Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2724605 **Date: 27/05/2016**

Subject Name: OPERATIONS PLANNING & CONTROL TECHNIQUES

Time:10:30 am to 01:00 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) Explain MPC frame work with suitable block diagram with labeling front end, engine and back end of manufacturing system. **07**

(ii) Define Aggregate Planning? Briefly explain various pure strategies used for aggregate planning.

(b) (i) What are the activities carried out in Planning, Action and Control phases of production management? **07**

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

Q.2 (a) A private 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 1850.

Month	January	February	March	April	May	June
Demand	1400	1200	1800	1300	2000	1700

(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 2015 using least square method, if turnover is 8 crore rupees. **07**

Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Turnover (crores)	3	4	5	6	10	9	8
Profit (lacs)	20	24	30	40	60	55	?

OR

(b) (i) What are the different types of errors in demand forecasting? Explain Mean absolute Deviation (MAD) error. **07**

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

Period	**1**	**2**	**3**	**4**	**5**
Demand	1500	1600	1650	1750	1800
Forecast	1650	1650	1650	1650	1650

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	380	340	580	700	560	370	350	480

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 in the **varying work force** strategy.

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

Month	1	2	3	4	5	6	7	8
Projected Requirements	-	350	300	450	-	100	400	560

The initial stock on hand is 150 units. The carrying cost is Rs. 3/unit/month and the lead time is one month. The ordering cost per order is Rs. 1000. 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	380	340	580	700	560	370	350	480

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

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

Month	1	2	3	4	5	6	7	8
Projected Requirements	-	350	300	450	-	100	400	560

The initial stock on hand is 150 units. The carrying cost is Rs. 3/unit/month and the lead time is one month. The ordering cost per order is Rs. 1000. 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	Price/unit	Annual Demand
C01	50	100
C02	250	60
C03	20	150
C04	200	250
C05	4000	105
C06	70	1000
C07	10	400
C08	40	600
C09	80	75
C10	150	20

(b) What is Material Requirement Planning? What are inputs of MRP? **07**

Compare Material Requirement Planning with Manufacturing Resource Planning – II.

OR

Q.4 **(a)** The annual demand for a component is 7200 units. The carrying cost is Rs.500/unit/year, the ordering cost is Rs.1500 /order and the shortage cost is Rs2000/unit/year. Find the optimum values of following. **07**

Ordering quantity, Maximum inventory, Maximum shortage inventory, cycle time, inventory period, shortage period.

(b) (i) Explain Fixed Order Quantity system. (Q system) **07**

(ii) Explain Periodic Review system. (P system)

Q.5 **(a)** (i) Explain concept of synchronous manufacturing. **07**

(ii) Explain: Hockey-stick phenomenon.

(b) Explain VAT classification of firms, with their significant features. **07**

OR

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

(ii) Discuss the concept of "drum-buffer-rope'.

(b) (i) Explain XYZ analysis of inventory control. Write stepwise procedure of the same. **07**

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

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