OLABISI ONABANJO UNIVERSITY, AGO-IWOYE
CENTRE FOR CONTINUING EDUCATION
FACULTY OF SOCIAL AND MANAGEMENT SCIENCES
DEPARTMENT OF ACCOUNTING AND BANKING & FINANCE
2014/2015 HARMATTAN SEMESTER EXAMINATIONS

COURSE CODE/TITLE: ACC 305: OPERATIONS RESEARCH I
INSTRUCTIONS: ATTEMPT QUESTIONS 1 & 2 AND ANY OTHER TWO (2) QUESTIONS

TIME ALLOWED: TWO (2) HOURS

Q1.

i) ..... defined Operations Research as 'an applied decision theory'

ii) The methodology of Operations Research are ..... and .....

iii) The model which represent dynamic situation is known as .....

iv) Given a material constraint $12A + 10B \leq 3500$ and a shadow price of N5, what is the total contribution?

Use the following information to answer questions vi-viii

Monthly demand of a component is 2,000 units at a cost of N20 each. Cost per order is N18 while handling cost is 12%.

v) What is total controllable cot of the order?

vi) What is the number of orders?

vii) What is the length of inventory assuming 320 days in the year

viii) What is the total cost of the order?

ix) With discounts, as order level increases, ordering cost tends to ..... while handling cost .....

x) Just in time system focuses on ..... and .....

xi) Probabilistic simulation is otherwise referred to as .....

Use the following information to answer questions xii to xiv

Demand	10	20	30	40	50	60
Frequency	21	18	22	18	11	10

and tag numbers: 2 9, 6 0, 5 1, 1 3, 5 0, 4 2, 7 8, 4 2, 5 2, 2 4, 6 1, 8 2, 0 8, 1 6, 3 2

xii) What is the demand in day 10?

xiii) What is the total demand up to day 7?

xiv) Assuming that there is the daily order of 40 units and that any excess of order cannot be used subsequently, what is the total scrap to day 7?

xv) A sensitivity margin of 21% to cost of capital means that .....

Use the following information to answer questions xvi and xvii

A total population of 2,000 bulbs with the probability of failure of 0.1, 0.3, 0.2 and 0.4 in the respective week are maintained by Associate Ltd.

xvi) What is the number of failure, ceteris paribus?

xvii) What is the number of failure in the third week if mixed replacement is considered?

xviii) Finite horizon of replacement is associated with assets that fail .....

xix) Given a replaceable asset of 5 year life with optimum replacement period of 4 years and 280 days in the year, state the formulae for determining the minimum daily hire rate.

xx) Given a labour constraint, $3A + 6B \leq 2800$. At an optimal level of 230 units of A, 180 units of B and a total contribution of N196,570, what is the shadow price of this constraint?

(20 marks)

Product	Selling Price per unit(₦)	Variable Costs per unit(₦)
A	15.00	6.50
B	18.50	9.50

You are *REQUIRED* to use graphical method to determine the optimal production plan in the following period and determine the shadow price of each of the constraints, if any. Ignoring the possibility of extending the product range, determine whether overtime working would be worthwhile, and if so, state how many overtime hours should be worked. (18 marks)

b. Briefly distinguish between the iconic and analog models, citing an example each (2 marks)

Q3.a. A particular item has a demand of 9000 units half yearly. The cost of one procurement is ₦100, cost of information is ₦20, transportation cost is 10% of the unit price, legal cost is 3% of the unit price, storage cost is 8%, Interest rate is 2% and obsolescence rate is 3%. The unit price of the item is N200. The replacement is instantaneous and no shortages are allowed.

You are required to determine:-

(i) The economic lot size. (4 marks)

(ii) The number of orders per year (2 marks)

(iii) The time between orders assuming 320 days in a year. (2 marks)

(iv) The total cost per year (3 marks)

bi. List the FOUR (4) categories of costs that must be reported in the pursue of total quality management (2 marks)

bii. State FOUR (4) justifications for a JIT system (2 marks)

Q4. Ajirebi won ₦1,400,000 from Baba Ijebu and considers investing this sum in either of projects A or B. The cash flows which have the following probabilities for the next financial year are as shown below:

Prob.	Project A ₦	Prob.	Project B ₦
0.15	600,000	0.15	400,000
0.20	700,000	0.25	600,000

0.35	800,000	0.30	800,000
0.20	900,000	0.20	1,000,000
0.10	1,000,000	0.10	1,200,000

His friend who is a renowned financial manager recommended that he should invest the amount in treasury certificates recently issued by federal government, which has an interest rate of 8%.

You are required to determine:

(a) Expected value of cash flows

(b) Standard deviation

(c) Co-efficient of variation

(d) Which of the investment should be undertaken and why.

Q5a. Briefly explain FIVE (5) of the successful areas of operations research (21/2 marks)

b. State FIVE (5) benefits associated with early replacement of assets (21/2 marks)

C. CHAPMAN PLC operates a machine which has the following cost and revenue structures over its four years life. Purchase cost of the machine was ₦ 50 M.

	Year 1	2	3	4
	₦'000	₦'000	₦'000	₦'000
Running cost and Cash Expenses	15,000	20,000	25,000	30,000
Scrap Value	30,000	20,000	15,000	5,000

Required.

(i) How frequently should the machine be replaced assuming a cost of capital is 10%?

(ii) Assuming this machine is on hire for 250 days per annum and the min annual rate of return is 20% on the purchase cost of the asset what will be the minimum dut hire rate?

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