Networks Analysis and Synthesis

1. A series RC circuit has R = 5 Ω and C = 10 μF. The current in the circuit is 5 sin 20000t. The applied voltage is

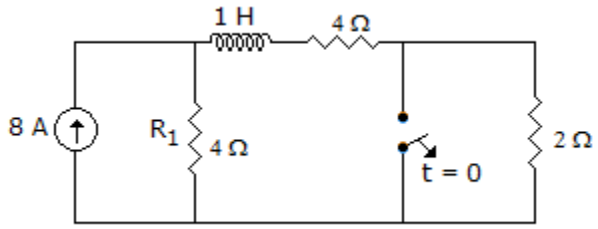
A. 252 sin (20000t + 45°)

B. 252 sin (20000t - 45°)

C. 252 sin 20000t

D. 252 sin (20000t - 90°)

2. In figure, the switch has been in closed position for a long time. At t = 0, the switch is opened. At t = 0+, the current R1 is



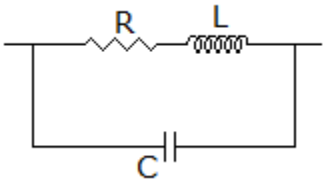
A. 8 A

B. 4 A

C. 6 A

D. 2 A

3. The expression for the resonant frequency ω0 in the circuit shown



A. 1/LC

B. $\frac{1}{\sqrt{LC}}\sqrt{1 - \frac{R^2C}{L}}$

C. $\frac{1}{\sqrt{LC}}\sqrt{1 - \frac{R^2C}{C}}$

D. none

4. A network has two sources of different frequencies. The only method of analysis which can be used to find current and voltages of different branches is the use of

A. Kirchoff's laws

B. Superposition theorem

C. Thevenin's theorem

D. Tellegen's theorem

5. Pick the correct statement with respect to following figure.

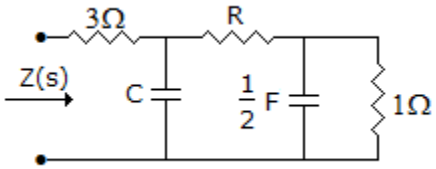
A. both the circuit are not identical filter Ckts

B. identical filter circuit at all frequencies

C. identical filter circuit at low frequency

D. identical filter circuit at high frequency

6. In figure, $Z(s) = \frac{3(s^2 + 6s + 8)}{s^2 + 4s + 3}$. The values of C and R are



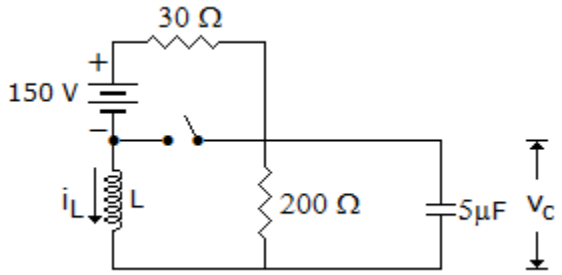
A. $\frac{1}{6}$ F and 4Ω

B. $\frac{2}{9}$ F and Ω

C. $\frac{2}{3}$ F and $\frac{1}{2}$ Ω

D. $\frac{1}{2}$ F and 1Ω

7. In figure, the switch is initially open. At t = 0 switch is closed. v_c (0+) and i_L (0+) are



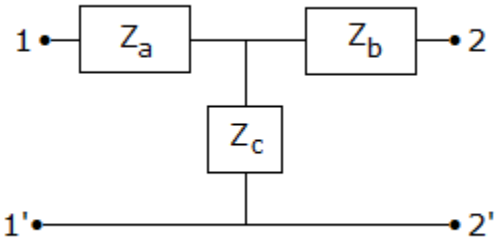
A. 60 V and - 0.3 A

B. 150 V and zero

C. zero and 0.3 A

D. 90 V and - 0.3 A

8. For the network of figure, [z] matrix is



9. In a network

A. Number of links = Number of branches - number of nodes + 1

B. Number of links = Number of branches - number of nodes

C. Number of links = Number of branches - number of nodes - 1

D. Number of links = Number of branches - number of nodes – 2

10. When analysing two port networks in cascade, it is more convenient to use

A. z parameters

B. h parameters

C. T parameters

D. y parameters

Measurements-And-Instrumentation

1. An ammeter of 0-25 A range has a guaranteed accuracy of 1% of full scale reading. The current measured is 5 A. The limiting error is

