

BUSINESS MATHEMATICS 3**7073****CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD**

General Certificate of Education Examination

JUNE 2016**ADVANCED LEVEL**

Subject Title	BUSINESS MATHEMATICS
Paper N ^o .	3
Subject Code No	7073

Three hours**Answer any FIVE questions**

You are reminded of the necessity for good English and orderly presentation in your answers.

In your calculations you are advised to show all steps in the working, giving the answer at each stage.

You are allowed to use calculators, statistical formulae and financial tables where appropriate.

You will be provided with graph paper where necessary.

Turn over

1. An inquiry on the salary of workers of an enterprise is concerned with the sample of 58 workers. The results of the inquiry are shown in the table below:

Hourly salary (cfaf)	1440-1620	1620-1800	1800-1980	1980-2160	2160-2340	2340-2520	2520-2700
Number of workers	x	2	4	8	11	15	y

Required:

- (a) Knowing that the average hourly salary of 58 workers of the enterprise is 2302.76 CFA Francs, determine the missing frequency values, x and y . (12 marks)
 (b) Determine the median salary of the 58 workers of the enterprise. (2 marks)
 (c) Determine the interquartile deviation of the distribution. (6 marks)

(Total 20 marks)

2. In the following set of data, INF stands for a certain country's rate of inflation in (%) and UR stands for the country's unemployment rate in (%), over a period of 10 years.

INF	5	5	4	4	2	2	6	9	12	12
UR	8	9	10	11	12	8	7	5	3	3

Required:

- (a) Find the means and standard deviations of INF and UR. (8 marks)
 (b) Find the equation of least squares regression line, assuming that INF is the dependent variable (Y) and that UR is the independent variable (X). Interpret your result. (8 marks)
 (c) Calculate the correlation coefficient. (4 marks)

(Total 20 marks)

3. NFC Bank has a portfolio of four branches: Buea (B), Douala (D), Limbe (L) and Yaounde (Y). These branches are expected to generate profits as follows:

Branch	Buea (B)	Douala (D)	Limbe (L)	Yaounde (Y)
Profit (000 fcs)	2,000	3,000	4,500	6,000

The likelihood that each branch will generate the expected profit is as follows:

Branch	Buea (B)	Douala (D)	Limbe (L)	Yaounde (Y)
Probability	0.3	0.2	0.1	0.4

- (a) Calculate the expected profit that will be generated by NFC Bank. (9 marks)
 (b) Calculate the variance of the profits. (5 marks)
 (c) Calculate the standard deviation of profits. (2 marks)
 (d) Differentiate between standard deviation and Mean deviation. (4 marks)

(Total 20 marks)

4. The human resource manager of a reference hospital suspects a difference in the mean amount of sick leave taken by nurses on the day shift compared to night shift. It is suspected that the night workers take more sick leaves on the average. A random sample of 38 day workers had a mean of $\bar{X}_1 = 10.6$ days sick leave last year the standard deviation was $S_1 = 3.3$ days. A random sample of 41 night workers had a mean $\bar{X}_2 = 12.9$ days sick leave last year with standard deviation $S_2 = 4.5$ days at the 5 % level of significance, can we say that the night workers take more sick leave on the average?

Required:

- State the null and alternative hypotheses. (4 marks)
- Find the critical value or values. (4 marks)
- Sketch a critical region and the acceptance region. (4 marks)
- On the sketch of part (c), show the location of $\bar{X}_1 - \bar{X}_2$, the observed sample difference. (4 marks)
- Decide whether you should accept or reject the null hypothesis. (2 marks)
- What is your conclusion? (2 marks)

(Total 20marks)

5. Let's consider the series made up of heights (xi) and weights (yi) of male students of level 1, their characters are shown in the table below:

Heights (xi)	154	155	156	160	162	162	167	171	173	180
Weights (yi)	54	58	61	63	65	61	68	68	76	86

Required:

- Determine the equation of the regression line $D_{y(x)}$. (15 marks)
- Determine the equation of the regression line $D_{x(y)}$. (2 marks)
- Present the two equations above on the same graph. (3 marks)

(Total 20 marks)

6. You are given the following average national income and turnover of a country

Years	2000	2001	2002	2003	2004	2005
National income (Xi)	770,000	735,000	860,000	900,000	1,010,000	985,000
Turnover (Yi)	44,000	40,000	49,000	59,000	74,000	66,000

Required:

- Calculate the coefficient of correlation between the average national income and turnover. (10 marks)
- Calculate the forecasted turnover for 2006, 2007 and 2008 using the least squares method. (10 marks)

(Total 20 marks)

7. (a) BOBY Company has 500 employees, 20 % are skilled and the rest are unskilled. 30 % of the total have been with the Company for more than ten years and the rest for less. Of those who have been with the Company for more than ten years, 40 % are skilled. If an employee is selected at random, what is the probability that:

- (i) He is unskilled and has been with the Company for less than ten years. (8 marks)
 (ii) He has been with the Company for more than ten years, given that he is unskilled. (3 marks)
 (iii) He is either unskilled or has been with the Company for more than 10 years. (3 marks)

- (b) x is a random variable with probability distribution as follows:

X	2	3	5	x	10
$P(X)$	0.2	0.4	0.2	0.1	0.1

Determine the value of x , given that the expected value is 4.4.

(6 marks)

(Total 20 marks)

8. The relationship between the monthly orders and years of experience of 10 sales representatives is shown in the following table:

Sales representatives	1	2	3	4	5	6	7	8	9	10
Experience (years)	12	8	14	17	9	10	12	4	16	3
Orders (000 craf)	64	29	57	72	60	45	55	32	75	20

Calculate:

- (a) The product moment correlation coefficient. (17 marks)
 (b) Define coefficient of determination and illustrate how it is calculated. (3 marks)

(Total 20 marks)