Reg.No.										

MANIPAL INSTITUTE OF TECHNOLOGY

Manipal University, Manipal – 576 104

I SEMESTER M.TECH (INDUSTRIAL ROBOTICS AND AUTOMATION)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: Automated Manufacturing Systems (MTE 507)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.

1A. Discuss the problems associated with conventional NC machines. **4**

1B. Define adaptive control optimization with respect to performance index value. Discuss with suitable example. **4**

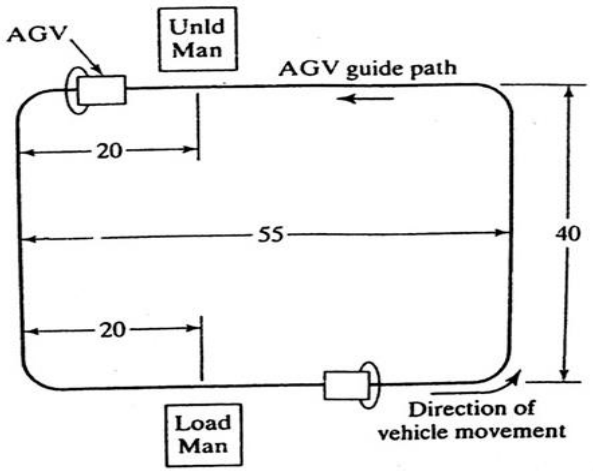
1C. Explain three basic types of automated manufacturing systems. Support your answer with a "Product variety Vs Production quantity" graph for three automation types. **2**

2A. With reference to vehicle guidance technology, what is the mechanism of operation for self-guided vehicle? **3**

2B. What methods do we use for traffic control of automated guided vehicle in an automated plant? **3**

2C. Given the AGVS layout shown in Figure. Vehicles travel counterclockwise around the loop to deliver loads from the load station to the unload station. **4**

Loading time at the load station = 0.75 min, and unloading time at the unload station is 0.50 min. It is desired to determine how many vehicles are required to satisfy demand for this layout if a total of 40 del/hr must be completed by the AGVS. The following performance parameters are given: vehicle velocity is 50m/min, availability is 0.95, traffic factor is O.90,and operator efficiency does not apply, So E = 1.0. Determine: (a) Travel distances loaded and empty, (b) Ideal delivery cycle time, and (c) Number of vehicles required to satisfy the delivery demand.



3A. In reference to Automatic data capture, explain RFID technology? **2**

3B. What do you understand by USA principle? **2**

3C. Explain variant process planning and generative approach methods in CAPP? **6**

4A. What are the assumptions made in analysis of multi-station automated assembly systems? Explain three events which occur at any station in an assembly line using relevant equations. **4**

4B. "Unit load principle is considered as most important principle in automated material handling" Justify the statement with appropriate reasons. **2**

4C. The cycle time for a given assembly work head is 6 sec. The parts feeder has a feed rate is 50 components/min. The probability that a given component fed by the feeder will pass through the selector is 0.25. The number of parts in the feed track corresponding to the low level sensor n_{f1} is 6.The capacity of the feed track n_{f2} is 18 parts. Determine (a) How long it will take for the supply of parts in the feed track to go from n_{f2} to n_{f1} and (b) How long it will take on an average for the supply of parts to go from n_{f1} to n_{f2}. **4**

5A. Explain various levels of Automation with examples for each of them. **5**

5B. How automated storage system do help to gain control over work in process system? Justify your answer with appropriate reasons. **5**

6A. What do you understand by canned cycle? Write a simple block for clockwise circular interpolation. **2**

6B. Write a CNC program for the given profile for the depth of contour 5mm. Take tool diameter as 5mm. All dimensions are in mm. Take contour feed rate 10mm/min, spindle speed 2500 RPM, Tool number 1 and lower left corner of rectangular block as X0Y0. **8**