Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME SEMESTER II EXAMINATION – SUMMER 2017

Subject Code: 2724605 Date:29/05/2017

Subject Name: OPERATION PLANNING & CONTROL TECHNIQUES

Time:02:30 PM to 05:00 PM Total Marks: 70

Instructions:

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

Q.1 (a) (i) Define Production Planning. Explain Strategic decisions, Tactical decisions & Operational decisions in the context of production planning. **07**

(ii) What is Enterprise Resource Planning? Which are the functional modules of ERP?

(b) (i) Define Aggregate Planning? Briefly explain various pure strategies used for aggregate planning? **07**

(ii) Define Demand forecasting. What are the factors affecting demand? What are the different types of demand patterns?

Q.2 (a) A trading company has following demand data of the current financial year. Find the forecast for the month of July using following three methods. **07**

(i) Simple 2 month moving average,

(ii) Weighted Moving Average with weights 0.4 and 0.6,

(iii) Single exponential smoothing with $\alpha = 0.2$, and if forecast of June is 180.

Month	January	February	March	April	May	June
Demand	145	125	180	130	200	175

(b) An engineering industry has recorded the turnover of past 6 years along with net profit generated during same years. Forecast the profit for the 2017 using least square method, if turnover is 80 lakh rupees. **07**

Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Turnover (lakhs)	30	42	54	65	98	90	80
Profit (lakhs)	2.5	3.2	3.5	4	6	5.5	?

OR

(b) (i) What are the different types of errors in demand forecasting? Explain Mean Absolute Percentage Error (MAPE) error. **07**

(ii) Calculate Mean Absolute Deviation, (MAD) and Mean Absolute Percent Error (MAPE) using following data.

Period	**1**	**2**	**3**	**4**	**5**
Demand	142	181	144	174	176
Forecast	155	157	159	161	165

Q.3 (a) The forecast for a group of items manufactured in a firm is shown below. **07**

Quarter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Demand	420	370	620	720	600	500	360	400

The firm estimates that it costs Rs. 200 per unit to increase the production rate, Rs. 250/unit to decrease the production rate. Calculate cost incurred by using **varying work force** strategy.

(b) A company manufactures valves. The MPS of the final assembly is as shown below. **07**

Period (week)	1	2	3	4	5	6	7	8
Projected Requirements	-	2500	2000	1800	-	1500	1200	2200

The initial stock on hand is 1200 units. The carrying cost is Rs. 3/unit/month and the lead time is one week. The ordering cost per order is Rs. 5000. Develop an **Economic Order Quantity** (EOQ) based MRP solution.

OR

Q.3 **(a)** The forecast for a group of items manufactured in a firm is shown below. **07**

Quarter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Demand	420	370	620	720	600	500	360	400

The firm estimates that it costs Rs. 80/unit/quarter to carry the items on inventory. Calculate cost incurred by using **changing inventory level** strategy.

(b) A company manufactures valves. The MPS of the final assembly is as shown below. **07**

Period (week)	1	2	3	4	5	6	7	8
Projected Requirements	-	2500	2000	1800	-	1500	1200	2200

The initial stock on hand is 1200 units. The carrying cost is Rs. 3/unit/month and the lead time is one week. The ordering cost per order is Rs. 5000. Develop **Period Order Quantity** based MRP solution.

Q.4 **(a)** An engineering manufacturing company stocks the items as shown in the following table in the stores. The unit prices, annual consumption in terms of units/year are also mentioned in the table. Classify the items in to A, B, and C categories. **07**

Component code	D80	F22	B2	E50	C12	E51	H12	A20	B18	C16
Price/unit	10	80	20	200	4000	70	50	40	60	400
Annual Demand	400	75	150	250	90	1000	100	600	250	20

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(b) (i) Explain VED Inventory analysis? **07**

(ii) Explain Fixed Order Quantity System (Q system) of purchase inventory model.

OR

Q.4 **(a)** Consider the data of 10 items kept in the stores of an automobile showroom for servicing the vehicles. The data contains demand values of each item for 4 quarters, as shown in table. Perform XYZ analysis and obtain X, Y, and Z items. **07**

Item code	A	B	C	D	E	F	G	H	I	J
Quarter 1	100	300	700	400	1000	30	100	500	105	1050
Quarter 2	120	260	760	320	900	50	80	450	100	900
Quarter 3	90	320	800	300	860	40	120	550	95	950
Quarter 4	130	400	900	500	1200	40	140	480	120	1100

(b) (i) Explain FSN Inventory analysis? **07**

(ii) Explain Periodic Review System (P system) of purchase inventory model

Q.5 **(a)** If a product is to be manufactured within the company, the details are as follows: (Manufacturing model without shortage) **07**

Annual demand, r = 24,000 units/year	Set-up cost, Co = 200 / set-up
Production rate, k = 48,000 units/year	Carrying cost, Cc = Rs. 20/unit/year

(b) (i) Explain the concept of **Synchronous manufacturing**. **07**

(ii) Explain: Hockey-stick phenomenon.

OR

Q.5 **(a)** (i) Explain stepwise procedure of "**Theory of constraints**". **07**

(ii) Discuss the concept of "**Drum-Buffer-Rope**".

(b) (i) Explain V-A-T classification of firms, with their significant features. **07**

(ii) Explain how a non-bottleneck can become a bottleneck?

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