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Courses » Computer Numeric Control Of Machine Tools And Processes

Announcements Course Ask a Question Progress Mentor

Unit 2 - Week1- Computer Numerical Control Machines : Introduction and Classification

Course outline

How to access the portal ?

Week1- Computer Numerical Control Machines : Introduction and Classification

- Lecture1: Introduction to computer control – role of computers in automation
- Lecture2 : Introduction Cotd.– binary logic and logic gates
- Lecture3 : Classification of Computer numerical control (CNC) – Point to point and continuous control
- Lecture4 : Classification Cotd. : Closed loop and open loop control
- Lecture5 : Tutorial involving simple calculations on different aspects of CNC controls
- Lecture6 : Questions, MCQ Discussions on Motors, Encoders,

Assignment-1

The due date for submitting this assignment has passed. **Due on 2018-02-23, 23:59 IST.**

Submitted assignment

- 1) A turning centre is 1 point
- A cutting tool
 - A CNC turntable (rotary table)
 - A lathe centre
 - None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
None of these

- 2) The stepper motor drives a rack through gear box (output RPM/input RPM =1/2), worm and 1 point
worm gear, pinion and rack (Fig. 1). The worm gear and the pinion are integral. The stepper motor is driven by voltage pulses and executes 1.8 degree rotation per pulse. Worm gear has 125 teeth and pinion has 30 teeth, 2 module. Worm is of double start.

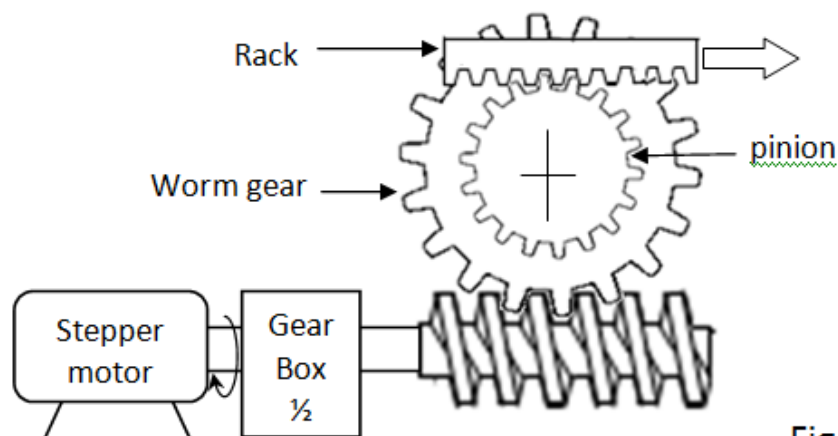


Fig. 1

The movement of the rack per voltage pulse (given to the stepper motor) is nearest to

- 60 microns
- 15 microns
- 7.5 microns
- 31.42 microns

Decoders and Programming Practice

- Quiz : Assignment-1
- Solution of Assignment-1

Week2:
Technologies and devices employed in CNC machines

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

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

Practice Assignments with their answers and explanations

DOWNLOAD VIDEOS

- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

7.5 microns

3) A company makes stepper motor controlled sight screens for cricket grounds. A PTP (point to **1 point** point) control circuit is employed for the position control, as shown in Fig. 2. "DOWN CTR" means one n-bit downcounter, into which, some binary number (data) can be loaded so that a required movement will be carried out. Direction control is done by other means. The shift of the sight screen against one loading of data is restricted to 2 meters and the velocity of shift of the sight screen should be 0.5 m/min. The pulse generator frequency is f pulses per minute and the stepper motor rotates one step of 1.8 degrees per pulse from pulse generator. The pitch of the screw is 50 mm.

