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NPTEL

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Courses » Computer numerical control (CNC) of machine tools and processes

Announcements Course Ask a Question Progress Mentor

Unit 4 - Week 3: Computer aided offline programming practice, Linear and curvilinear interpolator, Tutorial

Course outline

How to access
the portal ?

Week1-
Computer
Numerical
Control
Machines :
Introduction and
Classification

Week2:
Technologies
and devices
employed in CNC
machines

Week 3:
Computer aided
offline
programming
practice, Linear
and curvilinear
interpolator,
Tutorial

- Lecture 12 :
Computer Aided
Offline
Programming
- Lecture 13 :
Interpolators -
Linear
- Lecture 14 :
Interpolators -
Curvilinear
- Lecture 15 :
Questions on
Programming
and
Interpolation
- Quiz :
Assignment-3
- Solution to
Assignment-3

Assignment-3

The due date for submitting this assignment has passed. **Due on 2016-09-30, 22:00 IST.**

Submitted assignment

1) In the job shown (Fig. 1), the straight line $I2$ can be defined as per GTL offline computer programming system, as **1 point**

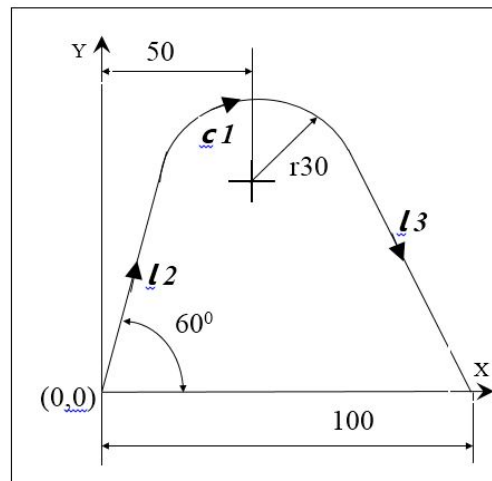


Fig. 1

- $I2 = X0Y0 , X100Y0$
- $I2 = X0Y0 , a60$
- $I2 = X0Y0 , a -120$
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

$I2 = X0Y0 , a60$

2) In the GTL offline computer aided programming system, $I2$ and $I3$ are defined with directions as shown (Fig.1). Now $c1$ can be defined (with direction as shown) as **1 point**

Week 4: 3-D
Machining,
Curved Surface
Geometry and
Cutter Path
generation,
Tutorial

Lecture notes:
pdf of all ppts
shown

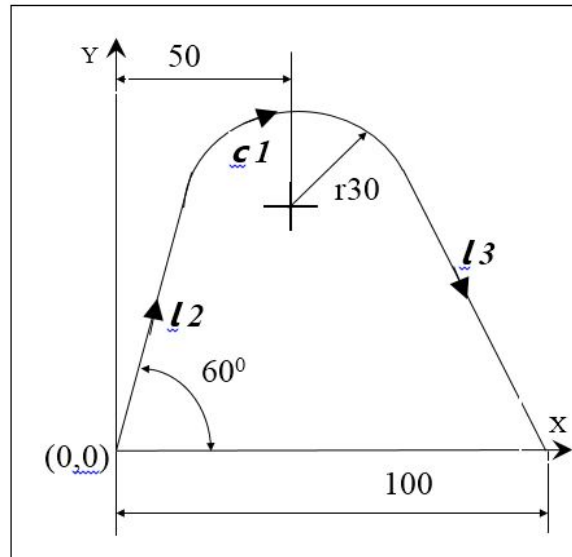


Fig. 1

- $c1 = l2, l3, r30$
- $c1 = l3, l2, r-30$
- $c1 = l2, l3, r-30$
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

$c1 = l2, l3, r-30$

3) For the CNC machining of 2-D profiles in a vertical spindle 3-axis CNC milling machine, cutter radius compensation is used **1 point**

- Only for those cutters which have diameter equal to or larger than the outer diameter of the spindle, so that extra material is not machined
- For drilling operations included in the part
- For shifting the cutter by its radius amount, to the left or right of its programmed path, looking in the direction of cutter movement
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

