

# Chhattisgarh Public Service Commission

## Notations :

- Options shown in green color and with ✓ icon are correct.
- Options shown in red color and with ✗ icon are incorrect.

<b>Question Paper Name:</b>	Electrical Engineering 25th February 2018 Shift 2
<b>Subject Name:</b>	Electrical Engineering
<b>Duration:</b>	150
<b>Calculator:</b>	None
<b>Magnifying Glass Required?:</b>	No
<b>Ruler Required?:</b>	No
<b>Eraser Required?:</b>	No
<b>Scratch Pad Required?:</b>	No
<b>Rough Sketch/Notepad Required?:</b>	No
<b>Protractor Required?:</b>	No

## Electrical Engineering

<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	150
<b>Revisit allowed for view? :</b>	No
<b>Revisit allowed for edit? :</b>	No

## Electrical Engineering

<b>Section Id :</b>	34753549
<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional:</b>	Mandatory
<b>Display Number Panel:</b>	Yes
<b>Group All Questions:</b>	No

Question Number : 1 Question Id : 3475353702 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the vector from a point A(2, 1, 2) to point B(3, -2, 1). Points are defined in Cartesian system.

Options :

1. ✓  $\hat{i} - 3\hat{j} - \hat{k}$

2. ✗  $-\hat{i} + 3\hat{j} - \hat{k}$

3. ✗  $-\hat{i} + 3\hat{j} + \hat{k}$

4. ✘  $\hat{i} - 3\hat{j} + \hat{k}$

5. ✘  $5\hat{i} - \hat{j} + 3\hat{k}$

Question Number : 2 Question Id : 3475353703 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Two point charges  $Q_1$  and  $Q_2$  are located at the points having position vectors  $\bar{r}_1$  and  $\bar{r}_2$ . Force exerted by  $Q_1$  on  $Q_2$  is:

Options :

1. ✘  $\bar{F} = \frac{Q_1 Q_2}{4\pi\epsilon_0 R_{12}^2} \frac{\bar{r}_1 - \bar{r}_2}{|\bar{r}_1 - \bar{r}_2|}$

2. ✘  $\bar{F} = \frac{Q_1 Q_2}{4\pi\epsilon_0 R_{12}^2} \frac{\bar{r}_1 - \bar{r}_2}{|\bar{r}_2 - \bar{r}_1|}$

3. ✔  $\bar{F} = \frac{Q_1 Q_2}{4\pi\epsilon_0 R_{12}^2} \frac{\bar{r}_2 - \bar{r}_1}{|\bar{r}_2 - \bar{r}_1|}$

4. ✘  $\bar{F} = \frac{Q_1 Q_2}{4\pi\epsilon_0 R_{12}^2}$

5. ✘  $\bar{F} = \frac{Q_1 Q_2}{4\pi\epsilon_0} \frac{\bar{r}_1 - \bar{r}_2}{|\bar{r}_1 - \bar{r}_2|}$

Question Number : 3 Question Id : 3475353704 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the divergence of  $rz \sin \phi \hat{a}_r + 3 r z^2 \cos \phi \hat{a}_\phi$  at  $P(5, \frac{\pi}{2}, 1)$ .

Options :

1. ✘ 1

2. ✔ -1

3. ✘ 5

4. ✘ -5

5. ✘  $\frac{\pi}{2}$

Question Number : 4 Question Id : 3475353705 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which law states that the line integral of  $\vec{A}$  around a closed path is equal to the integral of curl of  $\vec{A}$  over the open surface  $S$  enclosed by the closed path?

Options :

- ✘ Laplace's
- ✘ Coulomb's
- ✘ Ampere's
- ✘ Maxwell's
- ✔ Stoke's

Question Number : 5 Question Id : 3475353706 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Choose the wrong equation from the following.

