



UGANDA MANAGEMENT INSTITUTE

POSTGRADUATE DIPLOMA IN PROJECT PLANNING AND MANAGEMENT
(DPPM) DL VII, (DME) DL VII (WKD)

SECOND SEMESTER EXAMS 2017/2018

MODULE: QUANTITATIVE METHODS

Date: Monday 1 October 2018

Time: 09.00 AM – 12.00 NOON

INSTRUCTIONS

1. Answer FOUR Questions.
2. Question ONE of Section A is compulsory and carries 40 marks.
3. Answer any other THREE Questions from Section B. Each question carries 20 marks.
4. Write clearly and legibly.
5. Do not write anything on the question paper.
6. Do not take Mobile Phones into the examination room.
7. Follow the instructions of the Examination Supervisor.
8. Indicate questions answered on the Answer Sheet in the column of Questions.

This paper consists of 6 printed pages.

-GOOD LUCK-

SECTION A:

COMPULSORY

(40 MARKS)

QUESTION ONE

- a) Discuss the application of quantitative methods project management. **(10 marks)**
- b) Comment on the limitations of quantitative methods for decision making in management. **(4 marks)**
- c) The management of **ABC**, a humanitarian organization, has availed you with data on agricultural productivity in thousands of Kilograms for 60 randomly selected farmers in Kityo District as shown in the table below. The organization has been training farmers intensively for three year about modern farming methods with the intention of boosting agricultural output in the District. **ABC** has tasked you to provide baseline statistics upon which it will ascertain the impact of its intervention.

22	23	10	17	39	42
16	33	24	10	47	31
40	23	38	29	25	37
15	14	24	22	25	13
27	29	24	45	28	45
49	23	16	24	23	23
22	34	31	29	22	43
17	21	21	24	35	37
25	20	21	39	41	44
14	24	21	38	23	28

Required:

- i) Construct a frequency distribution table for the above data starting with class 10-14. **[6 marks]**
- ii) Using the data in the table above, determine the mean, median, mode and standard deviation of the farmers' productivity. Which of the calculated averages is most appropriate and why? **[12 marks]**
- iii) If the average agricultural productivity before the training was 30,000Kgs. Test the hypothesis at 5% level whether the training of farmers in modern farming methods has worked in the District and advise management accordingly. **[8 marks]**

SECTION B: ANSWER ANY THREE QUESTIONS FROM THIS SECTION

QUESTION TWO

- a) The terms project and program are many times used interchangeably. Discuss this statement using relevant examples. **(5 marks)**
- b) A manufacturing company has received a special order for a number of units of a special product that consists of two component parts, X and Y. The product is a nonstandard item that the firm has never produced before, and scheduling personnel have decided that the application of CPM is warranted. A team of manufacturing engineers has prepared the following table:

Activity	Description	Predecessor	Expected days
i	Plan production	-	5
ii	Procure materials for part X	A	14
iii	Manufacture part X	B	9
iv	Procure materials for part Y	A	15
v	Manufacture part Y	D	10
Vi	Assemble parts X and Y	C,E	4
Vii	Inspect assemblies	F	2

Required

- i) Construct a graphical representation of the CPM network. **(6 marks)**
- ii) Identify the critical path. What is the length of the time to complete the project? **(2 marks)**
- iii) Draw the Gantt chart. **(2 marks)**
- iv) Comment on the benefits of the CPM model in business management. **(5 marks)**

QUESTION THREE

- a) MK Ltd has to decide whether to launch a new product. If the launch goes ahead, the manager estimates a 60% chance of success. In case of failure, he has already stated that the product must be withdrawn from the market and abandoned. In case of success, the level of marketing support (High or Low) must be determined. Profits are estimated by the financial director to depend on the market size as follows.

