Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 41272

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Fifth Semester

Robotics and Automation

RO 8501 — CNC MACHINE AND METROLOGY

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the classification of CNC machine tools.

2. Draw the general configuration of DNC.

3. Mention the various types of DC motors used in a CNC machine tool.

4. List any four factors influencing selection of CNC machines.

5. What are the advantages of 'canned cycle'?

6. A program for machining a line is given as :

   (N100 G91 X –5.0 Y 7.0 F100 S200 T01 M03).

   Write the significance of the term "N" and "G".

7. What is meant by measurement error?

8. Mention the principle and use of a spirit level.

9. What is the purpose of the interferometer?

10. List the factors influencing the magnitude of dimensional errors of a CMM.

PART B — (5 × 13 = 65 marks)

11. (a) Compare the various linear motion guide ways used in CNC machine tools. (13)

    Or

    (b) With suitable sketch, differentiate between the types of CNC control systems. (13)

12. (a) Compare and contrast the types of spindle drives used in CNC machine tools. (13)

Or

(b) Compare the different types of axis measuring system used in CNC. (13)

13. (a) Write short notes on : (13)

(i) Structure of CNC part program

(ii) CNC machining cycles.

Or

(b) Explain the typical steps involved to generate CNC codes from a CAD model. (13)

14. (a) Explain the types of limit gauges used for gauging internal and external diameters of holes. (13)

Or

(b) State the sine principle and explain the various types and uses of sine bar. (13)

15. (a) What are the system components of a computer controlled CMM? Mention the different types of mechanical systems, applications and advantages of CMM. (13)

Or

(b) Explain the basic functions of a machine vision system with sketch. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Select a component of your choice and compare the economics of manufacture of the component using a CNC machine and a conventional machine. (15)

Or

(b) Write the part program to drill the holes in the part shown in Figure Q. 16(b). The part is 12 mm thick. Cutting speed = 100 m/min and feed = 0.06 mm/rev. Use the lower left corner of the part as the origin in the x–y axis system. Write the part program in the word address format with TAB separation and variable word order. Use absolute positioning. (15)
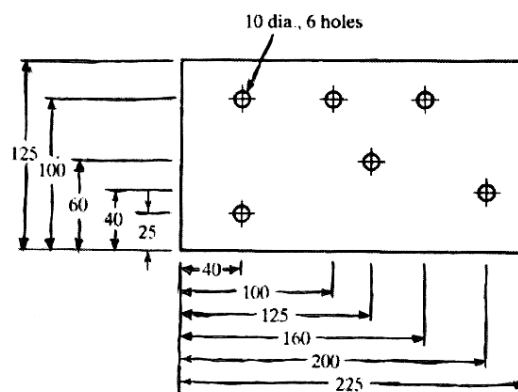

Figure Q. 16(b)

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