Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 2744701 Date:04/05/2016

Subject Name: Automation and Computer Integrated Manufacturing

Time:10:30 am to 01:00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary and clearly mention the same.**
3. **Figures to the right indicate full marks.**
4. **Draw neat diagrams. Diagrams with inferior quality may not be awarded credit.**

Q.1 **(a)** With the help of neat diagrams, describe the flow sequence of withdrawal and production Kanban and their interactions. **7**

(b) Explain the following in brief: **7**

1. Fixed cost
2. Variable cost
3. Compare Fixed and Variable cost for automated and manual production system on single graph
4. Factory over head rate and Corporate over head rate

Q.2 **(a)** ABC, a private limited company, is planning to introduce JIT production concepts for their cylinder manufacturing section. The following data are available: the requirements are 1,50,00,000 units per month. Since the company has just started implementing the JIT system, the policy variable is set at $\alpha = 0.30$. The container capacity is fixed at 1000 cylinders and the production lead time is 0.20 days. Assume 25 working days in a month. **7**

(a) Since it is the first time that ABC is implementing JIT, advise in developing a Kanban operating system. How many Kanbans will be needed?

(b) Suppose the company has a stable production environment and the policy variable can be at $\alpha = 0.10$. Determine the number of Kanbans and the resulting impact on work-in-process inventory.

(c) What does happen if the lead time is reduced to 0.08 days because of process improvements? The value of α is 0.15 as a result of process improvements.

(b) Differentiate between active and passive type of devices used for orientation of parts in part feeding system. Support your answer with suitable examples and neat schematic diagrams of it. **7**

OR

(b) Explain the characteristics of Low, Medium and High production system with suitable examples and kind of lay outs used for manufacturing. **7**

Q.3 **(a)** A manufacturing section has 8 lathe machines, all devoted to the production of same part. The section operates 11 shifts per week (2 shifts for five days and 1 shift for Saturday). The number of hours per shift averages to 8.0. Average production rate of each machine is 20 units per hour. During a week under consideration, the machine produced 12000 **7**

parts and was idle in remaining time. It has been observed that the mean time between failures is 88 hrs and mean time to repair is 8 hrs for this plant.

Your tasks:

Determine the weekly production capacity of this section.

Compute expected plant output considering its availability and utilization.

(b) Briefly explain various modelling approaches of demand forecasting used in manufacturing planning and control system. **7**

OR

Q.3 **(a)** The PQR manufacturing company has received orders for type L, M, N and O bushes on day 7 on the production schedule calendar and following data are available. Determine the order in which the jobs should be processed according to the FCFS, EDD, SPT, LS, LSPO and CR rules. **7**

Job type	Due date	Remaining process time (Days)	No. of remaining operations
L	25	9	10
M	22	4	12
N	15	4	4
O	14	2	6

(b) Briefly discuss the objective of Material Requirements Planning (MRP) and explain the following terms: **7**

1. Product structure and bill of materials
2. Independent and dependent demand
3. Master Production Schedule

Q.4 **(a)** Compare and contrast between serial engineering and concurrent engineering. Bring out the merits of concurrent engineering over serial engineering. **7**

(b) Describe the steps of Production Flow Analysis (PFA) for part family identification and machine cell formation. Compare relative merits and demerits of PFA technique. **7**

OR

Q.4 **(a)** Describe the following terms in brief: **7**

Primary Industry, Secondary Industry, Tertiary Industry, Consumer Goods, Capital Goods

(b) Using Naidu and Singh heuristic, determine the lot sizing for the data given in the following table. **7**

Period	Demand	Set up cost (Rs)	Unit variable cost (Rs)	Unit holding cost per period (Rs)
1	30	50	2	2
2	50	40	1	2
3	50	30	5	4
4	10	10	7	5

Q.5	**(a)**	With the help of suitable examples, describe AAG (Attribute Adjacency Graph) method for feature recognition in Computer Aided Process Planning.	**7**
	(b)	Briefly explain the following measures used to assess the performance of a storage system: storage capacity, storage density, accessibility, throughput, utilization, reliability	**7**

OR

Q.5	**(a)**	What is called a composite part in Group Technology? Explain with the help of suitable example. Also justify that the Composite part is useful for visualizing the machine sequence in designing a machine cell.	**7**
	(b)	Discuss and describe technologies used in vehicle guidance for Automated Guided Vehicle System (AGVS). Compare and contrast them with respect to each other.	**7**

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