



TECHNICAL UNIVERSITY OF MOMBASA
INSTITUTE OF COMPUTING AND INFORMATICS

Select department

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY
BIT 2212: BUSINESS SYSTEMS MODELING
END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other **TWO** questions.

Do not write on the question paper.

Question ONE

- a) Explain the difference between models and simulation (4 Marks)
- b) List at least two disadvantages of the following methods in getting information on reality (6 Marks)
- i) Experiment
 - ii) Analysis
 - iii) Simulation
- d) Explain three approaches used to describe discrete event simulation (9 Marks)
- e) The daily minimum requirement of an animal diet is **60g** of protein, **48g** of fat, and **120g** carbohydrates. The contents of scraps **A** and **B** per kg are as follows:

	Scrap A	Scrap B
Protein	10 g	5 g
Fat	16 g	2 g
Carbohydrates	6 g	24 g

The cost of scraps A and B are **Ksh 9 /kg** and **Ksh 13 /kg** respectively.

Advice a farmer on how to give a diet to the animal which will deliver adequate nutrition at the lowest cost? (11 marks)

Question TWO

In preparation for the rain season, a clothing company is manufacturing sweaters, overcoats, Caps, and gloves. All products are manufactured in four different departments: Cutting, Insulating, Sewing and packaging. The Company has received firm orders for its products. The contract stipulates a penalty for undelivered items. The following table provides the pertinent data of the situation.

Department	Time per Units (hrs)				Capacity (hrs)
	Sweaters	Overcoat s	Caps	Gloves	
Cutting	.30	.30	.25	.15	1000
Insulating	.25	.35	.30	.10	1000
Sewing	.45	.50	.40	.22	1000
Packaging	.15	.15	.1	.05	1000
Demand	800	750	600	500	
Unit profit	\$30	\$40	\$20	\$10	
Unit Penalty	\$15	\$20	\$10	\$8	

You are required to device a model for the optimal production for the company.

(20 Marks)

Question THREE

Neon lights on the U of A campus are replaced at the rate of 100 units per day. The physical plant orders the neon lights periodically. It costs \$100 to initiate a purchase order. A neon light kept in storage is estimated to cost about \$.02 per day. The lead time between placing and receiving an order is 12 days.

Determine the optimal inventory policy for ordering the neon lights. (20 marks)

Question FOUR

Babies are born in a sparsely populated state at the rate of one birth every 12 minutes. The time between births follows an exponential distribution. Find the following

- a) The average number of births per year (5 Marks)
- b) The probability that no birth will occur in any one day (6 Marks)
- c) The probability of issuing 50 birth certificates in 3 hours given that 40 certificates were issued during the first 2 hours of the 3-hour period. (11 Marks)

Question FIVE

Farmer McCoy can plant either corn or soybeans. The probabilities that the next harvest prices of these commodities will go up, stay the same, or go down are .25, .30 and .45, respectively. If the prices go up, the corn will net \$30,000 and the soybeans will net \$10,000. If the prices remain unchanged, McCoy will (barely) break even. But if the prices go down, the corn and soybeans crops will sustain losses of \$35,000 and \$5000, respectively.

- a) Represent McCoy's problem as a decision tree (12 Marks)
- b) Which crop should McCoy plant? (8 Marks)