A. 2%

B. 2.5%

C. 4%

D. 5%

2. The coil of a moving iron instrument has a resistance of 500 Ω and an inductance of 1 H. It reads 250 V when a 250 V dc is applied. If series resistance is 2000 Ω, its reading when fed by 250 V, 50 Hz ac will be

A. 260 V

B. 252 V

C. 250 V

D. 248 V

3. Assertion (A): De sauty's bridge is suitable only for pure capacitor.

Reason (R): Capacitors are mostly perfect.

A. Both A and R are true and R is correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true R is false

D. A is false R is true

4. A piezoelectric force transducer has a charge sensitivity of 20 pC/N. It is connected to a charge amplifier and overall gain of transducer and amplifier is 50 mV/N. The gain of amplifier is

A. 1 mV/pC

B. 1.5 mV/pC

C. 2.5 mV/pC

D. 4 mV/pC

5. An LVDT is used to measure displacement. The LVDT feeds a Voltmeter of 0-5 V range through a 250 gain amplifier. For a displacement 0.5 mm the output of LVDT is 2 mV. The sensitivity of instrument is

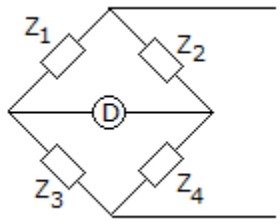
A. 0.1 V/mm

B. 0.5 V/mm

C. 1 V/mm

D. 5 V/mm

6. In figure, Z1 = 200∠60° Ω, Z2 = 400∠ - 90° Ω, Z3 = 300∠0°. Then Z4 for bridge to be balanced is



A. 150∠30° Ω

B. 400∠ - 90° Ω

C. 300∠90° Ω

D. 600∠ - 150° Ω

7. In a ballistic galvanometer, a charge of 100 μC gives a first swing of 25°. The charge required to cause first swing of 50° is

A. 200 μC

B. 400 μC

C. 50 μC

D. 25 μC

8. Two resistors R1 = 36 Ω ± 5% and R2 = 75 Ω ± 5% are connected in series. The total resistance is

A. 111 ± 0 Ω

B. 111 ± 2.778 Ω

C. 111 ± 5.55 Ω

D. 111 ± 7.23 Ω

9. A digital voltmeter has a read out range from 0 to 999 counts. If the full scale reading is 9.999 V, the resolution is

A. 1 V

B. 0.01 V

C. 1 mV

D. 1 μV

10. Which of the following are needed both for protection and metering?

A. Wattmeters

B. Instrument transformers

C. Energy meters

D. Power factor meters

Analog Electronics

1. To prevent a DC return between source and load, it is necessary to use

   A. resistor between source and load

   B. inductor between source and load

   C. capacitor between source and load

   D. either (a) or (b)

2. For a base current of 10 μA, what is the value of collector current in common emitter if βdc = 100

   A. 10 μA

   B. 100 μA

   C. 1 mA

   D. 10 mA

3. Which of the following oscillators is suitable for frequencies in the range of mega hertz?

   A. RC phase shift

   B. Wien bridge

   C. Hartley

   D. Both (a) and (c)

4. A half wave diode circuit using ideal diode has an input voltage 20 sin ωt volts. Then average and rms values of output voltage are