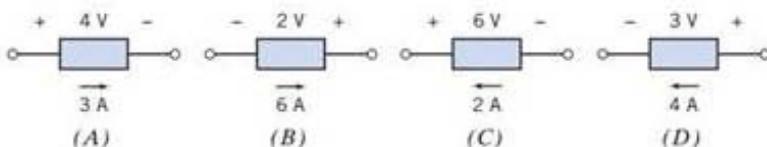
Options :

- ✘  $\nabla \cdot \vec{D} = \rho_v$
- ✘  $\nabla \times \vec{E} = 0$
- ✘  $\nabla \times \vec{H} = \vec{j}$
- ✘  $\nabla \cdot \vec{B} = 0$
- ✔  $\nabla \cdot \vec{B} = E$

Question Number : 6 Question Id : 3475353707 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the elements absorbs 12 W?



Options :

- ✘ A and B
- ✔ A and D

3. ✘ B and C

4. ✘ B and D

5. ✘ A and C

Question Number : 7 Question Id : 3475353708 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The total charge that has entered a circuit element is  $q(t) = 1.5 (1 - e^{-5t})$  when  $t \geq 0$  and  $q(t) = 0$  when  $t < 0$ . Find the current in circuit element for  $t \geq 0$ .

Options :

1. ✔  $i(t) = 7.5 e^{-5t}$  A

2. ✘  $i(t) = -7.5 e^{-5t}$  A

3. ✘  $i(t) = 1.5 (1 - e^{-5t})$  A

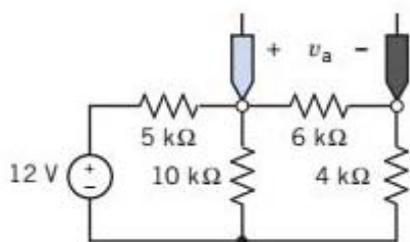
4. ✘  $i(t) = -7.5$  A

5. ✘  $i(t) = 7.5$  A

Question Number : 8 Question Id : 3475353709 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the voltage drop  $v_a$  in the following circuit.



Options :

1. ✔ 3.6 V

2. ✘ -3.6 V

3. ✘ 1.2 V

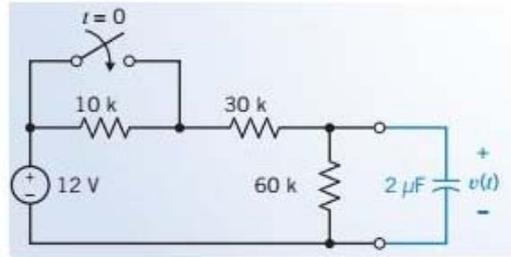
4. ✘ -1.2 V

5. ✘ 12 V

Question Number : 9 Question Id : 3475353710 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The circuit has reached steady state before the switch closes at time  $t = 0$ . Find the capacitor voltage for  $t \geq 0$ .



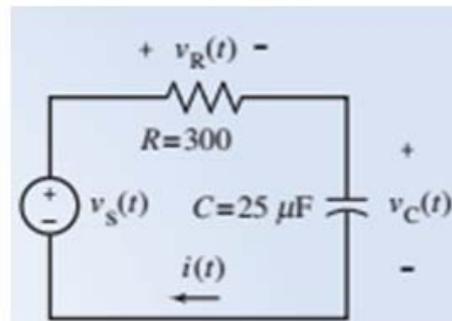
Options :

1. ✓  $v(t) = 8 - 0.8e^{-t/40}$  V
2. ✗  $v(t) = 8 + 0.8e^{-t/40}$  V
3. ✗  $v(t) = 8 - 8e^{-t/40}$  V
4. ✗  $v(t) = 8 - 0.8e^{-t/4}$  V
5. ✗  $v(t) = 8 - 8e^{-t/4}$  V

Question Number : 10 Question Id : 3475353711 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The source voltage of the following circuit is  $v_s(t) = 25 \cos(100t + 15^\circ)$  V. The output voltage across the capacitor is  $v_c(t) = 20 \cos(100t - 22^\circ)$  V. Find the resistor voltage  $v_R(t)$ .



