Total No. of Questions: 22

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

AU3CO58 CNC Machines & Metrology

Programme	:	B.Tech.	**Branch/Specialisation**	:	AU
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

Marks CO BL

Q1. Which of the following is an advantage of CNC machines? **1 1 1**

Rubric	Marks
High accuracy and repeatability	1

- ○ Manual operation required
- ○ Requires constant monitoring
- ○ Lower precision
- ◉ High accuracy and repeatability

Q2. CNC Stands for- **1 1 1**

Rubric	Marks
Anti-friction guideways	1

- ◉ Computer Numerical Control
- ○ Computer Non Control
- ○ Computer Need Control
- ○ None of the above

Q3. What principle does a servo motor operate on? **1 2 1**

Rubric	Marks
Closed-loop control	1

- ○ Friction control
- ○ Open-loop control
- ◉ Closed-loop control
- ○ Pneumatic control

Q4. Which of the following is NOT a work-holding device? **1 2 1**

Rubric	Marks
Spindle	1

- ○ Chuck
- ○ Fixture
- ◉ Spindle
- ○ Vice

Q5. What does G-code represent? **1 3 1**

Rubric	Marks
Preparatory function	1

- ○ Geometry code
- ○ General code
- ◉ Preparatory function
- ○ Machine code

Q6. In CNC programming, what is the coordinate system used for- 1 3 1

Rubric	Marks
Defining position	1

- ○ Power supply
- ○ Cooling
- ◉ Defining position
- ○ Lubrication

Q7. Which of the following is a linear measuring instrument? 1 4 1

Rubric	Marks
Vernier Caliper	1

- ○ Bevel Protractor
- ○ Sine Bar
- ◉ Vernier Caliper
- ○ Autocollimator

Q8. What type of measurement is a sine bar used for? 1 4 1

Rubric	Marks
Angular	1

- ○ Linear
- ◉ Angular
- ○ Circular
- ○ Surface finish

Q9. Laser interferometry is primarily used to measure- 1 5 1

Rubric	Marks
Length and displacement	1

- ○ Surface roughness
- ○ Temperature
- ◉ Length and displacement
- ○ Pressure

Q10. Which device converts mechanical motion into electrical signals in axis measurement? 1 5 1

Rubric	Marks
Encoder	1

- ○ Vernier caliper
- ○ Spirit level
- ◉ Encoder
- ○ Angle gauge

Section 2 (Answer all question(s))

Marks CO BL

Q11. What are the main advantages of CNC over conventional machining? 2 1 2

Rubric	Marks
At least 3 advantages of CNC as compared to conventional machining.	2

Q12. Discuss the difference between DNC and CNC. 3 1 2

Rubric	Marks
Basic meaning of DNC and CNC	1
Difference between from point of view of applications	2

Q13. (a) What are the essential requirements of the guideways? **5 1 1**

Rubric	Marks
At least 4 basic requirements of the guideways	5

(OR)

(b) Classify the CNC machines. Discuss the main components of CNC machine.

Rubric	Marks
Classifications of CNC	3
Discuss main components of CNC Machine	2

Section 3 (Answer all question(s))

Marks CO BL

Q14. Why carbide inserts are used in CNC machining? **2 2 2**

Rubric	Marks
Reason for using carbide inserts	2

Q15. (a) How work holding devices ensures the stability and accuracy in CNC machining? **8 2 1**

Rubric	Marks
Role of work holding devices on stability and accuracy	6
Name of the work holding devices	2

(OR)

(b) How servo motors differ from the stepper motors? Explain with proper conditions encountered in CNC machining.

Rubric	Marks
Difference between servo and stepper motors	6
Explanation according to CNC	2

Section 4 (Answer all question(s))

Marks CO BL

Q16. Explain the conditions in which incremental programming is preferred. **3 3 3**

Rubric	Marks
Defining incremental programming	1
Conditions to use incremental programing	2

Q17. (a) Explain the use of do loop and subprogram with programming examples. **7 3 1**

Rubric	Marks
Description of do loop and subprogram	3
Programming examples of both	4

(OR)

(b) A cylindrical bar of 60 mm diameter and 30 mm length is to be machined for diameter reduction of 40 mm upto 20 mm length and diameter of 30 mm for rest of the length. Write a CNC part programe with a sketch showing dimesions.

Rubric	Marks
Sketch of the work to be done	2
Complete CNC part program	5

Section 5 (Answer all question(s))

Marks CO BL

Q18. In which conditions micrometers are preferred over Vernier calipers . **4 4 3**

Rubric	Marks
Description of Vernier and micrometer	1
Condition of preference	3

Q19. (a) Explain the different types of angular measuring instruments with neat sketches. **6 4 1**

Rubric	Marks
Types of angular measuring instruments	2
Sketches of the instrumnets	4

(OR)

(b) Explain the working principle of autocollimator with a neat sketch.

Rubric	Marks
Working principle of autocollimator	3
Neat sketch	3

Section 6 (Answer any 2 question(s))

Marks CO BL

Q20. Explain working and applications of machine vision systems. **5 5 2**

Rubric	Marks
Working principle	3
Applications	2

Q21. Explain the working principle of a laser interferometer and its applications. **5 5 2**

Rubric	Marks
Working principle	2
Applications	3

Q22. Discuss the working principles and applications of a Coordinate Measuring Machine. **5 5 1**

Rubric	Marks
Working principle	3
Applications	2

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