Printed Page:-04 **Subject Code:- AMTME0201**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M. Tech

SEM: II - THEORY EXAMINATION (2023 - 2024)

Subject: Digital Manufacturing and Automation

Time: 3 Hours **Max. Marks: 70**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *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. Which does CNC stand for with respect to machine related manufacturing? [CO1] 1

(a) Computer Numb control

(b) Computer Number control

(c) Computer Numerical control

(d) Computerized Numerical controller

1-b. When referring to CNC programming, which of the following is the command coed to move the tool in the counterclockwise direction? [CO2] 1

(a) G01

(b) G02

(c) G03

(d) G17

1-c. Drives are also known as [CO3] 1

(a) Actuators

(b) Controller

(c) Sensors

(d) Manipulator

1-d. Which of the following terms refers to the use of compressed gasses to drive (power) the robot device? [CO4] 1

(a) pneumatic

(b) piezoelectric

(c) hydraulic

(d) photosensitive

1-e. An assembly line consists of four stations and has a cycle time of one minute. Idle times (per cycle) for these stations are 10 seconds, 5 seconds, 2 seconds and 13 seconds. What is the balance delay? [CO5] 1

(a) 7.5 percent

(b) 10 percent

(c) 12.5 percent

(d) 25 percent

2. Attempt all parts:-

2.a. Distinguish between NC, CNC and DNC. [CO1] 2

2.b. Define subroutine. [CO2] 2

2.c. What do you understand by smart manufacturing. [CO3] 2

2.d. Differentiate palletizing and depalletizing. [CO4] 2

2.e. What is the difference between a dedicated FMS and a random-order FMS? [CO5] 2

SECTION B **20**

3. Answer any <u>five</u> of the following:-

3-a. Briefly explain the different types of control systems in NC. [CO1] 4

3-b. With help of diagram explain the working of interpolator. [CO1] 4

3-c. Describe the features of a machining centre. Why machining centers are particularly advantage for the use of NC. [CO2] 4

3-d. With the aid of block diagram explain the steps involved in computer assisted part programming. [CO2] 4

3.e. Explain why it is more convenient to use the longest tool as a reference for establishing the Z offsets on a vertical spindle machining center. [CO3] 4

3.f. Explain spherical configuration of a robot. [CO4] 4

3.g. Differentiate between conventional and intelligent manufacturing systems [CO5] 4

SECTION C **35**

4. Answer any <u>one</u> of the following:-

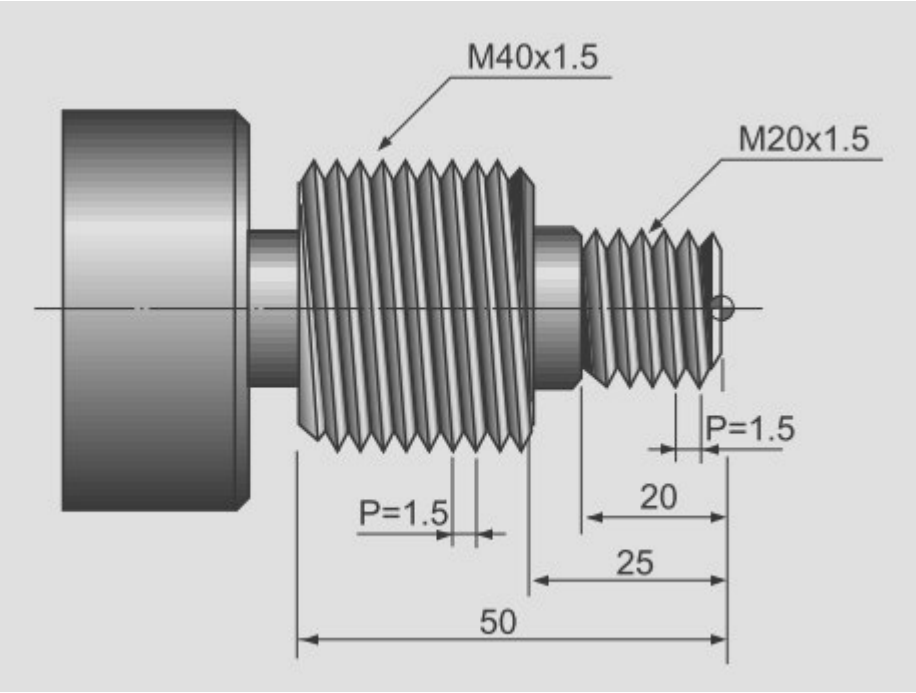
4-a. Explain adaptive control system. what are the benefits of adaptive control systems? [CO1] 7

4-b. Draw and explain the CIM wheel and state the benefits of CIM. [CO1] 7

5. Answer any <u>one</u> of the following:-

5-a. Write down simple CNC programs for turning, a Aluminum block of initial diameter of 40 mm to 10 mm using parametric subroutine. take spindle speed as 1200 RPM, depth of cut 2mm assume suitably missing data if any . [CO2] 7

5-b. Write a Threading part programme for CNC lathe machine using G92 For 7



[CO2]

6. Answer any <u>one</u> of the following:-

6-a. Explain with the help of neat sketches the working of Automatic Tool Changer (ATC). [CO3] 7

6-b. Name the various types of work holding arrangements that can be used on NC machines, specifying the type of work for which each method is particularly suited. [CO3] 7

7. Answer any <u>one</u> of the following:-

7-a. Classify Mechanical Drives used in Robots and explain them briefly. [CO4] 7

7-b. Which parameters are to be considered for robot specification & selection of 7

robot? Explain in detail. [CO4]

8. Answer any <u>one</u> of the following:-

8-a. Explain the steps required to determine machine cell and part families with an example using rank order clustering algorithm and cluster identification algorithm [CO5] 7

8-b. Describe the importance of CAD, CAPP & CAM and their effects on quality and quantity of production. [CO5] 7