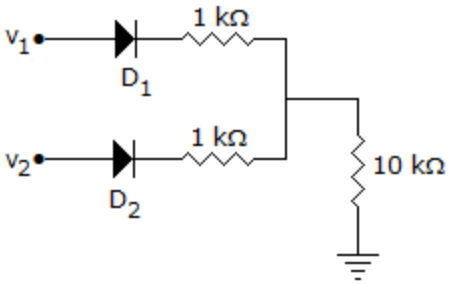
   A. $\frac{10}{\pi}V$ and 10 V

   B. $\frac{20}{\pi}V$ and 10 V

   C. $\frac{10}{\pi}V$ and 5 V

   D. $\frac{20}{\pi}V$ and 5 V

5. In figure v1 = 8 V and v2 = 4 V. Which diode will conduct?



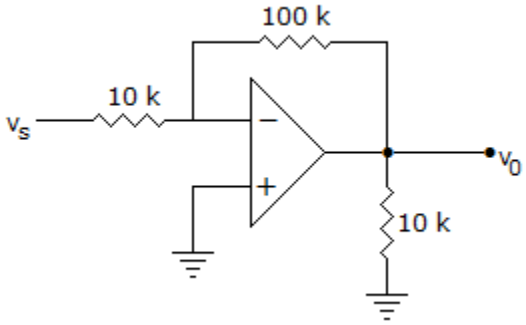
A. D2 only

B. D1 only

C. Both D1 and D2

D. Neither D1 nor D2

6. The input impedance of op-amp circuit of figure is



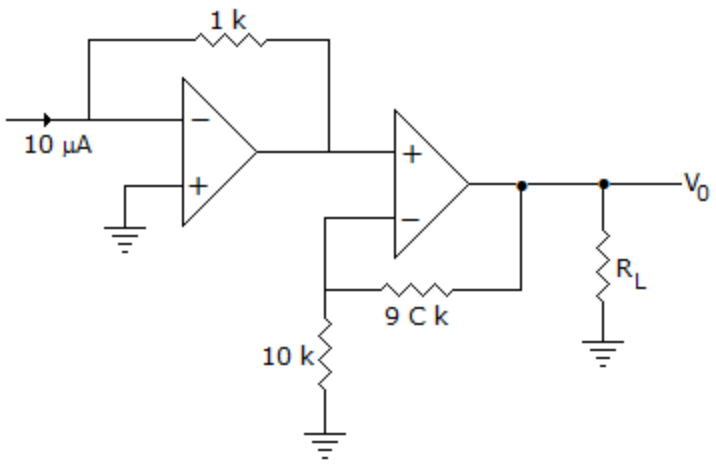
A. 120 k ohm

B. 110 k ohm

C. infinity

D. 10 k ohm

7. The output V0 in figure is



A. -100 V

B. -100 mV

C. 10 V

D. 10 mV

8. In a CE amplifier the input impedance is equal to the ratio of

A. ac base voltage to ac base current

B. ac base voltage to ac emitter current

C. ac emitter voltage to ac collector current

D. ac collector voltage to ac collector current

9. For a system to work, as oscillator the total phase shift of the loop gain must be equal to

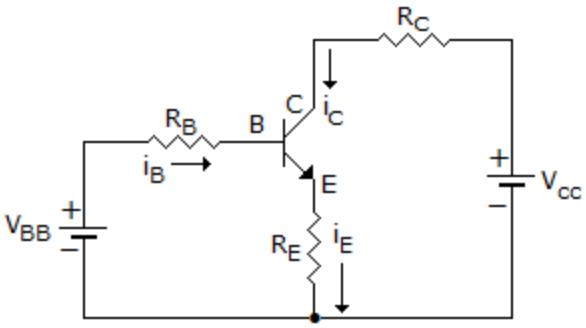
A. 90°

B. 45°

C. 270°

D. 360°

10. The transistor of following figure in Si diode with a base current of 40 μA and ICBO = 0, if VBB = 6V, RE = 2 kΩ and β = 90, IBQ = 20 μA then RB =



