

(4 marks)

(ii) Find x of which at most $z = 4\%$ of the values in the distribution lie.

(4 marks)

- Q3** (a) Explain Central Limit Theorem applied in sampling distribution. (6 marks)
- (b) Intelligent Quotients (IQ) in the general population are normally distributed with a mean of 100 and a standard deviation of 15. A random sample of 40 students was taken in a certain university. Find the probability that the mean IQ of the sample is less than 109. (6 marks)
- (c) From a random sample of 50 graduating students at a private college, the mean CGPA is 2.95 with a standard deviation of 3.25.
- (i) Calculate the point estimate of the CGPA. (2 marks)
- (ii) Construct a 90% confidence interval for the mean CGPA for all graduating students at this college. (6 marks)

- Q4** (a) State Type I and Type II errors in hypothesis testing. (4 marks)

- (b) A car manufacturer claimed that the average gas mileage of its new brand of hybrid car is 25 miles per liter. The gas mileages for ten randomly selected hybrid cars of the new brand are recorded as :

24.4, 25.1, 22.6, 26.2, 25.3, 23.2, 21.9, 23.8, 24.5, 25.0.

Assume that the gas mileage is normally distributed. Analyze whether the sample data support the manufacturer's claim at the 0.01 significance level.

(8 marks)

- (c) Airport Limos offers limousine service from KLCC to KLIA airport. Mr. Ramli, as an operational manager, is considering two alternative routes; PLUS Highway and ELITE Expressway. He had conducted a study on both alternative routes and produced the result shown in Table 3.

Table 3 : Result of both routes

Route	PLUS Highway	ELITE Expressway
Sample mean (minutes)	56.0	59.0
Sample standard deviation (minutes)	12	4.96
Sample size	7	8

Analyze if there is any difference in the variation of the two alternative routes.
[Use a 0.10 level of significance]

(8 marks)

- Q5** A research was carried out to study the relationship between inflation rate and unemployment rate. The data are summarized as in Table 4.

Table 4 : The data between inflation rate and unemployment rate

Inflation Rate	Unemployment Rate
0.7	4.5
1.5	9.0
2.4	9.5
2.8	10.5
3.5	6.5
3.5	6.8
4.5	4.0
6.5	5.5



- (a) State the dependent and independent variables. (2 marks)
- (b) Determine and interpret the Pearson correlation coefficient between inflation rate and unemployment rate. (8 marks)
- (c) Construct a least squares regression equation of the two variables. (6 marks)
- (d) Predict the inflation rate for an unemployment rate of 7.0. (4 marks)

-END OF QUESTION-