M.E. PRODUCTION ENGINEERING 1ST YEAR 2ND SEMESTER EXAMINATION, 2017
ADVANCED MANUFACTURING PLANNING AND CONTROL

Time: Three hours

Full marks: 100

Answer any five questions.

1. (a) State the challenges faced by the manufacturing organizations in the present day competitive scenario. (10)
   (b) Develop the corresponding EOQ (economic order quantity) model for instantaneous production and variable cycle time with shortage. (10)

2. (a) What is Enterprise Resource Planning (ERP)? (4)
   (b) State the benefits and problems faced by a manufacturing organization while implementing an ERP package. (10)
   (c) State the salient features of a typical ERP package. (6)

3. Process times (including the set up times) and due dates for six jobs waiting to be processed at a work centre are given in the following table. Determine the sequence of processing according to each of the following rules: (i) FCFS, (ii) SPT, (iii) DD and (iv) CR. (20)

Job	Processing time (days)	Due date (days)
A	3	8
B	9	10
C	5	6
D	12	14
E	6	12
F	10	17

   Assume jobs arrived in the order shown. For each of the methods, determine (i) the average lateness and (ii) the average number of jobs at the work centre.

4. The sequence of using 3 machines for 6 jobs and the corresponding processing times are shown in the following table. Determine the make span time. (20)

Job	Processing time (days)	Due date (days)
1	1,2	1,3
2	1,3	2,1
3	2,3,1	2,1,1
4	3,1	2,2
5	2,3	1,1
6	2	4

5. (a) Describe the various capacity expansion strategies. (6)
   (b) Calculate the capacity requirements per week for a company, which uses an MRP system. Actual capacity requirement and forecasted demand are given in the tables below. Company plans to adjust capacity when the cumulative deviation exceeds 1/4 of the forecasted average demand per week. Would this system necessitate any adjustment? (14)

   Actual capacity requirement

Week 1	Week 2	Week 3	Week 4	Week 5
285	460	350	210	315

   Forecasted demand

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
200	180	125	465	270	230	280	310	230	190

6. (a) What are the different types of bill of materials? (6)
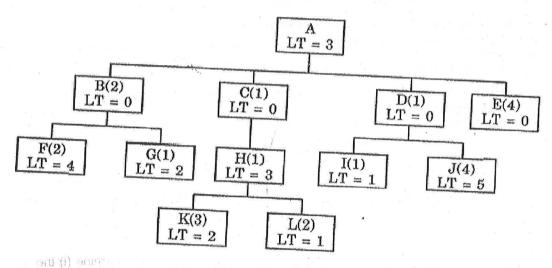   (b) Differentiate between make-to-stock and make-to-order production strategies. (4)

(c) The following table shows the processing times for 6 jobs on 3 machines. Determine the optimal sequencing using the slope order index as per Palmer algorithm. (10)

Job	Machines		
	1	2	3
1	5	2	6
2	3	4	5
3	3	1	7
4	5	2	3
5	7	6	1
6	2	5	3

7. An order has been received for 150 units of product A with the product structure as shown in the following figure. If no stock is available on order, determine the size of each order and when to release each order. (20)