FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
DEPARTMENT OF MECHANICAL ENGINEERING
RAIN SEMESTER EXAMINATION SESSION: 2013/2014
COURSE TITLE: PRODUCTION PLANNING AND CONTROL COURSE CODE: IPE 502 TIME: 3HOURS

INSTRUCTIONS: ANSWER FIVE QUESTIONS ONLY

1(a) Make a diagram to indicate the Process of Planning for Manufacture.

(b) A manufacturing company receives orders as follows: 50, 40, 30, 20, 15 units for the following assembly A, B, C, D, E respectively where each unit contains 100, 80, 70, 50, and 60 different components. Tabulate the plan for manufacturing A, B, C, D, and E assemblies.

2(a) Three machines A, B, C are used to process six products as shown in the table below: (Time in Hrs).

PRODUCTS	A	B	C
1	5	4	2
2	1	3	7
3	6	8	3
4	2	1	3
5	4	7	6
6	1	1	1

Using Johnson's rule to indicate the most economic sequence in which the machines can process the products.

(b) Based on your sequence, schedule the products using the Gnantt for one week, assuming hours of work from Monday to Saturday is 8A.M to 4PM with break every day at 1 PM to 2Pm. (Schedule only for machines A and B).

3(a) In layout design, Process layout is positively flexible but this is a problem. Comment.

(b) Product layout is not flexible but rigid and this creates a problem. Comment.

(c) State the advantages of process layout over product layout.

4(a) It takes a lathe 30 mins to machine a workpiece and a milling machine also 30 mins, a drilling machine 15 mins and a welding machine 10 mins. To reduce idle time how many milling machines, drilling machines and welding machines would accompany 4 lathe machines in the job?

(b) State the assumptions made in 4(a) above.

(c) Question 4(a) above is a simple transfer line. What action will you take when the times for various processes change?

5(a) Sketch the three Component Cost and Batch Quantity Curve with associated total cost and fully label it.

(b) The Total Cost Equation is given as $4Q + \frac{100}{Q} + 1$, where Q is quantity; the inventory charge is 50 dollars and set up cost 10 dollars. Calculate the Economic Order Quantity (EOQ)

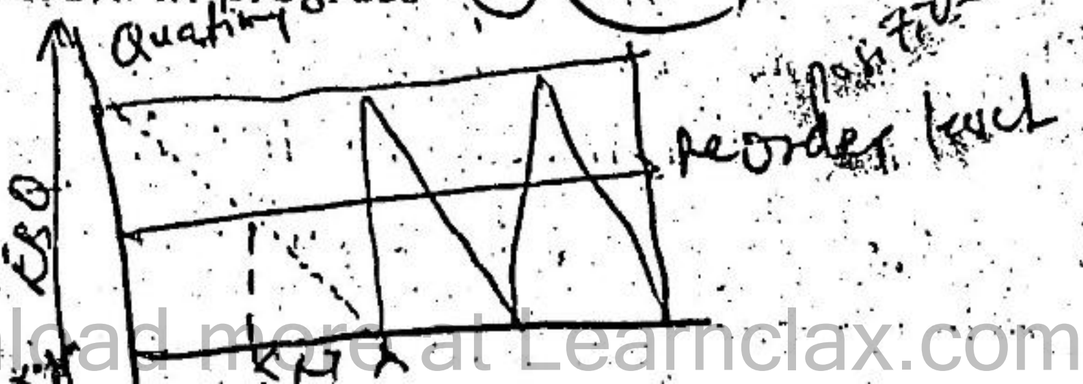
(c) State the Importance of Work-in-progress In a company making upholstery chairs.

6(a) Make a sketch to indicate a fixed order quantity Inventory management.

6(b) Make another sketch to indicate a fixed order cycle management of Inventory. (Label both sketches).

(c(i) State reasons why mass production does not feature work-in-progress

(c(ii) What are the four costs of work-in-progress



FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

2014/2015 RAIN SEMESTER EXAMINATION
IPE 502 PRODUCTION PLANNING AND CONTROL TIME ALLOWED 3HRS

INSTRUCTION: ANSWER FIVE QUESTIONS

1 Five jobs 1,2,3,4 and5 must be processed on each of three machines: A, B & C, in that order. Process times are given in the table below.

