

Instrumentation Engineering Sample Questions

Questions And Answers

No.	Question
1	In an 8085 microprocessor, which one of the following is the correct sequence of the machine cycles for the execution of the DCR M instruction?
	<p>A) op-code fetch</p> <p>B) op-code fetch, memory read, memory write</p> <p>C) op-code fetch memory read</p> <p>D) op-code fetch memory write, memory write</p>
Options	
Correct Answer	B

2

$$\lim_{x \rightarrow \frac{\pi}{4}} \sin 2 \left[x - \frac{\frac{\pi}{4}}{4} \right]$$

equals

Options	<p>B) $0 \frac{1}{2}$</p> <p>C) 1 D) 2</p>
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Correct Answer D

3 Three DC currents I_1 , I_2 and I_3 meet at a node with I_1 entering and I_2 and I_3 leaving the node. I_1 and I_2 are measured as 100mA and 99 mA with a $\pm 1\%$ accuracy. Then the value of I_3 and the accuracy of I_3 are

Options **A)** 1 mA $\pm 2\%$ **B)** 199 mA $\pm 2\%$
 C) 1 mA $\pm 2\%$ **D)** 1 mA $\pm 199\%$

Correct Answer C

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4 The input-output characteristic of a Schmidt trigger has a hysteresis band of ± 0.1 V. If the input voltage is $5 \sin(1000 \pi t)$, the delay between the corresponding zero cross-over points of the output and input signals is

Options **A)** 6.37 μ s **B)** 0.02 μ s
 C) 63.7 μ s **D)** 2.0 μ s

Correct Answer A

5 In a spirit level, 2.5mm of movement of the bubble corresponds to a tilt angle of 25 seconds. The radius of curvature of the tube of the spirit level is

Options **A)** 52.1 m **B)** 34.4 m
 C) 26.3 m **D)** 15.6 m

Correct Answer B

6 The loop transfer function of a system is given by $G(S)h(s) = \frac{10 e^{-Ls}}{s}$

. The phase cross-over frequency is 5 rad/s. The value of the dead time L is

Options **A)** $\pi/20$ **B)** $\pi/10$
 C) $-\pi/20$ **D)** zero

Correct Answer B

7 An 8-bit microcontroller has an external RAM is the memory map from 8000H to 9FFFH. The number of bytes this RAM can store is

- Options
- A) 8193 **B) 8191**
C) 8192 **D) 8000**

Correct Answer C

8 Two copper-constantan thermocouples are connected such that the two constantan wires are joined together. The two copper wires are connected to the input of a low noise chopper stabilized differential amplifier having a gain of 1000. One of the thermocouple junctions is immersed in a flask containing ice and water in equal proportion. The other thermocouple is at a temperature T. If the output of the amplifier is 2.050V, the temperature T is

- Options
- A) 205°C **B) 102.5°C**
C) 51.25°C **D) 50°C**

Correct Answer D

9 The vectored address corresponding to the software interrupt command RST7 in 8085 microprocessor is

- Options
- A) 0017H **B) 0027H**
C) 0038H **D) 0700H**

Correct Answer C

10 For a first order instrument a 5% settling time is equal to

- Options
- A) three times the time constant **B) two times the time constant**
C) the time constant **D) time required for the output signal to reaches 5% of the final value**

Correct Answer A

11 The measurements of a source voltage are 5.9V, 5.7V and 6.1V. The sample

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standard deviation of the readings is

A) 0.013 B) 0.04

Options

C) 0.115 D) 0.2

Correct

D

Answer

12

In an INTEL 8085 microprocessor the ADDRESS-DATA bus and the DATA bus are

A) Non multiplexed B) Multiplexed

Options

C) Duplicated D) Same as CONTROL bus

Correct

B

Answer

13

The number of comparators required in an 8-bit flash-type AID converter is

A) 256 B) 255

Options

C) $(8 + 2)$ D) 8

Correct

B

Answer

14

An ultrasonic beam of frequency 1 MHz and intensity 0.5 W/cm^2 passes through a layer of soft tissue of thickness t with an attenuation coefficient of 1.18 cm^{-1} . The ratio of output to input power is $1/e^2$. The thickness of the tissue is

A) 1 cm B) 1.695 cm

Options

C) 2.408 cm D) 3.712 cm

Correct

B

Answer

15

A twisted pair of wires is used for connecting the signal source with the instrumentation amplifier, as it helps reducing

A) the effect of external interference B) the error due to bias currents in the amplifier

Options

C) the loading of the source by the amplifier D) the common mode voltage

Correct
Answer

C

16

The output from a 633 nm He-Ne laser comes out from the mirror with a beam diameter of 1mm and diverges to the far field. It is brought to a focus by a convex lens of focal length of 17 mm. The spot size diameter of the beam at the focal point is

Options

A) 20 μ m B) 26 μ m

C) 52 μ m D) 13 μ m

Correct
Answer

C

17

International temperature scale in the range 0-630oC is defined by means of a

Options

A) mercury pressure spring thermometer

B) platinum-platinum. 10% rhodium thermocouple

C) platinum resistance thermometer

D) total radiation pyrometer.

Correct
Answer

D

18

A microprocessor has an instruction XOR (r_1 , r_2) which performs an Exclusive OR operation of registers r_1, r_2 and stores the result in r_1 . After the following instructions are executed
XOR (r_2 , r_1)

XOR (r_1, r_2)

XOR (r_2, r_1)

Which one of the following is true?

A) Content of register r_1 is half sum of r_1 and r_2

B) Content of register r_2 is half sum of r_1 and r_2

Options

C) Contents of registers r_1 and r_2 remain unaltered

D) Contents of registers r_1 and r_2 are swapped

Correct
Answer

D

19 A second order feedback system is found to be oscillating with a high frequency. The oscillations

- Options
- | | |
|--|--|
| A) can be reduced by increasing the proportional action | B) can be reduced by increasing the integral action |
| C) can be reduced by increasing the derivative action | D) cannot be reduced |

Correct Answer B

20 For a suppressed carrier amplitude modulator (AM-SC) system, the carrier and the modulating inputs are $x_c(t) = \cos \omega_c t$ and $x_m(t) = 0.5 \sin \omega_m t$, respectively. The output of the system is proportional to

- Options
- | | |
|---|---|
| A) $\sin(\omega_c + \omega_m)t - \sin(\omega_c - \omega_m)t$ | B) $\sin(\omega_c + \omega_m)t + \cos(\omega_c - \omega_m)t$ |
| C) $(1 + 0.5 \sin \omega_m t) \cos \omega_c t$ | D) $(1 - 0.5 \sin \omega_m t) \cos \omega_c t$ |

Correct Answer B