



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BUSINESS & ECONOMICS**

**UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS
ADMINISTRATION (BBA) AND BACHELOR OF EDUCATION (BED) FOR
THIRD YEAR 2ND SEMESTER ACADEMIC YEAR 2019/2020
MAIN CAMPUS**

COURSE CODE: ABA 315

COURSE TITLE: QUANTITATIVE METHODS FOR BUSINESS I

EXAM VENUE:

DATE: 1/12/20

EXAM SESSION: 3-6 PM

DURATION: 3 HOURS

INSTRUCTIONS

1. Answer QUESTION ONE and any other TWO questions

- 1. Candidates are advised to write on the text editor provided, or to write on a foolscap, scan and upload alongside the question.**
 - 2. Candidates must ensure that they submit their work by clicking 'FINISH AND SUBMIT ATTEMPT' button at the end.**
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QUESTION ONE (30 MARKS) - COMPULSORY

- a) List and discuss the steps of the decision-making process. (10 Marks)
- b) A firm recently built a new plant that will use more than 50 production lines and machines to produce over 500 different products. The production scheduling decisions are critical because sales will be lost if customer demand is not met on time. If no individual in the firm has had experience with this production operation, and if new production schedules must be generated each week, why should the firm consider a quantitative approach to the production scheduling problem? (4 Marks)
- c) Eastman Publishing Company is considering publishing a paperback textbook titled *spreadsheet application for business*. The fixed cost of manuscript preparation, textbook design, and production setup is estimated to be Sh.16 million. Variable production and material costs are estimated to be Sh.600 per book. Demand over the life of the book is estimated to be 4000 copies. The publisher plans to sell the text to college and university bookstores for Sh. 4,600 each.

Required:

- i) What is the breakeven point? (4 Marks)
- ii) What profit or loss can be anticipated with a demand of 3800 copies? (4 Marks)
- iii) With a demand of 3500 copies, what is the minimum price per copy that the publisher must charge to break even? (4 Marks)
- iv) If the publisher believes that the price per copy could be increased to Sh. 5,100 and not affect the anticipated demand of 4000 copies, what action would you recommend? What profit or loss can be anticipated? (4 Marks)

QUESTION TWO (20 MARKS)

- a) What are the two basic requirements of probabilities that must be fulfilled when assigning probabilities to experimental outcomes? (2 Marks)
- b) Discuss the methods commonly used to assign probabilities to experimental outcomes. (6 Marks)
- c) A police force has 1,200 officers, 960 of which are men and the remaining women. Over the past two years, 324 officers have been promoted. Out of the officers promoted, 288 are men and the remaining are women. After reviewing the relevant documents confirming these facts, a committee of female officers filed a discrimination case on the basis of biased promotion with regard to gender. The police administration argued that the relatively low number of promotion for women officers is not due to discrimination but to the fact that few female officer are on the force.

Required:

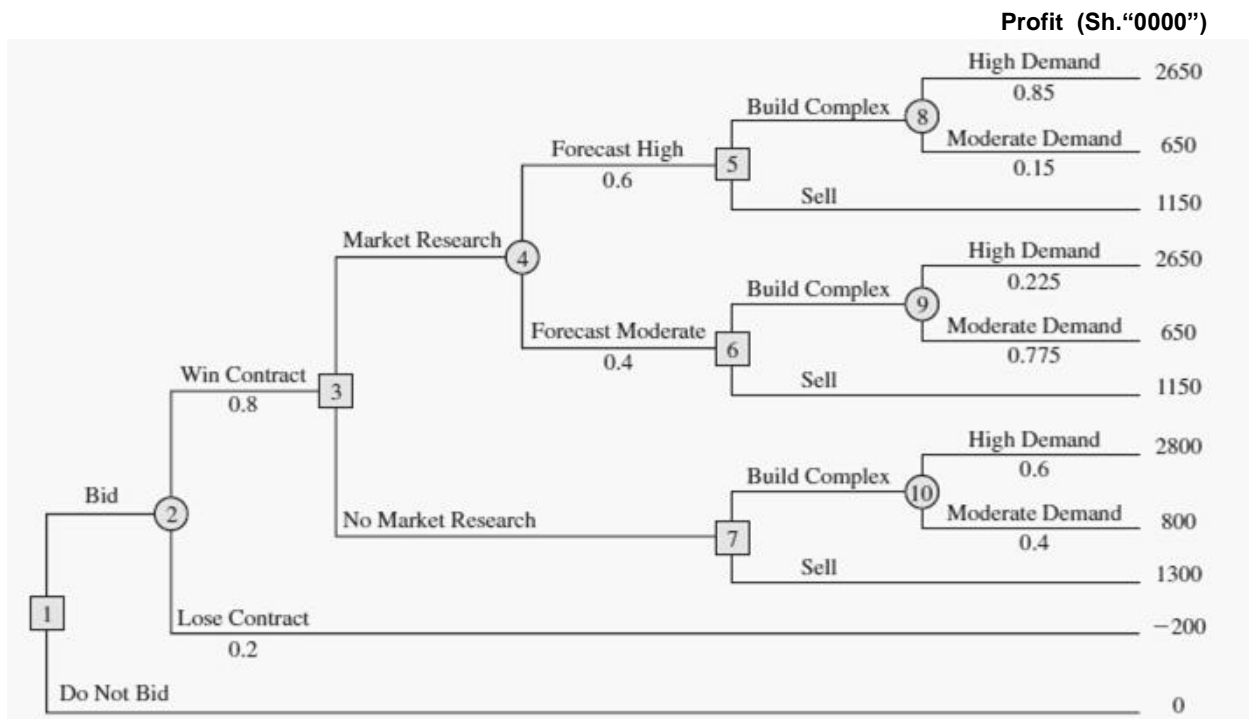
Use conditional probability to judge this case.

