



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2009/ 2010**

SUBJECT NAME : MATEMATIK IT II
SUBJECT CODE : DIT 1073
COURSE : 1 DIT
EXAMINATION DATE : APRIL/MAY 2010
DURATION : 2 HOURS AND 30 MINUTES
INSTRUCTION : ANSWER ALL QUESTIONS IN
PART A AND **TWO (2)** QUESTIONS
ONLY IN PART B.

THIS PAPER CONTAINS FIVE (5) PAGES

PART A

Instruction: Answer **ALL** questions.

- Q1** A random sample of size 100 is taken from a normal population with variance $\sigma_1^2=40$ and sample mean x_1 of 38.3. Another random sample of size 80, is taken from a normal population with variance $\sigma_2^2=30$. The sample mean x_2 is 40.1. Test at the 5% level, whether there is a significance difference in the population means μ_1 and μ_2 .

(20 marks)

- Q2** You were given a three week project in February and March 2010. You are required to describe all the stages involved in completing the project. You may use the format below as a guide.

- a. title
- b. objectives
- c. method and processing data
- d. results
- e. conclusion

(20 marks)

- Q3** (a) Given the number of patients that arrive in a hospital is 80. Probability of getting a sicked patient is 0.1. Using a Normal Distribution calculate:

- (i) mean
- (ii) standard deviation
- (iii) $P(9 < x < 11)$

(8 marks)

- (b) A radioactive disintegration gives counts that follow a Poisson distribution with mean count per second of 25. Find the probability that in 1 second the count is between 23 and 25 inclusives,

- (i) Using the Poisson distribution.
- (ii) Using the normal approximation to the Poisson distribution

(12 marks)

PART B

Instructions: Answer any **TWO (2)** questions

Q4 (a) Define each of the following terms:

- (i) Confidence Interval
- (ii) Type I and Type II error

(8 marks)

(b) Two types of tyres produced by Rojali (M) Tyre Sdn Bhd named Dunlopo and Mundolino . The sample number, mean, standard deviation and different length the tyre can last is shown below in **Table Q4**.

Table Q4

Brand of tyres	Dunlopo	Mundolino
n	100	150
Mean	13.5 months	14.5 months
Standard deviation	2.5 months	2.6 months

Test at 95% Confidence Interval whether both tyres are of equal quality.

(12 marks)

Q5 (a) Given a pack of 52 cards which are of two different colours. One is black and the other is red. Two cards are picked out one after the other without replacement. Find:

- (i) probability both cards are red
- (ii) probability that the pattern of colour is red, black or black, red
- (iii) draw a tree diagram in finding out from two consecutive pickings you will get at least one red card.

(12 marks)

(b) A school has to send a team of 3 debaters to a competition. The candidates are 3 girls and 2 boys. Find how many ways can the school choose the three candidates if the team must have:

- (i) more boys than girls
- (ii) more girls than boys

(8 marks)

- Q6 (a) Define any **THREE (3)** of the following terms. You have to supply an appropriate example with each definition.
- (i) Discrete random variable
 - (ii) Continuous random variable
 - (iii) Random sampling
 - (iv) stratified sampling
- (12 marks)
- (b) Given ten students who had done very well in SPM examination recently. Four of them could be selected for PSD scholarship. Calculate the probability of them **NOT** being selected.
- (2 marks)
- (c) Let x be a discrete random variable that possesses a binomial distribution. Using binomial formula solve $p(x=5)$ for $n= 8$ and $p=0.7$
- (6 marks)

FORMULAE

1. Mean = $\Sigma x / n$
2. Variance = $\Sigma(x - x')^2 / n$ where x' is the mean
3. $\sigma = \sqrt{\text{variance}}$
4. $X \sim N(x', \sigma^2)$ where X is normally distributed
5. if $X \sim \text{Bin}(np, npq)$
6. if $X \sim \text{Poi}(\lambda, \lambda)$
7. Under Poisson Distribution average = λ
8. $z = (x - X') / \sigma$
9. $z = [(x_1' - x_2') - (\mu_1 - \mu_2)] / \sqrt{(\sigma_1^2 / n_1 + \sigma_2^2 / n_2)}$ if two samples are used
10. $z = [(x - x') / (\sigma / \sqrt{n})]$ if sampling from a normal distribution
13. $p(x) + q(x) = 1.00$
14. Binomial = $nCr p^r q^{n-r}$
15. Poisson = $e^{-\lambda} \lambda^x / x!$ Where λ is average per unit time interval
16. Standard Normal z-score = $(x - x') / \sigma$