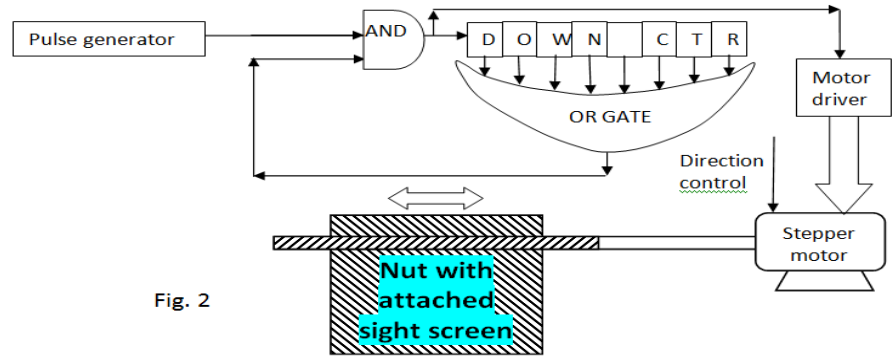


Fig. 2

The minimum value of n should be nearest to

- 15
- 4
- 8
- 13
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

13

4) In the problem of question number 3, assuming no missed pulses, the pulse generator output **1 point** frequency should be nearest to (in ppm)

- 500
- 2000
- 1000
- 3743
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

2000

5) A PTP (Point-to-point) CNC machine has a BLU (Basic length unit) of 20 μms in its feed **1 point** drive along X axis (Fig. 3). Speed of table along X axis is fixed at 500 mm/min. Feedback voltage spikes (see figure), corresponding to voltage pulses arising from the encoder, are sent back from the encoder to the machine controls. The time interval between two such successive spikes is equal to the time interval between the centres of two successive voltage pulses and is nearest to

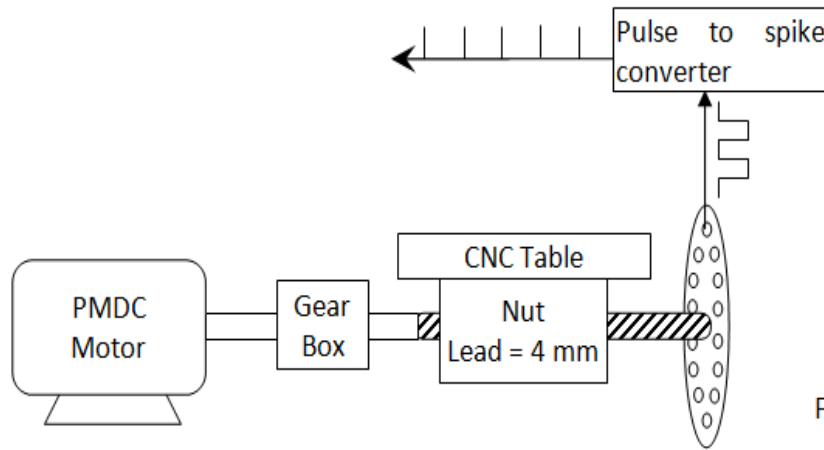


Fig. 3

- 0.05 seconds
- 0.024 seconds
- 0.0024 seconds
- 0.00024 seconds
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.0024 seconds

6) A CNC drilling table, capable of moving only along X and Y axis (Z axis is the drilling spindle axis with separate control), for workpiece manipulation, should necessarily have **1 point**

- Continuous control
- Point to point control
- Point to point control with stepper motors
- Continuous control with DC motors
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

Point to point control

7) The interpolator is definitely present in the following machine **1 point**

- CNC spot welding machine
- CNC drilling machine
- CNC milling machine
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

CNC milling machine

8) There is a stepper motor connected with a table through gear box, lead screw-nut connection as shown in Fig. 4. The table has single axis of motion and the stepper motor covers one rotation in 200 steps and moves one step per pulse of the pulse generator. The Basic length unit (BLU) of the drive is (motion of table per pulse of pulse generator) **1 point**

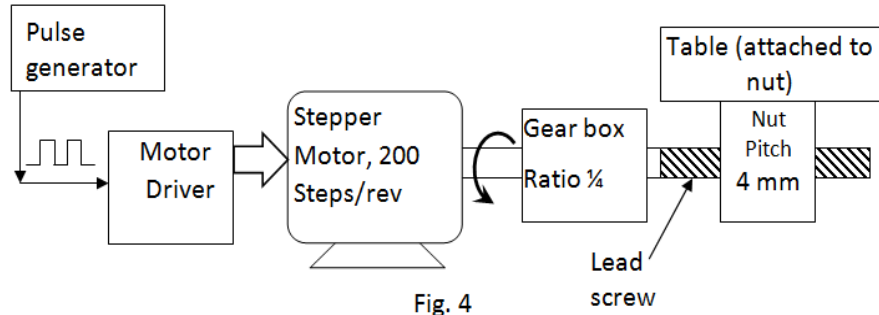


Fig. 4

- 0.01 mm
- 0.05 mm
- 0.1 mm
- 0.005 mm
- None of the others

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.005 mm

9)

