NATIONAL OPEN UNIVERSITY OF NIGERIA

91, CADASTRAL ZONE, UNIVERSITY VILLAGE, JABI, ABUJA

FACULTY OF MANAGEMENT SCIENCES

2021_1 EXAMINATION 1234

COURSE CODE: ENT 704: QUANTITATIVE METHODS.

CREDIT UNIT: 2

TIME ALLOWED: 2 HOURS

INSTRUCTIONS:
1. Indicate your Matriculation Number clearly
2. Attempt questions one (1) and any other two (2) questions. Three questions in all
3. Question one (1) is compulsory and carries 30marks, while the other questions carry 20marks each.
4. Present all your points in coherent and orderly Manner

1. {a}Consider a transportation problem with three warehouses and four markets. The warehouse capacities are: $a_1 = 3$, $a_2 = 7$, $a_3 = 5$.
The market demands are: $b_1 = 4$, $b_2 = 3$, $b_3 = 4$, $b_4 = 4$.
The unit cost of shipping is given below:

	P_1	P_2	P_3	P_4
W_1	2	2	2	1
W_2	10	8	5	4
W_3	7	6	6	8

Required: To determine distribution schedule and total transportation cost using North West Corner Rule and Least Cost Method.
{b} Explain any five significant factors in a layout decision of a manufacturing company.

2. An operation manager is faced with the task of selecting one of the three possible locations for a project. Cost data relating to each possible location is given in the table below. The mandate is to select a location most economical for the production of an expected volume of 2000 units per annum.

LOCATION	FIXED COST PER YEAR N	INPUTS/UNIT N	LABOUR/UNIT N
OYO	35000	25	50
OGUN	50000	30	15
ONDO	65000	20	10

3{a} Define the following terms as used in network analysis: (i) Project (ii) Event (iii) Activity (iv) Float

(v) Critical path.

{b} The following table show the activities at LAFENWA manufacturing industry

Activity	Predecessor	Time Duration
A	-	5
B	A	7
C	A	10
D	B	4
E	B	6
F	C	9
G	C	12
H	E,F	4
I	D,H,G	6

Required: (i) Construct a network of the table (ii) Identify the paths and the critical path.

(iii) Evaluate the EST, EFT, LST and LFT (iv) Compute the floats for all the activities.

4. The production manager of IKIRUN manufacturing company has eight jobs to process through the job shop. Each job has a specified routing and pattern. You have been consulted to assist in recommending an optimal sequencing pattern for the jobs through the machines with the following information in respect of the jobs.

Job	Processing time (days)	Due date (days)
A	4	9
B	10	18
C	6	6
D	12	19
E	7	17
F	14	20
G	9	24
H	18	28

(a) Use the Shortest Processing Time rule (SPT) and First Come First Serve (FCFS) to obtain the most optimal sequencing pattern for the jobs in line with the following criteria:

(i) Average flow time (ii) Average Number of jobs in the system (iii) Average job lateness (iv) Utilization of the work centre.

(b) “Production management centre on five subset elements” Elucidate.