

## STA301 FINAL TERM 2012 SUBJECTIVE PAPER

1. A random variable X is normally distributed with  $\mu = 50$  and  $\sigma^2 = 25$ . Find the probability of x larger than 54.
2. A random sample of 50 observations is drawn from a normal distribution with  $\sigma^2 = 52$ . Suppose that the sample mean is found to be  $\bar{x} = 71$ . Find 95% confidence interval for  $\mu$ .
3. Find the value of chi-square from the following table.

| Number of Customer Arrivals | Observed Frequency | Expected Frequency |
|-----------------------------|--------------------|--------------------|
| 0                           | 84                 | 54.12              |
| 1                           | 114                | 108.28             |
| 2                           | 70                 | 108.28             |
| 3                           | 60                 | 72.16              |
| 4                           | 32                 | 36.08              |
| 5                           | 16                 | 14.44              |
| 6                           | 15                 | 4.80               |
| 7                           | 4                  | 1.36               |
| 8                           | 5                  | 0.36               |
| 9 or more                   | 0                  | 0.08               |

- display from the following data.  
 48, 31, 54, 37, 18, 64, 61, 43,  
 40, 71, 51, 12, 52, 65, 53, 42,  
 39, 62, 74, 48, 29, 67, 30, 49,  
 68, 35, 57, 28, 27, 58.
5. The p. d. f. of a r.v. is given

$$f(x) = \begin{cases} \frac{4x}{5} & 0 \leq x \leq 1 \\ 0 & \text{elsewhere} \end{cases}$$

Calculate  $P(X < 0.5)$

6. If population proportions are given as:

$$P_1 = 0.30, P_2 = 0.20.$$

Find  $\sigma_{\hat{p}_1 - \hat{p}_2}^2$ , where  $n = 10$

7. Formulate the null and alternative hypothesis in each of the following.  
 (1) Average domestic consumption of electricity is 50 units per month.  
 (2) Not more than 30% people pay Zakat (tax).
8. What is the relationship between the confidence interval and hypothesis testing?
9. Why the distribution function of discrete random variable X is also known as cumulative distribution function?
10. An exercise physiologist wants to demonstrate that the average person walks more than 800 km per year. State the null and alternative hypothesis.
11. Find harmonic mean from the following values.  
 12, 22, 33, 44, 55
12. How many types a design have?
13. Find the value of maximum ordinate of the standard normal curve correct to four places of decimal.