A. 200 kΩ

B. 265 kΩ

C. 150 kΩ

D. 100 kΩ

Digital Electronics

1. Which of the following is minimum error code?

[A] Octal code

[B] Grey code

[C] Binary code

[D] Excess 3 code

2. Popular application flip-flop are ?

[A] Counters

[B] Shift registers

[C] Transfer registers

[D] All of above

3. SR Flip flop can be converted to T-type flip-flop if ?

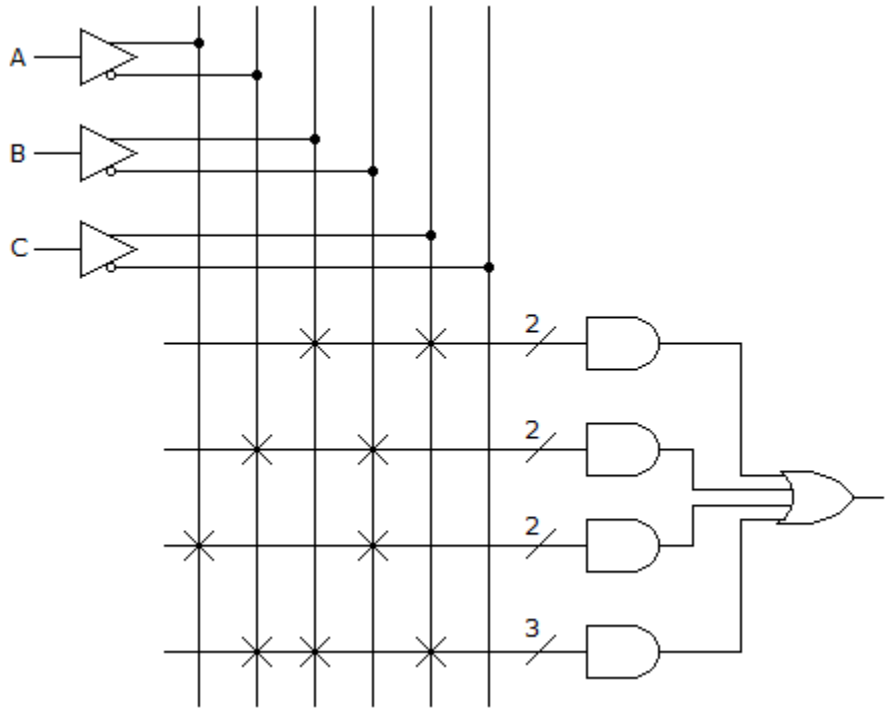
[A] S is connected to Q

[B] R is connected to Q

[C] Both S and R are shortend

[D] S and R are connected to Q and Q' respectively

4. Referring to the GAL diagram, which is the correct logic function?



A. $X = B\,C + \overline{A}\,\overline{B} + A\,\overline{B} + \overline{A}\,B\,C$

B. $X = B\,\overline{C} + \overline{A}\,\overline{B} + A\,\overline{B} + A\,B\,C$

C. $X = B\,C + \overline{A}\,\overline{B} + \overline{A}\,B + \overline{A}\,B\,C$

D. $X = B\,C + \overline{A}\,\overline{B} + A\,\overline{B} + \overline{A}\,B\,\overline{C}$

5. The Boolean SOP expression obtained from the truth table below is _____.

Inputs			Output
A	B	C	X
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

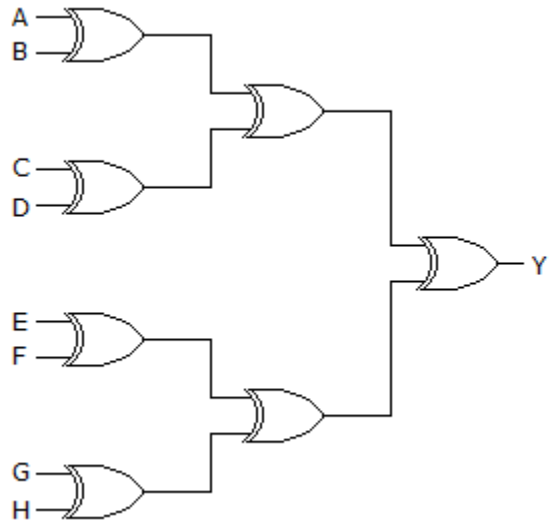
A. $A\,B\,C + A\,B\,C$

B. $A\,\overline{B}\,C + A\,B\,\overline{C}$

C. $\overline{A}\,\overline{B}\,C + A\,B\,\overline{C}$

D. None of these

6. The 8-input XOR circuit shown has an output of Y = 1. Which input combination below (ordered A – H) is correct?



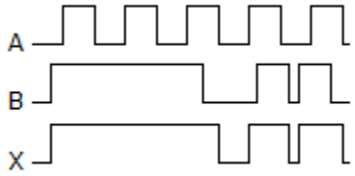
A. 10111100

B. 10111000

C. 11100111

D. 00011101

7. The following waveform pattern is for a(n) _____.



A. 2-input AND gate

B. 2-input OR gate

C. Exclusive-OR gate

D. None of the above

8. How many AND gates are required to implement the Boolean expression, ?

A. 1

B. 2

C. 3

D. 4

9. The inverter can be produced with how many NAND gates?

A. 1

B. 2

C. 3

D. 4

10.

10. A logic circuit with an output consists of _____.

A. two AND gates, two OR gates, two inverters

B. three AND gates, two OR gates, one inverter

C. two AND gates, one OR gate, two inverters

D. two AND gates, one OR gate

Microprocessor

1. The devices that provide the means for a computer to communicate with the user or other computers are referred to as:

