BOWEN UNIVERSITY,IWO

FACULTY OF SOCIAL AND MANAGEMENT SCIENCES

DEPARTMENT OF BANKING AND FINANCE

Bsc DEGREE PROGRAM

FIRST SEMESTER EXAMINATION 2013/2014 SESSION

Time:3hrs

COURSE TITLE:OPERATIONS RESEARCH
COURSE CODE:BFN 433

INSTRUCTION:ANSWER ANY FOUR QUESTIONS

1. Adah and Sons Nig Ltd. Has three warehouses situated in the Northern part of Nigeria .The warehouse capacities are 100,250 and 150 for W1,W2,and W3 respectively. T he units required by four retailers ,R1,R2,R3 and R4 are 90,160,200 and 50 respectively. The transportation costs (Naira)per unit between the whosalers and retailers are given in the matrix below:

Retailer/Wholesaler	R1	R2	R3	R4
W1	30	25	40	20
W2	29	26	35	40
W3	31	33	37	30

REQUIRED:(a)Formulate the problem as a transportation problem.

(b)Determine the transportation cost using(i) North West Corner rule(ii) least cost method. (ii)Vogel approximation method

17.5MARKS

2. (a)What are the assumptions of linear programming?

(b) Solve the linear programming problem below using (i)graphical method. (ii)algebraic method.(iii)Simplex method

Maximise $Z = 10x+12y$

Subject to: $6x+12y<240$(A Constraint)

$8x+6y<180$(B Constraint)

$X,y\geq 0$ (non negativity axiom)

17.5MARKS

3 A Company producing a good needs to supply 60,000units per year to its customers .If the set up costs and holding costs are N50 , the unit price is known to be N60 and the storage cost amount includingninsurance premium to 15.5%.Determine(a)Economic Order Quantity (b)Inventory Cycle (c)Optimum number of orders per given period of time (d)Total Cost

17.5MARKS

4.

Activity	Preceding Activity	Duration(days)
A	-	4
B	A	3
C	A	2
D	B	4
E	C	1
F	D,E	4
G	A	6
H	F,G	4
I	H	3

REQUIRED:(a)Construct a network diagram.(b)Determine the critical path.(c)What is the total duration of this project? (d)Explain the three types of floats in network analysis **17.5MARKS**

5.(a) JE VA NIG PLC wants to know the optimum time to change their newly acquired machine. The purchase cost is N96,000 with the following data:

YEAR	1	2	3	4	5	6	7	8
Machine at year end	72000	54000	42000	33000	27000	22500	18000	15000
Maintenance Cost	3000	6000	9000	12000	15000	18000	24000	30000

You are required to advise the company on the optimum time to replace the machine,in the light of the above data.

(5)(b) ABC Ltd uses 1000 electric bulbs in its factory.The data for the failure rate have been collected as follows:

month	1	2	3	4	5
cumulative failure rate per month	10	25	50	80	100
Probability of failure	0.10	0.15	0.25	0.30	0.20

Calculate:(a)The average life span per bulb (b)The average replacement per month. **17.5MARKS**

6. Write short notes on the following(A)Queue (B)Classes of Queuing Systems

(C)Simple Queue Characteristics(D)Queue Discipline. **17.5MARKS**