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MAIN EXAMINATION

JANUARY – APRIL 2013 TRIMESTER

FACULTY OF COMMERCE

DEPARTMENT ACCOUNTING AND FINANCE

DIPLOMA IN BUSINESS MANAGEMENT

CID 073: INTRODUCTION TO BUSINESS STATISTICS

Date: April 2013	**Duration: 2 Hours**
INSTRUCTIONS: Answer Question ONE and any other TWO Questions	

Q1. a) Distinguish between the following terms as used in statistics:

i) Population and sample
ii) Census and sampling
iii) Simple random sampling and stratified random sampling.
iv) Parameter and statistic (**2 marks each**)

b) Write the following expressions using $\sum$

i) $(4x_1+3)+(9x_2+4)+(16x_3+5)+(25x_4+6)+(36x_5+7)$

ii) 1, 3, 5, 7, 9, 11, ……., 117. (**3 marks each**)

c) Data on the number of students who registered for various degree programmes in three academic years at University Z were as follows:

	Degree Courses		
	Commerce	**Law**	**Education**
2009/2010	150	90	50
2010/2011	200	100	45
2011/2012	270	130	60

Represent the data by an appropriate bar – chart. (**6 marks**)

d) Data was collected and found to have the following properties:

$$\sum_{i=1}^{20} x_i = 60$$

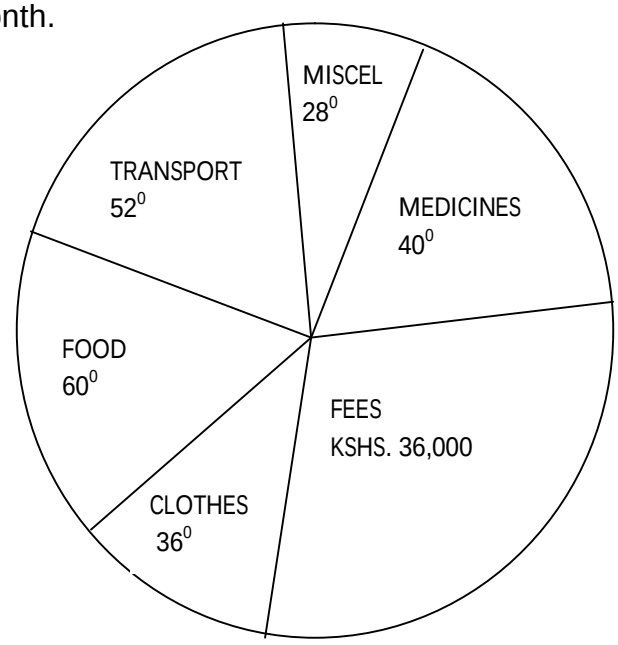
$$\sum_{i=i}^{20} x_i^2 = 360$$

Assuming that there were 20 observations, determine their standard deviation. (**5 marks**)

e) Consider the following 25 measurements 1, 3, 2, 4, 3, 2, 1, 5, 7, 3, 2, 4, 5, 6, 6, 3, 2, 6, 5, 1, 3, 2, 5, 4, 1.
Construct a frequency distribution of the data.
Hence obtain:
i) Mode
ii) Median
iii) Mean
iv) Standard deviation (**5 marks**)

Q2. a) i) State three methods of collecting primary data and three functions of statistics. (**5 marks**)
ii) State the difference between secondary data and primary data. (**5 marks**)

b) The pie-chart below represents various domestic expenditures by family Z last month.



i) Use a simple bar-chart to represent the different amounts of money spent in the six different areas. (**5 marks**)

ii) Determine the percentage of total expenditure that is taken by school fees. (**5 marks**)

Q3. A certain business man collected data from his business. He denoted the respective, figures $x_1, x_2, x_3, ..., x_n$ and the respective frequencies as $f_1, f_2, f_3, ..., f_n$. If the Arithmetic mean of this data was $\bar{x}$ and that the total cumulative frequency was N.

Determine whether the following statements are true or false:

a) $\frac{1}{N}\sum_{i=1}^{n}(x_i - \bar{x})f_i = 0$ (**5 marks**)

b) $\sum_{i=1}^{n}(3\bar{x} + 4x_i)f_i = 4\bar{x}$ (**5 marks**)

c) $\sum_{i=1}^{n}\{(\bar{x} - 4x_i)f_i + 2\} = -3N\bar{x} + 2n$ (**5 marks**)

d) $\frac{(n+1)!}{(n-1)!} - 30 = 0$ (**5 marks**)

Q4. a) State which of the following represents a discrete variable and which one represents a continues variable.

i) Number of shares sold each day in the stock market.

ii) Temperature recorded every half hour at a weather station.

iii) Lifetimes of television tubes produced by a company.

iv) Student enrolment in a university over a number of years.

