Seat No.: \_\_\_\_\_

## **GUJARAT TECHNOLOGICAL UNIVERSITY** ME - SEMESTER-IV• EXAMINATION – SUMMER 2015

## Subject Code: 744701Date:01 /05/2015Subject Name: Automation and Computer Integrated Manufacturing<br/>Time:2:30 pm to 5:00 pmTotal 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) Explain the following terminology with the mathematical equation for 7 batch production:
  Production rate; Production Capacity; Utilization
  - (b) Describe briefly with the help of block diagram the different inputs to 7 Materials Requirement Planning (MRP) system.
- Q.2 (a) Briefly describe the following dimensions of Concurrent Engineering. 7 Product complexity; Product technology; Programme structure; Resource tightness; Schedule tightness
  - (b) The following data are given for a work center consisting of one worker 7 and one machine: direct labor rate = Rs. 50/hr, applicable factory overhead rate on labor = 60%, capital investment in the machine = Rs. 10,00,000, service life of the machine = 8 years, rate of return = 25%, salvage value in 8 years = 0, and applicable factory overhead rate on machine is 50%. The work center will be operated for one 8-hr shift, 250 days/year. Determine the appropriate hourly rate for the work center.

## OR

- (b) What is the significance of Availability and Manufacturing Lead Time in 7 a production system? Describe with the help of suitable mathematical formulae.
- Q.3 (a) Bring out the difference between the following two MRP lot sizing 7 problem formulations.
  - 1. Wagner and Whitin Algorithm
  - 2. Naidu and Singh Algorithm
  - (b) What is concurrent engineering and what are the objectives of concurrent 7 engineering? How is the concurrent engineering approach different from serial engineering approach to achieve the objectives?

- Q.3 (a) Explain the following types of CAPP (Computer Aided Process Planning) 7 techniques.
  Variant CAPP, Generative CAPP, Knowledge based CAPP
  - (b) Draw neat schematic labeled diagrams of the Tumbling barrel hopper and 7 Magnetic elevating hopper feeder for achieving automation in material handling system. Support your answer with brief and relevant explanation.
- Q.4 (a) With the help of neat schematic diagrams briefly explain the various 7 layout configurations of Flexible Manufacturing System (FMS).
  - (b) How does the feature reorganization possible in Computer Aided Process 7 Planning? Explain with the help of suitable examples.

## OR

- Q.4 (a) Briefly describe the following manual assembly line pacing: Rigid pacing; Pacing with margin; No pacing
  - (b) List out and discuss the various measures used to assess the performance 7 of a storage system of a production plant.
- Q.5 (a) What are the different flexibilities of Flexible manufacturing system 7 (FMS)? Describe the significance of them.
  - (b) Explain with the help of suitable diagrams the following three types of 7 transport systems used in production line:
    Continuous transport; Synchronous transport; Asynchronous transport
    OR
- Q.5 (a) Discuss in brief the different technologies used to implement automated 7 identification and data collection (AIDC).
  - (b) Differentiate between vehicle guidance and vehicle management for 7 Automated Guided Vehicles (AGVs) used in industry for material handling.

\*\*\*\*\*

7