A. CPU

B. ALU

C. I/O

D. none of the above

2. Single-bit indicators that may be set or cleared to show the results of logical or arithmetic operations are the:

A. flags

B. registers

C. monitors

D. decisions

3. When referring to instruction words, a mnemonic is:

A. a short abbreviation for the operand address

B. a short abbreviation for the operation to be performed

C. a short abbreviation for the data word stored at the operand address

D. shorthand for machine language

4. The technique of assigning a memory address to each I/O device in the computer system is called:

A. memory-mapped I/O

B. ported I/O

C. dedicated I/O

D. wired I/O

5. What type of circuit is used at the interface point of an output port?

A. decoder

B. latch

C. tristate buffer

D. none of the above

6. The register in the 8085A that is used to keep track of the memory address of the next op-code to be run in the program is the:

A. stack pointer

B. program counter

C. instruction pointer

D. accumulator

7. The 8085A is a(n):

A. 16-bit parallel CPU

B. 8-bit serial CPU

C. 8-bit parallel CPU

D. none of the above

8. Because microprocessor CPUs do not understand mnemonics as they are, they have to be converted to _____.

A. hexadecimal machine code

B. binary machine code

C. assembly language

D. all of the above

9. A register in the microprocessor that keeps track of the answer or results of any arithmetic or logic operation is the:

A. stack pointer

B. program counter

C. instruction pointer

D. accumulator

10. Which bus is a bidirectional bus?

A. address bus

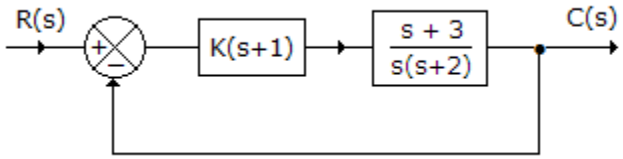
B. data bus

C. address bus and data bus

D. none of the above

Automatic-Control-Systems

1. For the system in the given figure the characteristic equation is



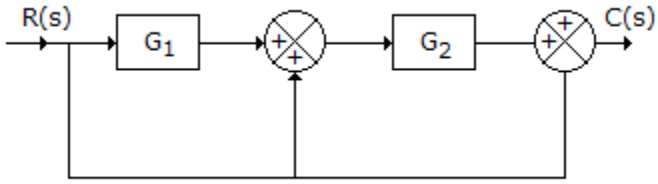
A. $1 + \frac{K(s+1)(s+3)}{s(s+2)} = 0$

B. $1 + \frac{K(s-1)(s-3)}{s(s-2)} = 0$

C. K(s + 1)(s + 3) = 0

D. s(s + 2) = 0

2. For the system in the given figure. The transfer function C(s)/R(s) is



A. G1 + G2 + 1

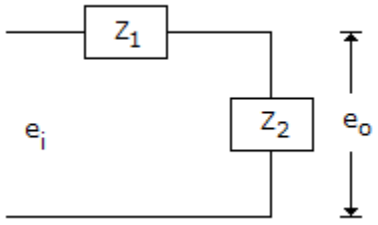
B. G1 G2 + 1

C. G1 G2 + G2 + 1

D. G1 G2 + G1 + 1

3.