(**4 marks**)

b) What are the pros and cons of using the mean as a measure of central tendency? (**4 marks**)

c) A researcher collected a data and recorded down the following properties

$N = 50$

$\bar{X} = 350$

Further scrutiny reveal that two figures whose values were 580 and 320 had been recorded as 805 and 230 when summarizing the data. Determine the correct value of the arithmetic mean. (**5 marks**)

d) The arithmetic mean of 20 observations was found to be 50. If two more observations are introduced, the mean decreases by 2. Determine the values of the two observations, given that their difference is 16.

(**5 marks**)

The following formulae may be useful:

$$S_x^2 = \left[\frac{1}{N}\sum_{i=1}^{n} X_i^2 f_i\right] - X^{-2} = \left[\frac{1}{N}\sum X^2 f\right] - X^{-2}$$

$$\sigma^2 = Var\left(x\right) = \frac{\sum fx^2}{\sum f} - x^{-2}$$

$$\bar{X}_c = \frac{1}{N}\sum_{i=1}^{k} N_i \bar{X}_i, \quad r_{xy} = r = \frac{S_{xy}}{S_x S_y}$$

$$r = \frac{COV_{xy}}{\sigma_x \sigma_y}; \quad \bar{X}_{1,2} = \frac{N_1\bar{X}_1 + N_2\bar{X}_2}{N_1 + N_2}$$

$$\rho_{xy} = 1 - \frac{6\sum_{i=1}^{n} d_i^2}{n\left(n^2 - 1\right)} = 1 - \frac{\sum d^2}{n^3 - n}$$

$$\rho = 1 - \frac{6\sum d^2}{n\left(n^2 - 1\right)}$$

$$M_0 = e_1 + \frac{\Delta_1 C}{\Delta_1 + \Delta_2}$$

$$Y = a + bX$$

$$M_0 = L_1 + \left\{ \frac{f_m - f_1}{(f_m - f_1) + (f_m - f_2)} \right\} X_i$$

$$S_{xy} = \left\{ \frac{1}{n} \sum_{i=1}^{n} x_i y_i \right\} - \bar{x}\,\bar{y} = \left\{ \frac{1}{n} \sum xy \right\} - \bar{x}\,\bar{y}$$

$$M_e = L_1 + (M - C)\frac{i}{f}$$

$$M_e = e_1 + \frac{1}{f_{md}} \left(\frac{N}{2} - \sum f_{md-1} \right) C$$

$$a = \bar{y} + b\bar{x}$$

$$COV_{xy} = \sum xy - n\bar{x}\,\bar{y}$$

$$b = \frac{\left(\sum_{i=n}^{n} x_i y_i \right) - n\overline{xy}}{\left(\sum_{i=1}^{n} X_i^2 \right) - X^{-2}} = \frac{\sum xy - \bar{x}\,\bar{y}}{\sum X^2 - X^{-2}}$$

$$S_c^2 = \frac{1}{N} \sum_{i=1}^{k} N_i \left(S_i^2 + d_i^2 \right) \quad where \quad d_i + \bar{x}_i - \bar{x}_c$$

$$\sigma_{1,2}^2 = \frac{N_1 \left(\delta_1^2 + d^2 \right) + N_2 \left(\delta_2^2 + d_2^2 \right)}{N_1 + N_2}$$

$$b(x; n, p) = \binom{n}{x} p^x (1 - p)^{n-x}$$

$$r_{xy} = b\frac{S_x}{S_y}; \quad r_{xy} = b\frac{\delta_x}{\delta_y}$$

$$\sum_{i=1}^{n} y_1 = na + b \sum_{i=1}^{n} x_i$$

$$\sum_{i=1}^{n} x_1 y_1 = a\sum_{i=1}^{n} x_i + b\sum_{i=1}^{n} x_i^2$$

$$\bar{X} = \frac{1}{N}\sum_{i=1}^{N} X_i$$

$$\bar{X} = \frac{1}{N}\sum_{i=1}^{N} x_i f_i$$

$$\bar{X} = h\bar{d} + A$$

$$Q_1 = L_{Q_1} + \frac{\left(\frac{N}{4} - \sum f_{Q_1 - 1}\right)C}{f_{Q_1}}$$

$$Q_3 = L_{Q_3} + \frac{\left(\frac{3N}{4} - \sum f_{Q-1}\right)C}{f_{Q_3}}$$

$$M.D = \frac{1}{N}\sum_{i=1}^{N}\left|X - \bar{X}\right|$$

$$M.D = \frac{1}{N}\sum_{i=1}^{N}\left|X - \bar{X}\right|_{f_i}$$

Where $N = \sum_{i=1}^{N} f_i$

$$S = \sqrt{\frac{1}{N}\sum_{i=1}^{N}\left(X - \bar{X}\right)^2}$$

$$S = \sqrt{\frac{1}{N}\sum_{i=1}^{N}\left(X - \bar{X}\right)^2 f_i}$$

$$S_x = hS_d$$

END