(12 Marks)

QUESTION THREE (20 MARKS)

Victoria Development Corporation is considering building on a contract for a new office complex. The decision tree prepared by Victoria’s analysts is shown below. At node 1, the company must decide whether to bid on the contract. The cost of preparing the bid is Sh. 200,000. The upper branch from node 2 shows that the company has a 0.8 probability of winning the contract if it submits a bid. If the company wins the bid, it will have to pay Sh. 2,000,000 to become a partner in the project. Node 3 shows that the company will then consider doing a market research study to forecast demand for the office units prior to beginning construction. The cost of this study is Sh. 150,000. Node 4 is a chance node showing the possible outcomes of the market research study.

Nodes 5, 6, and 7 are similar in that they are the decision nodes for Victoria to either build the office complex or sell the rights in the project to another developer. The decision to build the complex will result in an income of Sh. 5,000,000 if demand is high and Sh. 3,000,000 if demand is moderate. If Victoria chooses to sell its rights in the project to another developer, income from the sale is estimated to be Sh. 3,500,000. The probabilities shown in nodes 4, 8, and 9 are based on the projected outcomes of the market research study.



Required:

- a) Verify Victoria’s profit projections shown at the ending branches of the decision tree by calculating the payoffs of Sh. 2,650,000 and Sh. 650,000 for the first two outcomes.

(5 Marks)

- b) What is the optimal decision strategy for Victoria, and what is the expected profit for this project? (5 Marks)
- c) What would the cost of the market research study have to be before Victoria would change its decision about the market research study? (5 Marks)
- d) Develop a risk profile for Victoria. (5 Marks)

QUESTION FOUR (20 MARKS)

- a) Westside Auto purchases a component used in the manufacture of automobile generators directly from the supplier. Westside's generator production operation, which is operated at a constant rate, will require 1000 components per month. Assume that the ordering costs are Sh. 2,500 per order, the unit cost is Sh. 250 per component, and the annual holding costs are 20% of the value of the inventory. Westside has 250 working days per year and a lead time of 5 days.

Required:

- i) What is the EOQ for this component? (2 Marks)
 - ii) What is the reorder point? (2 Marks)
 - iii) What is the cycle time? (2 Marks)
 - iv) What are the total annual holding and ordering costs associated with your recommended EOQ? (2 Marks)

- b) The following table reports the percentage of stocks in a portfolio for nine quarters form 2007 to 2009.

Quarter	Stock %
1st - 2007	29.8
2nd - 2007	31
3rd - 2007	29.9
4th - 2007	30.1
1st - 2008	32.2
2nd - 2008	31.5
3rd - 2008	32
4th - 2008	31.9
1st - 2009	30

Required:

- i) Compute a time series plot. What type of pattern exists in the data? (4 Marks)
- ii) Use trial and error to find a value of the exponential smoothing coefficient α that results in a relatively small MSE. (4 Marks)
- iii) Using the exponential smoothing model you developed in part (ii), what is the forecast of the percentage of stock in a typical portfolio for the second quarter of 2009? (4 Marks)

QUESTION FIVE (20 MARKS)

a) Lolwe City Developers is coordinating the construction of an office complex. As part of the planning process, the company generated the following activity list. Draw a project network that can be used to assist in the scheduling of the project activities.

Activity	A	B	C	D	E	F	G	H
Immediate predecessor	-	-	A	A,B	A,B	C	D,F	E,G

(5 Marks)

b) Kisumu Sporting Equipment Ltd makes two different types of football goal nets: a regular model and a cute model. The company has 900 hours of production time available in its cutting and sewing department, 300 hours in finishing department, and 100 hours in packaging and shipping department. The production time requirements and the profit contribution per net are given below:

Model	Production time (hours)			Profit per net
	Cutting and sewing	Finishing	Packaging and shipping	
Regular	1	$\frac{1}{2}$	$\frac{1}{8}$	Sh. 500
Cute	$\frac{3}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	Sh. 800

Assume that the company is interested in maximizing the total profit contribution.

Required:

- i) What is the linear programming model for this problem? (3 Marks)
- ii) Find the optimal solution using the graphical solution procedure. How many nets of each model should Kisumu Sporting Ltd manufacture? (3 Marks)
- iii) What is the total profit contribution the company can earn with the given production quantities? (3 Marks)
- iv) How many hours of production time will be scheduled in each department? (3 Marks)
- v) What is the slack time in each department? (3 Marks)

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