CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate of Education Examination

JUNE 2015   **ADVANCED LEVEL**

Subject Title	BUSINESS MATHEMATICS
Paper Nº.	2
Subject Code No	7073

Three hours

This paper is made up of TWO sections. Section A is based on the " BACCALAUREAT" approach (APPLIED MATHEMATICS). Section B is based on LCCI approach (BUSINESS STATISTICS AND ADVANCED BUSINESS CALCULATIONS).

You are required to attempt questions from ONE section only. Answer the compulsory question and SIX others from your chosen section, choosing not less than THREE questions from each part.

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.
Use Calculators, statistical formulae, and financial tables where appropriate.

You will be provided with graph paper.

SECTION: A BACCALAUREAT

PART ONE: FINANCIAL MATHEMATICS

COMPULSORY QUESTION

1. A business man wishes to buy a new oven for his bakery situated at cow street Bamenda. The cost of this investment is 25 000 000 frs and to be purchased at end of 2015. Its life span is 4 years and it is depreciated linearly over 4 years. At the end of the life span, its residual value is 2 500 000 frs. The running cost is 5 000 000 frs end of 2013, 6 000 000 frs end of 2014, 8 000 000 frs end of 2015 and 8 000 000 frs end of 2016. The turnover generated by the outputs manufactured will be 14 000 000 frs each of the two first years and 15 000 000 frs each of the two last years. This bakery is liable to the company tax at 38.5%. You are required to calculate for each year.
   (a) the forecasted profit before tax
   (b) the company tax
   (c) the forecasted profit after tax
   (d) the net cash flow
   (e) the net actualized cash flow given that the actualization rate is 4%
      (i) Calculate the profitability rate of the investment.
      (ii) What is the payback with actualisation

(16 marks)

2. How much should you deposit initially in an account paying 10% p.a compounded simi-annually in order to have 1000 000F in 30 years

   (a) Compounded monthly?   (7 marks)
   (b) Compounded daily?   (7 marks)

(Total = 14 marks)

3. The Tiko rural council has contracted an ordinary loan of 10 000 000frs from Bank Atlantique. The conditions are such that, the loan is to be reimbursed through five constant end of period annuities with interest calculated at the rate of 10% annually.
      (a) Calculate the constant annuity   (7 marks)
      (b) Calculate the first amortization   (7 marks)

(Total = 14 marks)

4. A business under took an engagement to deposit 1000 000F each year in an account in a Bank paying interst at the rate of 10% annually. The first deposit is made on the 1/1/2002 and the last deposit on 1/1/2017. Calculate the amount of capital constituted on
   (a) 1/1/2017
   (b) 1/1/2018 (note that the last deposit was made on the (1/1/2017)
   (c) 1/1/2022 (note that the last deposit was made on the 1/1/2017)

(Total = 14 marks)

5. XCAM PLC issued a debenture loan with the following conditions:
   - Number of debenture issued 5000
   - Issued Price: 4 500frs
   - Face value 5 000 frs
   - Nominal rate: 20%
   - Maturity date: 5 years (constant annuities)

   Calculate
   (a) The constant annuities   (3 marks)
   (b) The number of debentures redeemed in the 1st draw and in the 4th draw   (5 marks)
   (c) Consider the redemption price to be 6000 frs. Calculate   (6 marks)
      (i) The constant annuity
      (ii) The number of debentures redeemed in the 1st draw and in the last draw

(Total = 14 marks)

6. The consumption of electricity ha increased historically at 6% per year. If it continues to increase at this rate indefinitely find the number of years before the electric utilities will need to double their generating capacity (round up to the next highest year) **(Total = 14 marks)**

PART TWO: STATISTICS

7. An economist has established that personal income X may be used to predict personal consumption by the relationship: $Y(x) = 0.940x-24000$ For each of the following levels of personal income, calculate the predicted value for personal consumption:

(a) 300 000 frs **(5marks)**
(b) 500 000 frs **(5marks)**
(c) 700 000 frs **(5marks)**
(Total = 14 marks)

8. The following date relates annual household usage Y of a cleaning agent to the size X of the family.

X	5	8	7	3	2	4	5	5	6	7
Y	2	3	3	2	1	2	3	2	4	5

Compute the sample correction coefficient

(Total = 14 marks)

9. A MFI records the following numbering of new members

Years	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Members	300	321	342	383	406	413	434	488	495	531

(a) Determine the equation for the regression line using $X = 0$ in 2005 **(11 marks)**
(b) Forecast the number of new members recorded in the following years: 2016, 2021 and 2026
(3 marks)
(Total = 14 marks)

10. Deflate the following time series data on average hourly wages for workers in a particular industry. The consumer price index (CPT) values are based on 1997=100:

Years	2006	2007	2008	2009	2010
WAGE (In 10 000frs)	15.30	18.27	20.20	23.47	25.10
CP	170.5	181.5	195.4	217.4	247.7

