Unit 4 - Week 2: Technologies and devices employed in CNC machines

Assignment 2

The due date for submitting this assignment has passed. Due on 2019-09-11, 23:59 IST. As per our records you have not submitted this assignment.

1)
In a point to point CNC machine with PMDC motor, gear box, lead screw-nut and encoder as shown, the maximum travel along X axis is 500 mm while the BLU along X axis is 20 microns. In that case, the minimum size (number of bits) of the position down counter along the X axis should be

![Diagram](https://onlinecourses.nptel.ac.in/noc19_me46/unit?unit=13&lesson=13)

**Fig. 1**

2. a. 10 bits  
   b. 15 bits  
   c. 20 bits  
   d. None of these

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

2) A company making handheld drill machines, incorporates a drill thrust (axial force) measuring sensor which outputs the force as a 4-bit signal X = PQRS in binary (P is MSB and S is LSB) where

- X = 0 (P = 0, Q = 0, R = 0, S = 0) when force is 0
- X = 15 in decimal is 1111 (P = Q = R = S = 1) in binary when force is 1000 N. In between, it sends out proportionate but digitally approximated data for the force.

The company wants the power to the drill motor to be disconnected whenever the force equals or exceeds 800 N.

The decoding circuit which sends out a 0 for force equal or exceeding 800 N is

- a. P, Q  
- b. (P, Q)'  
- c. P, Q, R', S'  
- d. None of these

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
- a.
3) In a laboratory, there is a pulse generator with an output pulse rate of 800 ppm. However, a pulse rate of 500 ppm is required for an experiment. If a 4 bit DDA is available (X is repeatedly added and dumped into a 4-bit register to create overflow), it can produce the required pulse rate of 500 ppm at its output by taking the pulse generator output as shown and using X equal to

![Diagram of 4 bit DDA](image)

a. 10  
b. 20  
c. 30  
d. None of these

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

4) A permanent magnet DC motor, with a time constant of 1 second, is employed as the prime mover in a feed axis drive of a CNC milling machine. It will acquire 99% of the programmed speed at time nearest to

a. 2.5 sec  
b. 4.6 sec  
c. 8.8 sec  
d. None of these

No, the answer is incorrect. 
Score: 0  
Accepted Answers:  
a.
5) During a circular cut on a CNC milling machine (taking place in the X-Y plane), the feed rate velocity values along X axis and Y axis
   a. Can never have the same magnitude at a particular instant of time
   b. Can never reverse direction (either in X or in Y or in both)
   c. Are always constant
   d. None of these

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

6) If the G code G96 is used, it provides constant surface speed during turning process. Hence,
   a. The RPM of the work piece being turned, remains constant over multiple passes due to this command
   b. The feedrate (longitudinal) gets changed from one pass to another due to this command
   c. The cutting speed remains same over multiple passes due to this command
   d. None of these

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

7) CNC in machining technology stands for
   a. Cam Norton control
   b. Cryogenic nano coolants
   c. Computer numerical control
   d. None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.
1 point
8) The main advantage of Computer controlled automation over mechanical (e.g., cam controlled) automation is

a. Glamour  
b. Flexibility  
c. Ability to apply higher speed feed depth of cut compared to those of conventionally controlled machine of same duty  
d. None of these

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

1 point
9) A Stepper motor is a motor

a. For which, the rotational speeds are only available in specific steps \(100\) rpm, \(200\) rpm, \(300\) rpm till \(1400\) rpm in steps of \(100\) rpm  
b. Which is capable of rotating in discrete angular steps  
c. None of the others  
d. Whose output shaft is necessarily a stepped shaft so that any diameter shaft can be joined to it

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

1 point
10)
The function of a Tachogenerator, when connected up with a permanent magnet DC motor as shown (fig 1) in the feed axis of a CNC machining centre, is

\[ V \text{ is the voltage applied, } K_A \text{ is the amplifier gain, } K_T \text{ is the tachogenerator gain, } \omega \text{ the} \]

\[ V_T = K_T \omega \]

(a) To reduce wear and tear of recirculating ball screw-nut mechanism
(b) Reduction of BLU (Basic Length Unit)
(c) None of the others
(d) Faster response of motor

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( \text{d.} \)