[Time: Three Hours] [Marks:60]

Please check whether you have got the right question paper.

N.B:
1. Question No.6 is compulsory. (30 Marks)
2. Attempt any THREE Questions from Ques 1 to Ques 5 (10 Marks each)

Q1 (a) Explain what is meant by 'decomposition of time series'. (4)

(b) A chemicals manufacturing company has the following production (in tons) (6)

Year	2009	2010	2011	2012	2013	2014	2015
Production	77	88	94	85	91	98	90

(i) Fit a straight line by regression, least square method.

(ii) What is the monthly increase in production?

(iii) Estimate the production for the year 2017.

Q2 (a) Discuss the process, or functional layout. (5)

(b) ABC Co. Ltd. is setting up an assembly line to produce 192 units per 8 hour shift. The information regarding work elements, about the time and immediate predecessors are given below:

Work Element	Time (Seconds)	Immediate Predecessors
A	40	-none -
B	80	A
C	30	D, E, F
D	25	B
E	20	B
F	15	B
G	120	A
H	145	G
I	130	H
J	115	C, I

(i) Draw the precedence diagram.

(ii) What is the desired cycle time?

(iii) How many number of work-stations are required theoretically?   (5)

Q3 (a) Explain the strategies to meet the capacity demand.   (5)

   (b) The accounting and production data, for a small plastic part MQ437, reveals
   that it costs Rs. 2 per part, and its Ordering costs are Rs. 36 per order. The
   cost of carrying inventory is 9 % of the average annual inventory.
   The quarterly demand is estimated to be 250 units.
   (i) What should be the Economic Order Quantity?
   (ii) What should be the optimal number of orders?
   (iii) How frequently should orders be placed?   (5)

Q4 (a) Discuss the characteristics of Job Shop, and Continuous Production.   (5)

   (b) A foreman wants to process four different jobs (P, Q, R, and T) on three machines –
   Shaping machine, Drilling machine, and Tapping machine; all jobs follow the same
   sequence : Shaping – Drilling – Tapping. The time taken by each job on each of the
   machine (in minutes) is as given:

Job	Shaping (minutes)	Drilling (minutes)	Tapping (minutes)
P	13	3	18
Q	18	8	4
R	8	6	13
T	23	10	8

Decide the optimal sequence for the four jobs so as to minimize the elapsed time,
also find the idle time on each of the machine.   (5)

Q5 Write short notes on any TWO   (10)
(i) ERP   (ii) Product-Process matrix   (iii) JIT   (iv) Batch Sizing

Q6 (a) Read the case and answer the questions: (30)

   Sudhir, the G.M. of a tier-3 supplier of automobile parts, leaned forward to read an urgent
   email that ahs just arrived from one of his major customer. The email read as follows:

"To all our Preferred Suppliers,

Due to our commitment to our major OEMs, we will in future be doing all our supply chain business by way of Internet, Email, and EDI. This includes order preparation, bidding, forecasting, production scheduling, delivery monitoring , cost control, accounts payable and receivables, market and advertisement planning, manpower requirements, engineering specifications and so on. To maintain compatibility with our systems, you need to invest in a specific set of EDI hardware and software, available from XYZ Company. Although the hardware and software are expensive, we anticipate that the cost savings and increased business over the coming years can more than offset the additional cost.

If most of our suppliers like you, give positive response for the new EDI system, we as a special case negotiate with the XYZ Company for discount in prices, or longer credit terms.

Please let us know if we can count on you as one of our preferred suppliers,as we move our supply chain into the new information age.

Manoj Mathur
Managing Director – ABC Ltd."

Sudhir, was working with PQR company, for more than a decade. He had read about these new technologies in the magazines, and sounded promising. But he had come across some horror stories too. In one case, a customer had forced its suppliers to obtain production schedules from its website. Initially it worked well, but when one major order of their got cancelled, the same was not posted on the website. Hence, the suppliers landed with unwanted parts / components, which the customer was not willing even to partly reimburse. In another case, a customer gave order to its supplier on the internet, and the parts received from it, were found to be consistent with the earlier version of manufacturing specifications.

Sudhir believed that this new technology was indeed the future of the industry, but was concerned about getting in too early, and being stuck with the wrong / proprietary equipment. This new way of working would cut costs, and lead to better business with one major customer – i.e. ABC Ltd. However obtaining the EDI system would be a major financial investment, and if at all ABC Ltd. at some later stage backed out of EDI, then it would be a big problem.

Sudhir was not sure what to do.

(i) Identify the trade-offs facing PQR Company.
(ii) Discuss the pros and cons of shifting to this new method.
(iii) What additional information would be useful to have? How will it be beneficial?
(iv) Give your recommendations to Sudhir.
(v) What alternative actions will Sudhir have to take, in case it decides not to invest in EDI system as proposed by ABC Ltd.?
(vi) What can Sudhir do to ensure that if he goes ahead to invest in EDI, there is very less possibility of a problem for PQR Co.?
 (vii) Discuss your learnings form this situation.