	JOBS				
	1	2	3	4	5
Machine A	5	4	9	7	6
Machine B	3	2	4	3	1
Machine C	8	3	7	5	2

a. Use Johnson's Rule to determine the best sequence for the five jobs.
b. Use GANTT chart to show an optimum schedule for the jobs.

2 We have the following data for an item we purchase regularly: annual requirements =10,000 units; order preparation cost = N250, inventory holding cost = N100 per unit per year.

a. Calculate the economic order quantity (do not make any assumptions)
b. Calculate the number of orders that must be placed each year.
c. Calculate the annual cost of placing orders.

3 The set up cost (ordering) for a component is given as **{2000/3Q + 50}** and the inventory cost is given as: (Q + 300), where Q =Quantity ordered. If the constant cost is 300, calculate:

a. Economic order quantity (b.) Total cost at economic order quantity
c. On a sketch indicate the three components of the total cost and label clearly.

4 (a.) On a chart only illustrate the principle of fixed order quantity inventory model were EBQ =50; lead time = 1 day, Reorder level =25 and buffer stock = 5
(b.) On another table generally indicate the principle of fixed order cycle inventory model.
Label: Order Quantity, review period, buffer stock and lead time.
(c.) Using a sketch only to indicate the ABC analysis. Label clearly.

5 A manufacturing company receives the following orders: 500,400,300,200,150 of A, B, C, D and E assemblies respectively. Number of components in A, B, C, D and E are 100,80,75,50 and 60 respectively.
a. Tabulate the manufacturing plan.
b. If each unit of A,B,C,D and E take 20,50,45,60 and 30 hours respectively to machine and assemble, indicate tabularly how many hours it would take to execute the orders.

6 (a) Make a diagram to illustrate queuing and % capacity utilization.
(b) A lathe takes 45mins to machine a component; a milling machine takes 30mins, a drilling machine takes 20 mins and a welding machine takes 15mins to machine the same component.
Given 2 lathes to do the job, how many milling, drilling and welding machines would be engaged with the two lathe machines?
(c) Comment appropriately on your answers to 6(b) above.

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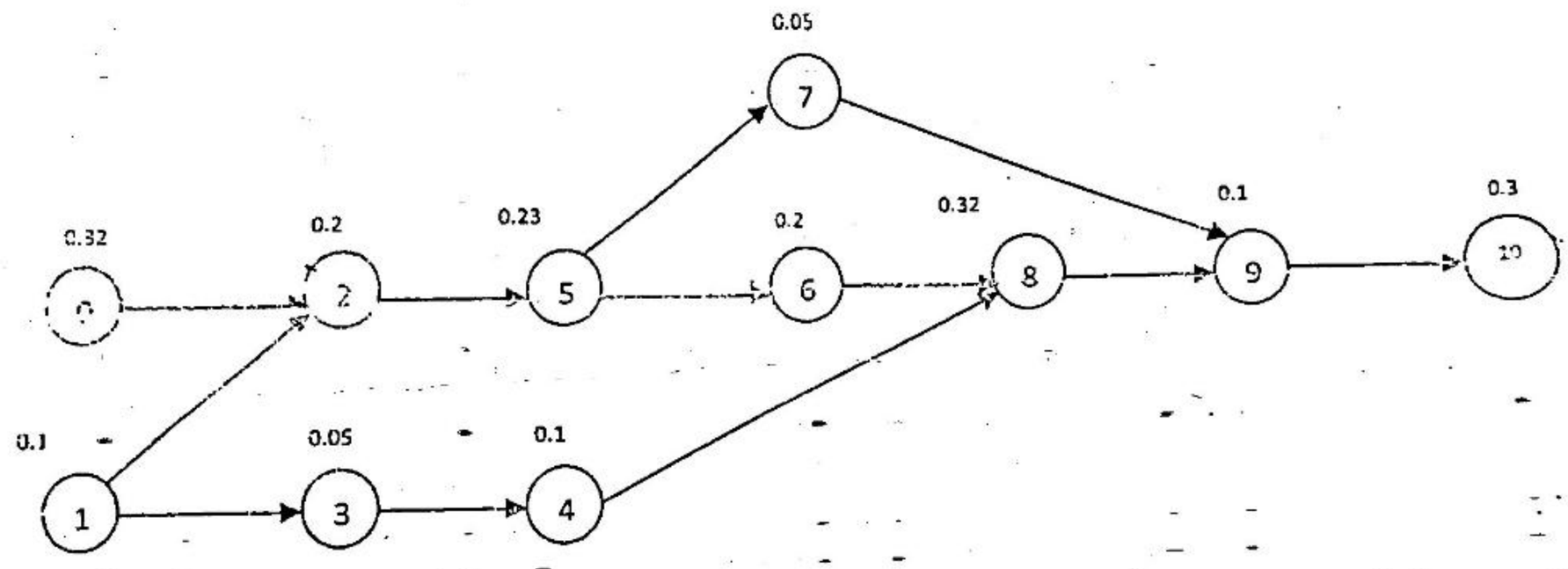
2017/2018 Rain Semester Examination
COURSE: IPE 502 – Production Planning and Control.
TIME: 3 Hours, Answer **FIVE** Questions Only. DATE: 31/08/18

