UGANDA MARTYRS UNIVERSITY

FACULTY OF BUSINESS ADMINISTRATION AND MANAGEMENT

2021 / 2022

FINAL EXAMS FOR BACHELOR OF BUSINESS ADMINISTRATION AND MANAGEMENT: YEAR 1

Quantitative Methods 1

QM 1201

DATE: 03/03/2022

TIME: 9:30 – 12:30

DURATION: 3 HOURS

Instructions

1. Carefully read through ALL the questions before attempting
2. **Attempt FOUR questions**
3. Ensure that your **Registration number** is indicated on all pages of your answer sheets.
4. Ensure your work is **clear** and **readable**. Untidy work shall be penalized

Question One

Discuss the stages of quantitative techniques as a scientific approach to management. State the possible area of each stage and suggest practical solutions to such problems **[25 marks]**

Question Two

(a) Define the following terms

(i) Linear programming **[3 marks]**

(ii) Constraints **[3 marks]**

(iii) Objective function **[3 marks]**

(b) Zazu Ltd is a computer firm which manufactures and sells computer parts. To produce one unit of a monitor, Zazu requires 4 hours of skilled labor and 2 hours of machine time whereas to produce one unit of keyboard requires 3 hours of skilled labor and 1hour of machine time. Zazu Ltd can only afford 240 hours of skilled labor and up to 100 hours of machine time. The profits from the sale of a unit of these parts are 7euros for a monitor and 5euros for a keyboard. The firm wishes to maximize profits.

(i) Establish the LPP problem **[3 marks]**

(ii) Use the graphical method to find optimal units to be sold and the maximum profits. **[8 marks]**

(iii) Determine the levels of utilization of each resource **[3 marks]**

Question Three

(a. Consider the following table

	Right Handed	Left Handed	Total
Male	0.41	0.08	0.49
Female	0.45	0.06	0.51
Total	0.86	0.14	1

Find the probability that a random selection of a person is :

(a). A male given that he is right handed **[02 marks]**

(b). A female given that she is left handed **[02 marks]**

(c). Is right handed given that he is a male. **[02 marks]**

(d). Is left handed given that she is a female. **[02 marks]**

(e). Are the events being a female and being left handed independent. **[02 marks]**

(b) A Company manufactures and sells a single product in shillings. Estimated sales, costs and selling prices for the coming year are as follows.

Sales units	Probability	Selling price per unit	Probability
20,000	0.4	900	0.3
25,000	0.4	850	0.6
30,000	0.2	800	0.1
Variable cost per unit	Probability	Fixed costs for the year	Probability
600	0.1	1,200,000	0.4
650	0.2	1,500,000	0.6
680	0.5		
700	0.2		

Determine

i. The expected annual profit **[10 marks]**

ii. The worst possible scenario for the coming year **[5 marks]**

Question Four

(a) Three workers of a diary corporation Adam, Betty and Carol seal milk packets. Adam seals 45%, Betty seals 30% and Carol seals 25%. The probability that Adam seals wrongly is 0.3 while the probabilities for Betty and Carol to seal wrongly are 0.2 and 0.1 respectively.

(i) Draw a probability tree diagram for the above scenario **[5 marks]**

(ii) A packet is picked at random; determine the probability that it is not faulty **[3 marks]**

(b) Define the following terms

(i) Effective interest rate **[2 marks]**

(ii) Annuity due **[2 marks]**

(iii) Ordinary annuity **[2 marks]**

(c) An investor is considering investment in Hotel construction in Masaka. The initial cost of the investment is shs.24 millions with associated cash inflows over the following four years being shs.9 millions,shs.13 millions,shs.18millions and 18.5millions respectively. If the cash outflows of the investment over the four years are estimated as shs.10 millions, shs.8 millions, shs.4 millions and shs.3 millions.

(i) Evaluate the NPV of the investment at discount rates of 20% and 10% **[5 marks]**

(ii) At which discount rate is the investment worthwhile? **[3 marks]**

(iii) Calculate the IRR of the investment. **[3 marks]**

Question Five

(a) The cost of fifteen books and twenty pens is 22,000/= and the cost of ten books and fifteen pens is 15,500/=. Using determinant method, find the cost of each item. **[10 marks]**

£20,000 is invested for ten years at an interest rate of 4% compounded annually for the first 6 years and 6% compounded bi-annually for the next 4 years. Find the compound amount at the end of the tenth year [320.57 and 120.57]. **[7 marks]**

(c) John's beginning salary is UGX3,600,000. The annual increase is 52,000 per annum. Determine how much john will earn from the company in the 12 years of service. **[8 marks]**

Question Six

(a) JB Ltd company supply tool kits for some customers. Each tool kit comprises a standard plastic box which contains a variable number of tools depending on the type of tools, the market and the requirements

of wholesalers. The firm has derived a profit function which shows that their profits depend on both the number of tool kits supplied and the number of tools in each kit. The profit function is as follows:-Profit = 8K – 0.0001K2 + 0.05KT – 10,000 where:-K = number of kits and T = number of tools in each kit. Determine the:-

i. Number of tool kits to be sold **[5 marks]**

ii. Number of tools each tool kit contains **[5 marks]**

(b) If an investment company pays 6% compounded semiannually, how much you should deposit now to have $10,000 in 10 years from now? **[5 marks]**

(c) A firm has a marginal profit function (in £) given by:- Marginal profit = 100 – 2Q where Q is the number of units to be sold

(i) Determine the increase in profit in moving from an activity level of 10 units to 15 units. **[5 marks]**

(ii) The output to give maximum sales revenue **[5 marks]**

FORMULA SHEET

1. Straight line depreciation: $S = P_0 + (n - 1)\, d$

2. Compounding at various interval: $A = P(1 + \frac{r}{m})^{mn}$

3. $EAR = (1 + \frac{n}{m})^{m} - 1$

4. $PV_{OA} = \frac{F[1 - (1 + r)^{-n}}{r}$