	High marketing support	Low marketing support
Large market	\$ 2.400.000	\$ 400,000
Small market	\$ 300,000	\$ 200,000

(Note: these are from sales only, and do not include launch costs)

The marketing director feels there is a 30% chance of the market being large. If the initial launch would cost \$350,000, should it be undertaken. **(10 marks)**

- b) A soap manufacturing company was distributing a particular brand of soaps through a large number of retail shops. Before a heavy campaign, the mean of sales per week per shop was 142 dozens. After the campaign, a sample of 49 shops was taken and the mean of sales was found to be 148 dozens with a standard deviation of 15. Can you consider the advertising campaign effective? (Test the hypothesis at 5 % level). **(10 marks)**

QUESTION FOUR

Linear programming is a decision making technique used by managers of business firms to make decisions in relation to; profit maximization, cost minimization and resource allocation. However for managers to use this technique, several assumptions must be considered. Discuss these assumptions. **(5 marks)**

- b) A firm has 1000 man hours available each week for manufacturing and can spend up to £700 a week on raw materials. They produce only 2 products: Bosco and Momo. It takes 2 man hours to manufacture a unit of Bosco and 1 man hour to manufacture a unit of Momo and it costs £1 in raw materials to make either a unit of Bosco or a unit of

Momo. The firm makes £2 profit on each unit of Bosco and £1.5 profit on each unit of Momo.

Required

- i) Write the objective function and the constraints for this problem
- ii) Use a graph to find out how many of each product the firm should manufacture each week in order to maximize profit. **(8 marks)**
- iii) Briefly discuss the benefits of the linear programming model to business decision making. **(7 marks)**

QUESTION FIVE

Mutamivu Co. Ltd is a leading producer of a special spirit known as 'KNOCK OUT' in Uganda. The company has of recent experienced declining levels of production and the Chief Executive Officer believes this decline is due to pay of the workers. As newly recruited consultant, you have been tasked to establish whether there is a relationship between remuneration and production levels of workers in this company. To enable you accomplish your task, a sample of ten workers in the organization has been selected and below are the findings.

Worker	A	B	C	D	E	F	G	H	I	J
Annual pay in Millions of UG Shs (x)	19	17	16	13	12	12	10	9	6	2
Annual output in millions of units (y)	16	16	15	14	13	13	8	7	4	1

Required:

- i) Determine the coefficient of correlation **(4 marks)**
- ii) Calculate the coefficient of determination. **(2 marks)**
- iii) Comment on the Chief Executive's belief **(3 marks)**
- iv) Find using the least squares method the equation of the regression line to predict the annual output from pay of workers **(8 marks)**
- v) Determine the expected output of a worker earning UG Shs 5.4 million. **(3 marks)**

QUESTION SIX

Discuss the basic factors to be taken into account before computation of Index Numbers. **(4 Marks)**

- (b) The following data was collected from the Suburbs of Mbale Municipality where most of the support staff of the Municipality live.

	2014		2017	
	Unit Price in Shs.	Quantity Consumed	Unit Price in Shs.	Quantity Consumed
Posho	2,000	10 tons	2,200	12 tons
Rice	2,500	6 tons	3,000	5 tons
Meat	7,000	1000 kg	8,000	950 kg
Chicken	15,000	200 birds	20,000	150 birds
Beer	3,000	225 bottles	3,500	180 bottles
Beans	1,800	3 tons	1,500	4 tons

The Municipality is now preparing the 2018-2019 Budget and would want to adjust the salaries of their workers to take into account the changes in price levels. Mutosi Annet was appointed a cleaner in the Municipality in 2014 with a salary of Shs. 280,000 per month. Her salary has remained the same to-date.

Required:

Using each of the following methods of computing Index Numbers, determine the salary that should be provided for Mutosi Annet in the 2018-2019 budget if she is to consume the same basket of goods as she did when she was first appointed.

- i) Simple Aggregative Index Number; **(3 Marks)**
- ii) Laspeyres' Index Number; **(4 Marks)**
- iii) Paasche's Index Number; **(4 Marks)**
- iv) Briefly discuss the usefulness of Index Numbers to a business manager. **(5 Marks)**

END