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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech.

SEM: II - THEORY EXAMINATION (2021 - 2022)

Subject: Digital Manufacturing and Automation

Time: 3 Hours Max. Marks: 70

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 marks each.
3. Section B - Question No-3 is based on external choice carrying 4 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 7 marks each.
5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A 15

1. Attempt all parts:-

1-a. The most common type of feed drives used on CNC machines is the: [CO1] 1

(a) Electric servo motor.

(b) Hydraulic drive.

(c) Manual crank.

(d) Manual/hydraulic system.

1-b. Which of the following statement is true with respect to CNC multiple repetitive machining cycles? [CO2] 1

(a) For boring or internal facing the tool must be located above the cored diameter.

(b) Only absolute values may be used for co-ordinate positions.

(c) The starting point should be as far away from the workpiece as possible to assist with tool movement.

(d) For external turning and facing the tool must be located above and in front of the workpiece.

1-c. When referring to CNC operations, an excessive surface cutting speed will result in: [CO3] 1

(a) Extended tool life.

(b) A longer time to machine the workpiece.

(c) Rapid tool wear.

(d) A decreased use of coolant.

1-d. AVG Robot is placed in which of the following category ? [CO4] 1

(a) A Mobile Robot

(b) A Saturated Robot

(c) An Unsaturated Robot

(d) A Natural Robot

1-e. Cellular manufacturing is an approach whereby production can be done in [CO5] 1

(a) Small batches

(b) Medium batches

(c) Large batches

(d) Any of the above

2. Attempt all parts:-

2.a. Differentiate the NC and CNC machines. [CO1] 2

2.b. Specify the three types of information in a part program required to control a machine. [CO2] 2

2.c. Describe how the datum positions are established on turning centres. [CO3] 2

2.d. Distinguish between the AGV and Robot. [CO4] 2

2.e. Describe various layouts used in FMS. [CO5] 2

SECTION B 20

3. Answer any five of the following:-

3-a. Explain open loop and closed loop control system of CNC machines. [CO1] 4

3-b. What are the advantages and limitations of using the magnetic tape as a means of storing part programs? [CO1] 4

3-c. What are canned cycles? Discuss how a canned cycle is useful in writing a part program? [CO2] 4

3-d. Explain how it is possible to machine curves using the true path technique and specify the information that is required. [CO2] 4

3.e. Explain the principle of operation of an automatic tool changer. [CO3] 4

3.f. Give the classification of robots. [CO4] 4

3.g. Explain Computerized material handling system at construction site. [CO5] 4

4. Answer any one of the following:-

4-a.	Explain various types of adaptive control systems. what are the various benefits of adaptive control systems? [CO1]	7
4-b.	Draw and explain the CIM wheel and state the benefits of CIM. [CO1]	7

5. Answer any one of the following:-

5-a.	Explain types of statements used in APT language. [CO2]	7
5-b.	What are the main features of CNC Machine Tool? Explain any 10 G-codes and 10 M-codes with a short description. [CO2]	7

6. Answer any one of the following:-

6-a.	List and explain the considerations involved in the decision to recondition, recycle, or discard a cutting tool. [CO3]	7
6-b.	Explain how the spindle speed and feed rates are determined for (a) milling (b) drilling and (c) turning. [CO3]	7

7. Answer any one of the following:-

7-a.	Discuss the various robots control systems in detail. [CO4]	7
7-b.	Detail the differences between conventional programming and computer-assisted programming for machining. [CO4]	7

8. Answer any one of the following:-

8-a.	Describe the importance of CAD, CAPP & CAM and their effects on quality and quantity of production. [CO5]	7
8-b.	What is buffer storage? what are the reasons for implementing buffer storage in an automated production line? [CO5]	7