

APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER



Q. P. Code: IAR0821311C-I

(Pages: 2)

Name:

Reg. No:

THIRD SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2021

Branch: Mechanical Engineering

Specialization: Industrial Automation and Robotics

08ME7311(C) NUMERICAL CONTROL OF MACHINE TOOLS

(Common to Industrial Automation and Robotics)

Time: 3 hours

Max. Marks: 60

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q. No. Module 1 Marks

1. a What is meant by multi-axis machining? 3

Answer b or c

b Discuss the advantages of tool path simulation 6

c Describe the outputs of a CAM software package. 6

Q. No. Module 2 Marks

2. a Distinguish between incremental and absolute measuring devices. 3

Answer b or c

b Give a brief note on encoders used in CNC machine tools. 6

c Explain the working principle of open loop and closed loop systems. 6

Q. No. Module 3 Marks

3. a Explain the principle of achieving linear interpolations. 3

Answer b or c

b Compare the advantages and disadvantages of hardware and software interpolations. 6

c The worktable of a CNC machine which operates by open loop positioning system is driven by a lead screw with a pitch = 6.0 mm. The lead screw is connected to the output shaft of a stepping motor through a gearbox whose ratio is 5:1 (5 turns of the motor to one turn of the lead screw). The stepping motor has 52 step angles. The table must move a distance of 300 mm from its present position at a linear velocity = 600 mm/min. 6

Determine:

(i) How many pulses are required to move the table the specified distance

(ii) The required motor speed and pulse rate to achieve the desired table velocity.

Q. No.	Module 4	Marks
4. a	Compare pre-set and qualified tools	3
Answer b or c		
b	What are the types of MCU available?	6
c	List out the requirements of structure in the CNC machine tools.	6

Q. No.	Module 5	Marks
5. a	What is CAPP?	4
Answer b or c		
b	Write a part program for drilling the part shown in Fig. 1. The plate thickness is 25 mm.	8

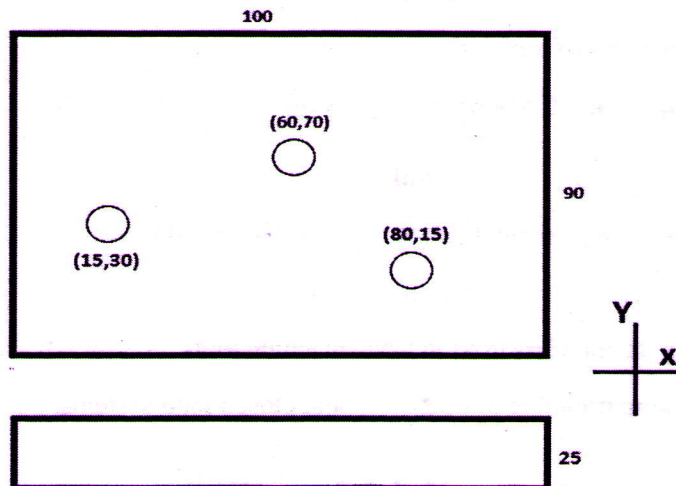


Fig. 1

c	What is tool length offset? Where do you store tool length offsets?	8
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Q. No.	Module 6	Marks
6. a	What is online condition monitoring in CNC?	4
Answer b or c		
b	What are the components of DNC? Explain them.	8
c	Write a short note on BTR system.	8