For shifting the cutter by its radius amount, to the left or right of its programmed path, looking in the direction of cutter movement

4) In case of taper turning on CNC turning centre **1 point**

- A taper turning attachment is made use of
- The cross feed drive derives power from the longitudinal feed drive through a gear connection which is automatically through program whenever combined motion of two axes is required
- There are individual motors in longitudinal and cross feed drives which combine their motion to make the cutter move along taper path
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

There are individual motors in longitudinal and cross feed drives which combine their motion to make the cutter move along taper path

5) During the circular interpolation movement in the X-Y plane in a 3-axis CNC milling machine **1 point**

- The RPM of the X-axis motor will remain constant

- The RPM of the X-axis motor will vary sinusoidally with time
- The RPM of the X-axis motor will rise or fall at constant rate with time
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

The RPM of the X-axis motor will vary sinusoidally with time

6) In the CNC command on a 3-axis CNC machine centre

1 point

```
N01 G90 G00 X-100 Y0
N02 G03 X-70.71 Y-70.71 CX0 CY0 F50
```

(CX = X coordinate of centre of circle of interpolation, CY= Y coordinate of centre of circle of interpolation, all length dimensions in mm)

The radius of the circle along which circular interpolation is taking place is (in mm) nearest to

- 70.71
- 50
- 100
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

100

7) During a linear cut taken on a CNC milling machine in the X-Y plane

1 point

(V_x, V_y are velocities of cutter along X and Y axes and Δx and Δy are the incremental distances covered by cutter along X and Y axes.)

$\frac{V_y}{V_x} = \frac{\Delta x}{\Delta y}$

$\frac{V_x}{V_y} = \frac{\Delta x}{\Delta y}$

$\frac{V_x}{V_y} > \frac{\Delta x}{\Delta y}$

- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\frac{V_x}{V_y} = \frac{\Delta x}{\Delta y}$$

8) In the second line of the following program, the feed along X axis is nearest to (in mm/min)

1 point

```
N01 G00 X20.98 Y25.23
N02 G01 X145.39 Y149.64F200
```

(All dimensions are in mm, Feed is in mm/min)

- 242.42

- 100
- 141.42
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

141.42

9) In a 3-axis CNC milling machine, a hardware interpolator sends pulse trains to the X, Y and Z **1 point** axes control loops. The X-Y table of the milling machine can carry out a maximum incremental movement of 500 mm along X-axis and there is an incremental encoder (400 holes) fitted on the lead screw (lead = 4 mm) of the X-axis drive.

For every linear interpolation command involving the X-axis, Δx in BLU is to be loaded into the p register of X-DDA in binary (Fig. 2). In that case, the minimum size (n bit) of the P register of the X-DDA is

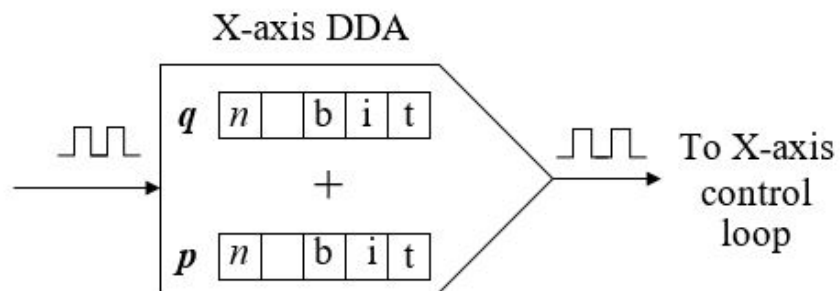


Fig 2

- 15
- 16
- 17
- 9
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

16

10) If drilling is done on a CNC machine with contouring control system

1 point

- The "cutter diameter compensation left" should be used
- The "cutter diameter compensation right" should be used
- Drilling cannot be done on CNC machines with contouring control system
- Cutter diameter compensation is not required
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

Cutter diameter compensation is not required

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