Unit 5 - Week 3: Computer aided offline programming practice, Linear and curvilinear interpolator, Tutorial

Assignment 3

The due date for submitting this assignment has passed. Due on 2019-09-18, 23:59 IST. As per our records you have not submitted this assignment.

1)
The Khadi and Village Industries commission (KVIC) wants to computerize the process of inlay work (making pattern of grooves in marble slab and putting coloured stones in those grooves). The grooving is only along circles and straight lines and is done by a horizontal axis grinding wheel as shown. Grinding wheel is given necessary vertical motion. Table (on which marble slab is placed) is provided with circular and linear interpolation in horizontal plane. Ends of grooves are hand tooled to correct depth. Groove cross section should closely correspond to grinding wheel conjugate form. One design engineer suggests an additional rotary axis as shown for reducing inaccuracy of groove form.

**Quiz:**

2. In a CNC drilling machine, a number of holes have to be drilled on a rectangular metal plate by the execution of a single program. Part surface is parallel to X-Y plane. These holes are on the circumference of a circle with all their axes along Z axis. In that case, in order to drill these holes, the following facility has to be present in the CNC drilling machine

   a. Rotary table with rotational axis along Z axis
   b. Circular interpolation in X-Y plane
   c. Linear interpolation in X-Y plane
   d. None of the others

No, the answer is incorrect.
Score: 0
Accepted Answers: d.
3) The circle chosen by the GTL command `ex = c1, l1, r20` is (all the small circles are of radius 20 mm)

- a. The circle marked as 6 and with sign as shown
- b. The circle marked as 3 and with sign as shown
- c. The circle marked as 4 and with sign as shown
- d. The circle marked as 7 and with sign as shown
- e. None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
- a.
In the job shown – the inclined lines are touching the circle. Definition of the circle is (fig not to scale, dimensions in mm)

(a). Possible through GTL
(b). Not possible as the X coordinate of the circle center is missing
(c). Not possible as the lengths of the inclined lines are not provided
(d). None of the above explicitly describes the situation

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.
5) In the figure

a. \( l_2 \) can be defined but \( l_3 \) cannot be defined
b. \( l_2 \) cannot be defined but \( l_3 \) can be defined
c. Neither \( l_2 \) nor \( l_3 \) can be defined
d. None of the others

No, the answer is incorrect.
Score: 0
Accepted Answers:
b

6) The function of the interpolator in continuous control CNC machine tools is to

a. Calculate cutting forces
b. Measure tool wear and send alert for tool change
c. Determine axes velocities for linear and circular cuts
d. None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
c
7) In the CNC turning centre

a. An interpolator is not necessary
b. 2-D Interpolation is required
c. Only linear interpolator is required
d. None of these

1 point
No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

8) The position down counters for feed axes of a 3-axis vertical machining centre

a. Are not required if interpolator is present
b. Are not required if encoders are present
c. Are necessary even if encoders are present
d. None of these

1 point
No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

9)
You start up a company to cater towards development of special purpose automatic machines with electronic control. A client asks for a laser drilling machine for making equispaced circumferential holes on circular precious stones (CPT) where 20, 40, 60 and 80 such holes can be drilled to cover full circumference. X is the whole number to be added to itself inside DDA and it can be put in by operator for selecting number of holes to be laser drilled. If the control system as shown in the figure is employed, the successfully working, cheapest control system, among the following options, will have

a. \( h = 80 \) holes, \( n = 2 \)
b. \( h = 160 \) holes, \( n = 3 \)
c. \( h = 320 \) holes, \( n = 4 \)
d. None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
10) b.
If a DDA-based hardware interpolator is employed with only two DDAs instead of three

a. It will not be possible to carry out linear interpolation correctly
b. It will not be possible to carry out circular interpolation correctly
c. It will be possible to carry out both linear and circular interpolation properly
d. None of these

No, the answer is incorrect.
Score: 0
Accepted Answers: b.