For the system of the given figure the transfer function =



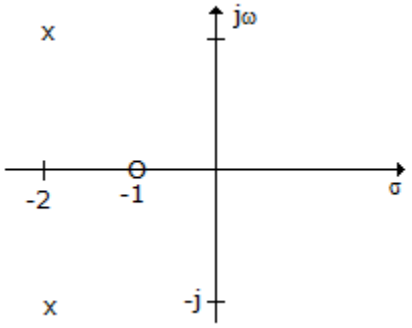
A. $\frac{Z_2(s)}{Z_1(s)}$

B. $\frac{Z_2(s)}{Z_1(s) + Z_2(s)}$

C. $\frac{Z_1(s)}{Z_2(s)}$

D. $\frac{Z_1(s)}{Z_1(s) + Z_2(s)}$

4. In the given figure shows pole-zero plot. If steady state gain is 2 the transfer function G(s) is



A. $\frac{2(s + 1)}{s^2 + 4s + 5}$

B. $\frac{5(s + 1)}{s^2 + 4s + 4}$

C. $\frac{10(s + 1)}{s^2 + 4s + 3}$

D. $\frac{10(s + 1)}{(s + 2)^2}$

5. For a first order system having transfer function , the unit impulse response is

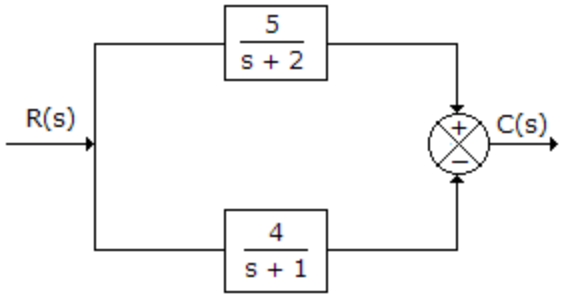
A. $e^{-t/T}$

B. $T\, e^{-t/T}$

C. $\frac{1}{T}\, e^{-t/T}$

D. $T^2\, e^{-t/T}$

6. For the given figure C(s)/R(s)



A. $\frac{4(s+2)}{(s+2)(s+1)}$

B. $\frac{s-3}{(s+2)(s+1)}$

C. $\frac{9s+13}{(s+2)(s+1)}$

D. $\frac{1}{(s+2)(s+1)}$

7. First column elements of Routh's tabulation are 3, 5, , 2. It means that there

A. is one root in left half s plane

B. are two roots in left half s plane

C. are two roots in right half s plane

D. is one root in right half s plane

8. First column elements of Routh's tabulation are 3, 5, $\frac{-3}{4}$, $\frac{1}{2}$, 2. It means that there

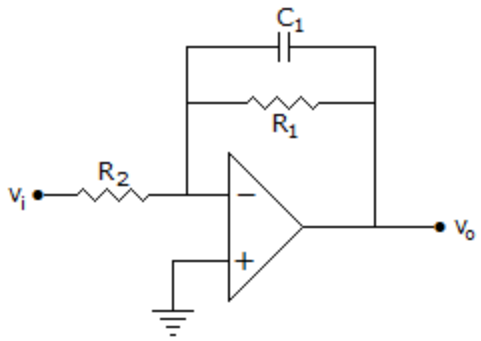
A. is one root in left half s plane

B. are two roots in left half s plane

C. are two roots in right half s plane

D. is one root in right half s plane

9. For the circuit in the given figure,



A. $\frac{1}{R_2\,(1 + j\omega C_1 R_1)}$

B. $\frac{-\,1}{R_2\,(1 + j\omega C_1 R_1)}$

C. $\frac{-R_1/R_2}{1 + j\omega C_1 R_1}$

D. $\frac{R_1/R_2}{1 + j\omega C_1 R_1}$

10. A system has its two poles on the negative real axis and one pair of poles lies on jω axis. The system is

A. stable

B. unstable

C. limitedly stable

D. either (a) or (c)