(Total = 14 marks)

SECTION B: LCCI APPROACH

11.   Musango bus has seven passengers' seats. On a routine trip to Yaoundé, it is estimated that any passenger seat will be filled with a probability of 0.42:

(a) What is the mean and variance of the number of passenger seats on a routine trip.   **(4 marks)**

(b) Calculate the probability that on a routine to Yaounde

      (i)   There will be no passenger   **(2 marks)**

      (ii)   There will be just one passenger   **(2 marks)**

      (iii)   There will be exactly two passengers   **(2 marks)**

      (iv)   There will be at least three passengers   **(3 marks)**

(c) List three characteristics of a normal distribution   **(3 marks)**

(Total 16 marks)

12.   (a)   Give two differences between the net present value and the internal rate of return methods of investment appraisal   **(2 marks)**

(b)   Konye council is planning an investment with the following projected cash flows

Year	0	1	2	3	4	5
Net cash flows	(25 000)	8 000	12 000	9 000	7 000	75 000

    (i)   Using the NDV technique and a cost of 20%, determine whether the investment is worthwhile   **(6 marks)**

    (ii)   Using the IRR technique with discount rates 20% and 25%, determine graphically the IRR   **(6 marks)**

(Total 14 marks)

13.   The price of garri in Cameroon has been increasing over the last five years as, X frs, 4 500frs, 5 250frs, 5 725frs, 6 000frs per bucket. Given the geometric mean multiplier is 1.1066, determine

(a)   The proportional/multiplier for the successive years and the price of garri five years ago.   **(12 marks)**

(b)   The Geometric mean   **(2 marks)**

(Total 14 marks)

14.   What should a potential investor pay to purchase an annuity of 600 000 frs for 9 years compound interest calculated at 6.5%?   **(14 marks)**

15.

	2010		2012	
Item	Unit Price	Quantity	Unit Price	Quantity
Juice	850	2	1085	3
Bread	295	1	365	1
Yogourt	300	1	350	2

(a)   Compute the price and quantity indices of each product.   **(6 marks)**

(b)   Compute the laspeyres price and quantity indices   **(8 marks)**

(Total = 14 marks)

16. A business plan to buy a 50 000 000 frs machine in 5 years from now has two alternatives for saving the money

Plan1. Buy a 5 years note at an interest rate of 9% p.a compounded quarterly and plan 2. Deposit a fixed amount each quarter for 5 years to accumulate the money at an interest rate of 12% p.a compounded quarterly.

Determine

(a) The principal that must be deposited for alter native 1 to yield the required 50 000 000frs.

(4 marks)

(b) The amount that must be invested each a quarter for alternative 2 to yield the required 50 000 000frs

(6 marks)

(c) Which alternative do you advice the business to take. Justify your advice with calculations

(4 marks)

(Total 14 marks)

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17. (a) Distinguish between type 1 and type II errors. **(4marks)**

(b) A market inspector randomly samples the produce on two market stalls. A random sample of 80 apples from TELCA's stall had masses (in gm) having a sample mean of 742 and a sample variance of 24.21. gm^2 An independent random sample of 100 of the cocoa sold by CIC cacoa had a sample mean of $68.23gm^2$.

Assuming a common population variance obtain the pooled estimate of this variance and test, at the 0.01% level of significant evidence that the population of cocoa sold by CIC cacoa has a lover mean mass than that of the population of that was sold by TELCA. **(10 marks)**

(Total 14 marks)

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18. (a) Distinguish clearly between one-tailed and two-tailed test of hypothesis **(4 marks)**

(b) What is :

(i) a statistical hypothesis? **(3 marks)**

(ii) a null hypothesis? **(2 mark)**

(iii) an alternative hypothesis **(2 marks)**

(iv) the level of significance of a test of hypothesis? **(3 marks)**

(Total 14 marks)

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19. (a) Define depreciation and explain any 2 reasons why you think assets should be depreciated **(4 marks)**

(b) Mr Stone bought two machines at 350 000 frs and 700 000frs respectively and the useful lives are 4 and 6 years respectively. Determine the common rate of depreciation that can enable the book values of the two machines to be equal at the end of their useful lives.

(10 marks)

(Total 14 marks)

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20. (a) Mr. PASSPASS makes savings in A.P. After twelve savings he discovered he had an amount of 116 100frs but after 8 more savings his total savings was 229 500frs. Determine

(i) his first saving **(3 marks)**

(ii) his incremental saving. **(4 marks)**

(7 marks)

(b) A researcher observed that the number of microbes growing in a mapped out environment increase in geometric progression (GP) at equal intervals of 30mins.

At the end of the 1st 30min interval 460 were observed and at the end of the 4th, 30min interval 3680 were observed. Estimate the possible number observable at the end of the 7th, 30min interval.

(7 marks)

(Total 14 marks)