Question 5.

(a) Define a game.

(b) Explain the term on 'Saddle Point'.

(c) In a game involving 2 Players A and B, A has 4 possible strategies p, q, r, s and B has 5 possible strategies j, k, l, m, n. The result of any 2 are as follows:

Play	pj	pk	pl	pm	pn	qj	qk	ql	qm	qn
Payoff	B90	B30	B10	B30	even	B60	B50	B40	B60	B70
Play	rj	rk	rl	rm	rn	sj	sk	sl	sm	sn
Payoff	A20	B40	B30	B30	B80	B50	B60	B20	B20	A10

All payment are made in Naira, where 'X7' means X pays the opponent ₦7.

(i) Draw up a payoff matrix of this game.

(ii) Find the value of this game?

(iii) What type of game is this?

UNIVERSITY OF AGRICULTURE, ABEOKUTA.
DEPARTMENT OF MATHEMATICS.

FIRST SEMESTER 2009/2010 B.Sc DEGREE EXAMINATION

COURSE TITLE: MTS 363 – OPERATIONS RESEARCH
Time Allowed: 2 Hours
Instructions: Answer any three (3) Questions.

Question 1.

(a) What do you understand by Operations Research?

(b) Give a mathematical model of a linear programming problem. (Define all your variables)

(c) UNAAB Farm has 100 acres of land, 100 hours of labour in March and 80 hours of July labour, which limit the programme selected. Four crops are possible viz – corn, oats, soyabeans and wheat. The per acre yields, prices, variable cost, returns e.t.c. are as follows:

Item	Corn	Oats	Soyabeans	Wheat
Yields/acre (Measures)	40	30	30	12
Price/measure (₦)	1.25	0.60	2.0	2.5
Gross Returns/Acre (₦)	50	18	60	30
Variable Cost/Acre (₦)	20	8	20	18
Net Return above fixed cost/acre (₦)	30	10	40	12
March labour/acre (hours)	0	1	0	0.5
July labour/acre (hours)	1	0	2	0

Formulate a Linear Programing to advise UNAAB Farm on programme selection. (You don't have to solve the problem).

Question 2.

(a) Define an artificial variable?

(b) Explain the Big – M Simplex Method.

(c) Min. $Z = 4x_1 + x_2$

Subject to $3x_1 + x_2 = 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 3$

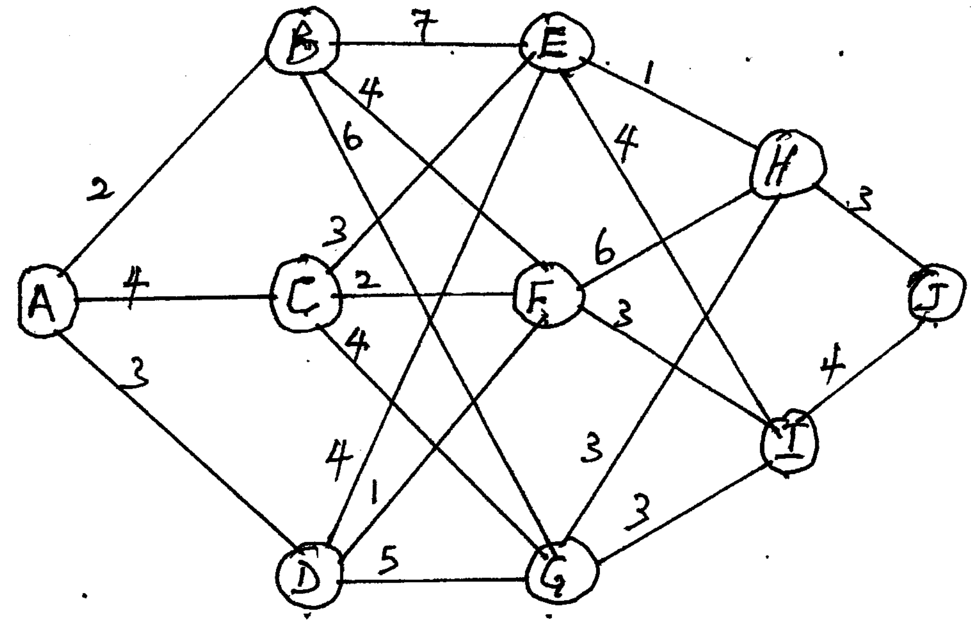
$x_1, x_2 \geq 0.$

Question 3.

(a) What do you understand by Dynamic Programming?

(b) A fortune seeker was to travel to the west. The journey involved traveling by stage – coach through unsettled countries where there were serious danger of attack by marauders. Although his starting point and destination were fixed, he had considerable choice as to which territories he traveled enroute. His journey had four stages as shown in the diagram below: In the diagram, letters denote countries, while numbers denote the policy costs.

As a prudent man who was safety conscious, he took some insurance policy before leaving. The cost of the policy depended on the route he selected, since the greater the danger, the higher the cost. Hence determine the route with minimum cost.



Question 4.

(a) Explain Economic Order Quantity as applied to inventory models.

(b) Mention 3 variations of economic order quantity models that you know.

(c) Neon lights on Campus are replaced at the order of 100 units per day.
Maintenance Department orders the replacement Periodically. It cost ₦100 to initiate a purchase order. A Neon light kept in storage is estimated to cost about 2 Kobo per day. Determine the optimal inventory policy for ordering the Neon light.