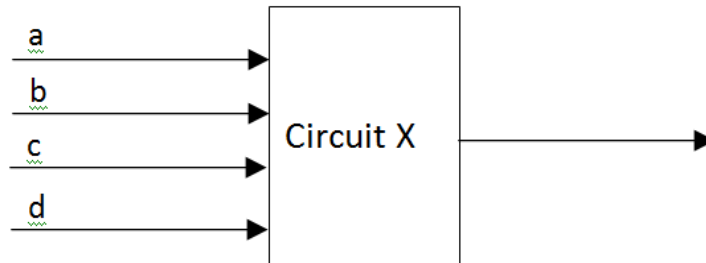


Fig. 5

1 point

In a CNC turning centre, The turning tool is being used with same speed, feed, depth of cut, cutting fluid and work piece material throughout. There are some safety conditions to be complied with. Only after these are satisfied, a turning operation can be started by the output of the circuit X.

(a) The door of the glass enclosure of the machining space has to be kept closed. There is a sensor so placed that it has a digital output signal $a = 0$ if the door is open and 1 if the door is closed.

(b) The cumulative machining time t_c of the mounted tool $<$ its tool life t_l as specified by tool manufacturer. One output signal from the machine controls $b = 0$ if $t_c > t_l$ and $b = 1$ otherwise.

(c) The machine is being operated either by the officially assigned operator or service personnel or both. The biometric identifier attached with machine develops $c = 1$ if officially assigned machine operator is working else $c = 0$; and $d = 1$ if service personnel is working, else $d = 0$.

In that case, the logic circuit X which will correctly operate the machine is

- $X = a.b.c.d$
- $X = a'.b'.c.d$
- $X = a.b.(c+d)$
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

$X = a.b.(c+d)$

10) You are a second hand machine tool dealer (i.e., you buy second hand machine tools and sell them after restoration and modification). You procure an **inch system** closed loop CNC machine tool in which the least count is 0.0005 inches by virtue of feedback pulses from the encoder and the encoder has 200 holes (Fig. 6). An interested customer asks whether you can

convert the least count to 0.01 mm. This can be obtained by

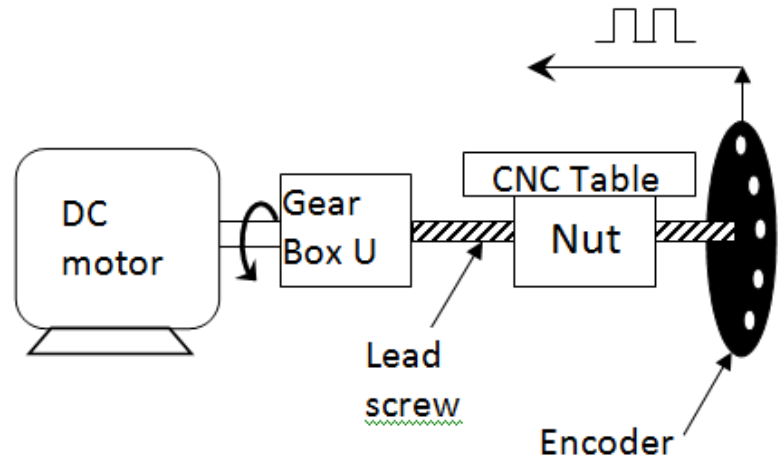


Fig. 6

- Changing the existing gear ratio U to $25.4 \times U$
- Removing the existing encoder and putting an encoder with 254 holes
- Changing the existing encoder and putting an encoder with 127 holes
- Changing the existing gear ratio U to $12.7 \times U$
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

Removing the existing encoder and putting an encoder with 254 holes

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