1. (a) Explain the least square method of forecasting.
   (b) What are the limitations of moving average method?

2. (a) Star papers Ltd uses simple exponential with smoothing constant of 0.4 to forecast demand. The forecast for October was 315 units and the actual demand turns out to be 300units. November and December demands were 350 and 400 units respectively. Forecast the sales for January.

3. (a) A company is engaged in the assembly of an item. The information regarding assembly steps and precedence relationship is given below. Find the minimum number of work stations, balance delay and line efficiency.



4. Using a well labelled sketch, illustrate the features of upper stock level, lower stock level, reorder level, and indicate their significance to production planning for a named process.

5. (a) Identify the seven main elements of production planning and control.
   (b) Write short notes on the impact of any five main elements identified above.

6. (a) Enumerate the objectives of Production Planning and Control.
   (b) How would you apply work study techniques in the management of any named production planning operation?
   (c) Clearly outline the process flow in such operation and the associated risk.

7. What is production programming? Using any specific industry, explain "reliable delivery" to the customer.

NWABUGHOGU WINSTON .U.

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
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2018/2019 RAIN SEMESTER EXAMINATION
COURSE: IPE 502 – Production Planning and Control.
TIME: 3 Hours, Answer FIVE Questions.

DATE: 23/10/19

1. a) Compare least square and exponential smoothing method, what are the limitations of moving average method.
   b) The data given below refers to past sales of a product.

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sales '000	35	50	48	47	53	58	68	79	92	85	96

If the smoothing factor of 0.5 is used, forecast the sales for the next two years

2. a) Define; i. design capacity, ii. System capacity, iii. Installed capacity, iv. Licensed capacity, and v. Rated capacity
   b) The lead time to procure the raw material from a supplier is 4 weeks. The present stock is 54 kg of the material. There is also a scheduled receipt of 45 kg of it in 4 weeks. The production requirements over the period of next 9 weeks are;

Week	1	2	3	4	5	6	7	8	9
Amount required (Kg)	24	-	29	11	-	5	19	27	18

Order quantity is 45 Kg. find the planned order releases.

3. a) A company wishes to assign 4 salesman to 4 deports. The volume of sales matrix is given below. Make the optimal assignment which result in maximum volumes of sales.

	Deports			
Salesmen	A	B	C	D
1	300	420	400	250
2	400	200	250	350
3	375	400	350	500
4	350	420	300	400

b) There are four machines W, X, Y, and Z. Three jobs A, B, and C are to be assigned to 3 machines out of the 4 machines. The cost of assignment is given below. Find out the optimal assignment.

	W	X	Y	Z
A	10	8	18	32
B	15	13	24	18
C	19	17	28	17

4. (a) Define inventory (b) state 4 advantages of inventory (c) Explain the following types of inventory (i) Raw material inventory (ii) Work-in-progress inventory (iii) Finished goods inventory. (iv) Tool inventory.

5. A company entered into contract for the purchase of 12500 precision instruments at the rate of 250 Dollar per instrument during the year. The deliveries of the instruments will be made each time half a month after the order is placed. The company estimates its carrying cost to be 48 Dollar per instrument per annum. The cost of paper work, follow up, transportation and receipt work is 2000 Dollar. Calculate (i) the economic order quantity (EOQ) (ii) the number of orders in a year. (iii) The re -order point (ROP)

6. (a) with the aid of a well labelled diagram explain inventory cost relationships. (b) Write short notes on the following: (i) safety stock (ii) order cycle (iii) re-order level and (iv) lead time. (c) State two advantages of ABC analysis. (d) Derive the expression for economic order quantity (EOQ) with instantaneous stock replenishment stating clearly the assumptions made.