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M.TECH
IMPC 102

1st Semester M.Tech Regular / Back Examination – 2015-16
PRODUCTION PLANNING AND INVENTORY CONTROL
BRANCH: INDUSTRIAL ENGINEERING AND MANAGEMENT

Time: 3 Hours
Max marks: 70
Q.CODE:T1259

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

a) Distinguish between mechanization and automation.
b) What are the criteria for rating hotels in star?
c) What type of layout is used for aircraft building and why?
d) Write the name of various Priority Dispatching Rules used in job-shop scheduling.
e) What is forecasting by linear regression analysis?
f) What are the inputs and outputs of MRP?
g) What is Reserve Stock? List the factors that determine safety stock.
h) What is Delphi Method?
i) Compare Level Output Rate plan and Chase plan production strategy.
j) 'Some organizations create shortages intentionally' – Do you agree with this statement? Why?

Q2 a) State Johnson's algorithm for 'n' jobs through 2 machines and 3 machines. (3)

b) Calculate the trend adjusted forecasts using the following data: (7)

Quarter	1	2	3	4	5
Demand	231	201	198	207	220

Further given initial estimate=208,initial trend=0,α=0.2, β=0.1

Q3 a) Compare between job and cellular production systems. (4)

b) A bookseller buys 2500 copies of a book 'Production Planning' every year. The OC is Rs.1000 per order. The CC is 5% of the inventory value. The price of a copy of the book is Rs. 400. The publisher of the book offers 1% discount if purchases are made in lot of 1250 or more. Should the bookseller opt for the discount option or the follow the EOQ model? (6)

Q4 a) What are the features of batch production? Derive the expression for Economic Batch Quantity. (6)

b) What are the types of demand pattern in forecasting? Explain them with suitable sketches. (4)

P.T.O.

Q5 a) A control Panel consists of 3 nos. Electronics circuit and 6 nos. Electric circuit. Each Electronics circuit consists of 4 Transistors and 5 Rectifiers and each Electric circuit consists of 3 same Rectifiers and 1 control fuse. The lead time of each component are mentioned below. Draw the Product Structure and Material requirements plan of the various items involved if 50 units of control panel to be shipped out on day 10.Specify as to when an item is required and when to be ordered and in what quantities. (7)

Lead Times	
Control Panel	1 day
Electronics circuit	3 days
Electric circuit	2 days
Rectifier	3 days
Transistor	4 days
Control Fuse	1 day

b) What is meant by aggregate planning? Why is it required? 3

Q6 A company is setting an assembly line to produce 500 units per day. The production time per day is 420 minutes. The information regarding work elements in terms of times and immediate predecessors are given (10)

Work Element	Time(Sec)	Immediate Predecessors
A	45	None
B	11	A
C	09	B
D	50	None
E	15	D
F	12	C
G	12	C
H	12	E
I	12	E
J	08	F,G,H,I
K	09	J

Find the minimum number of work stations, balance delay and line efficiency.

Q7 a) Explain the basic principles of JIT manufacturing system. (5)

b) There are six jobs to be processed through three machines M1, M2 and M3. The processing time (in hours) required for each job is given below. (5)

Machine		M1	M2	M3
Job	A	11	7	18
	B	18	7	7
	C	15	9	12
	D	13	5	15
	E	9	8	10
	F	12	7	18

Determine the optimal sequence. Find total time elapsed to complete the jobs and idle time for each machine

Q8 a) What do you mean by FMS? (2)

b) Explain MPS with a suitable example. (3)

c) The following figure shows two layout options for facility. The distance between any two adjacent departments is 10 m. No diagonal movement is possible. Table 1 shows the department processing sequence of various products and their quantities produced per month. Which layout is better in terms of lower total loaf-distance value? (5)

Layout A				Layout B		
5	4	2		4	3	6
3	1	6		5	2	1

Table 1

Product	Department processing sequence	Quantity per month (units)
M	6-4-3	1000
N	1-5-2	2000
O	4-2-6	3000