

Reg. No.																			
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code	12378
---------------------	-------

**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023**

Fourth Semester

**Mechanical and Automation Engineering**

**20MUPC403 - CNC MACHINES AND METROLOGY**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |  | <i>Marks,<br/>K-Level, CO</i> |
|--|-------------------------------|
| 1. What are the types of control system?   | <i>2,K1,CO1</i>               |
| 2. Classification of CNC machines.   | <i>2,K2,CO1</i>               |
| 3. Define spindle drive.   | <i>2,K1,CO2</i>               |
| 4. Mention any two types of AC motors.   | <i>2,K1,CO2</i>               |
| 5. What are the various types of linear measuring instruments?   | <i>2,K1,CO4</i>               |
| 6. List any four linear measuring instruments.   | <i>2,K1,CO4</i>               |
| 7. A 100 mm sine bar was used to measure the taper angle of the specimen and the gauge block was 5.055mm. Calculate the taper angle. | <i>2,K2,CO5</i>               |
| 8. What are the types of bevel protractors?  | <i>2,K1,CO5</i>               |
| 9. What is CMM?  | <i>2,K1,CO6</i>               |
| 10. Point out the applications of CMM in machine tool metrology.   | <i>2,K1,CO6</i>               |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

- |   |                  |
|---|------------------|
| 11. a) Enumerate constructional features of CNC machining centre                                | <i>13,K2,CO1</i> |
| <b>OR</b>   |                  |
| b) Explain the types of anti-friction guide ways with neat sketches.                            | <i>13,K2,CO1</i> |
| 12. a) Explain the various feed drives and write the advantages and also state its limitations. | <i>13,K2,CO2</i> |
| <b>OR</b>   |                  |
| b) Briefly explain the working principles of DC shunt motor with neat sketches.                 | <i>13,K2,CO2</i> |
| 13. a) Explain the following with neat sketches,  |                  |
| (i) Plug Gauges   | <i>4,K2,CO4</i>  |
| (ii) Ring Gauge and   | <i>4,K2,CO4</i>  |
|   | <i>5,K2,CO4</i>  |

(iii) Snap Gauge

**OR**

- b) Explain the following with neat sketches,  
(i) Depth gauge micrometer  
(ii) Inside micrometer and  
(ii) Thread micrometer

5,K2,CO4  
4,K2,CO4  
4,K2,CO4

14. a) Explain the working principle of alignment telescope with neat sketch and mention its applications. 13,K2,CO5

**OR**

- b) Show with the help of a neat sketch, explain any two bevel protractors. 13,K2,CO5

15. a) (a) Explain the applications of CMM. 7,K2,CO6

(b) Explain the advantages and disadvantages of CMM. 6,K2,CO6

**OR**

- b) (a) Explain the machine vision and Name any four types of machine vision systems. 6,K2,CO6

(b) Describe the functions of machine vision system. 7,K2,CO6

**PART - C (1 × 15 = 15 Marks)**

16. a) Solve the problems using CNC part program for the component shown in Figure. 15,K3,CO3

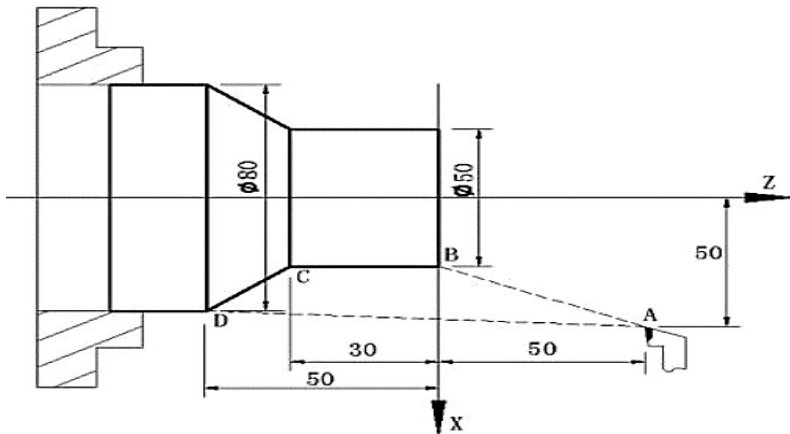


Figure 1

**OR**

- b) Identify the manual part programming for the following: (i) M codes and G codes, (ii) Canned cycle, (iii) Coordinate System, (iv) Program Sheet. 15,K3,CO3