

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013

Subject code: 715001**Date: 23-12-2013****Subject Name: Production and Operation Management****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full mark.

- Q.1** (a) Enlist various Qualitative and Quantitative methods for forecasting. Discuss Box Zerkins method of forecasting with suitable example. **07**
- (b) Define the term “Management Information System”. Explain the role of decision making in designing MIS. **07**
- Q.2** (a) A car manufacturer has recently held 3-day road side exhibits on the introduction of a new model of its deluxe cars. The number of sales personnel employed at each of a sample of 10 exhibitions and the number of cars booked at each one are given in the table below. **07**

No. of salesmen	5	8	6	8	9	3	5	4	6	6
No. of cars booked	132	160	148	156	168	102	142	98	152	142

Using these data, regress the number of cars booked on the number of salesmen, and obtain the regression equation. Estimate the number of cars booked if 10 salesmen are employed on an exhibition.

- (b) Explain OPTIZ classification system with suitable example. **07**
- OR**
- (b) Enlist the various modules available in ERP packages. How they are integrated in the ERP system? **07**
- Q.3** (a) Define a simulation model. Distinguish between deterministic and stochastic simulation models. **07**
- (b) Define Jackson queuing network with suitable example. What are the assumptions underlying a Jackson network? **07**
- OR**
- Q.3** (a) What is capacity planning? What are the alternative sources of capacity? Define the terms: *regular capacity*, *optimal capacity*, and *maximum capacity*. **07**
- (b) Explain the following Facility layouts: Jo shop process layout, Product-oriented layout, cellular layout and Group technology layout. **07**
- Q.4** (a) A small-scale unit manufactures a product and it is expected to supply 80 units in week 1, 120 in week 4, 120 in week 6, and 100 in week 8. Each product is made of 2 housings, a shaft assembly and one wheel. For these components order quantities, lead times and inventories on hand at the beginning of period 1 are given in the table. **07**

Part	Order Quantity	lead time (weeks)	Inventory on hand
Housings	600	2	200
Shaft assembly*	400	3	440
Wheel	800	1	100

*180 wheel assemblies are also needed in period 5 for another customer.

A shipment of 600 housings is already scheduled to be received at the beginning of week 2 (i.e., a scheduled receipt). Construct the product structure tree and Complete the MRP for the housing, shaft and wheel and show what quantities or orders must be released and when they must be released to satisfy the master schedule.

- (b) Why aggregate production planning is needed? Differentiate between Chase strategy and Level strategy of aggregate production planning. 07

OR

- Q.4 (a) What is a “Kanban”? Why is this system called a “Pull” or demand system of inventory control? Also explain how a simple kanban system works. 07

- (b) What is generative process planning? Compare variant and generative process planning methodologies. 07

- Q.5 (a) A project consists of nine activities with their time estimate (in days) as given in table below. 07

Activity	A	B	C	D	E	F	G	H	I
Preceding activity(ies)	-	A	A	B	B	C	E	D,F	G,H
t_o	4	5	4	15	10	8	4	1	6
t_m	6	7	8	20	18	9	8	2	7
t_p	8	15	12	25	26	16	12	3	8

(1) Construct the network.

(2) Determine the critical path using network simplex method.

(3) Compute expected project duration and variance of the project length.

- (b) Define the terms “Project” and “Project management”. Explain the various stages of project life cycle with sketch. 07

OR

- Q.5 (a) A maintenance project has following estimates of times in hours and cost in rupees for jobs. Assuming that jobs can be done either at normal or at fast pace, but not any pace in between. If the indirect cost is Rs. 25/- per hour, find the optimal duration and optimal cost. 07

Activity	Predecessor	Normal		Crash	
		Time (Hrs.)	Cost (Rs.)	Time (Hrs.)	Cost (Rs.)
A	-	8	80	6	100
B	A	7	40	4	94
C	A	12	100	5	184
D	A	9	70	5	102
E	B,C,D	6	50	6	50

- (b) How do you distinguish between resource leveling and resource allocation problems? Explain the algorithm for resource allocation. 07