Options :

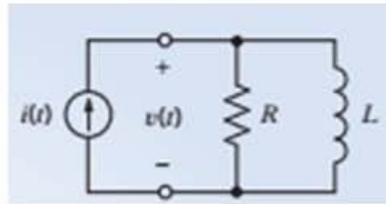
1. ✗  $v_R(t) = 5 \angle 68.1^\circ$  V
2. ✗  $v_R(t) = 15 \angle -38.1^\circ$  V
3. ✗  $v_R(t) = 15 \angle 38.1^\circ$  V
4. ✗  $v_R(t) = 15 \angle -68.1^\circ$  V

5. ✓  $v_R(t) = 15\angle 68.1^\circ \text{ V}$

Question Number : 11 Question Id : 3475353712 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

What is the average power delivered to the L in the following circuit, if  $i(t) = 1.25 \cos(5t - 15^\circ) \text{ A}$ ,  $R = 20 \Omega$  and  $L = 3 \text{ H}$ ?



Options :

1. ✗ 9.375 W

2. ✗ 25.63 W

3. ✓ 0 W

4. ✗ 9.375 W lag

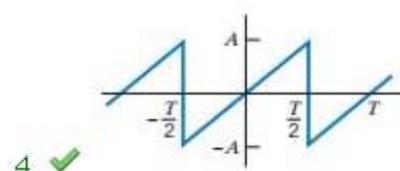
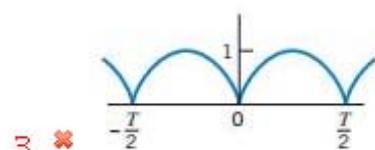
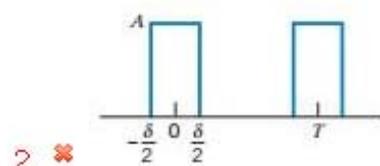
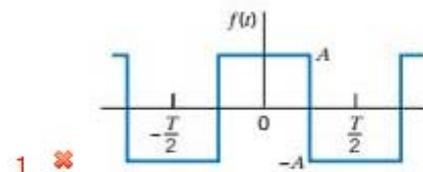
5. ✗ 25.63 W lead

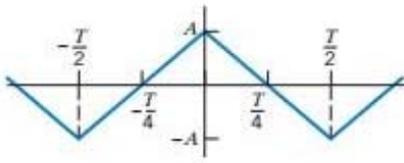
Question Number : 12 Question Id : 3475353713 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is an ODD waveform?

Options :



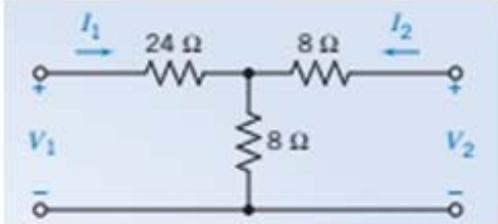


5. ✘

Question Number : 13 Question Id : 3475353714 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the Z parameters for the following network.



Options :

1. ✔  $\begin{bmatrix} 32 & 8 \\ 8 & 16 \end{bmatrix}$

2. ✘  $\begin{bmatrix} 32 & -8 \\ -8 & 16 \end{bmatrix}$

3. ✘  $\begin{bmatrix} 16 & 8 \\ 8 & 16 \end{bmatrix}$

4. ✘  $\begin{bmatrix} 32 & 8 \\ 8 & 32 \end{bmatrix}$

5. ✘  $\begin{bmatrix} 16 & 8 \\ 8 & 32 \end{bmatrix}$

Question Number : 14 Question Id : 3475353715 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In case of conductors:

Options :

1. ✔ the valance and conduction bands overlap each other

2. ✘ the valance and conduction bands are same

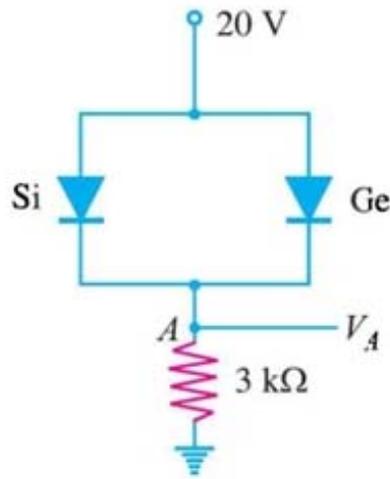
3. ✘ the valance and conduction bands are far away

4. ✘ no valance band is present

5. ✘ conduction band is not present

Question Number : 15 Question Id : 3475353716 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical  
Correct : 2 Wrong : 0

Find the voltage  $V_A$  in the diode circuit. Internal resistance of the diode is zero.

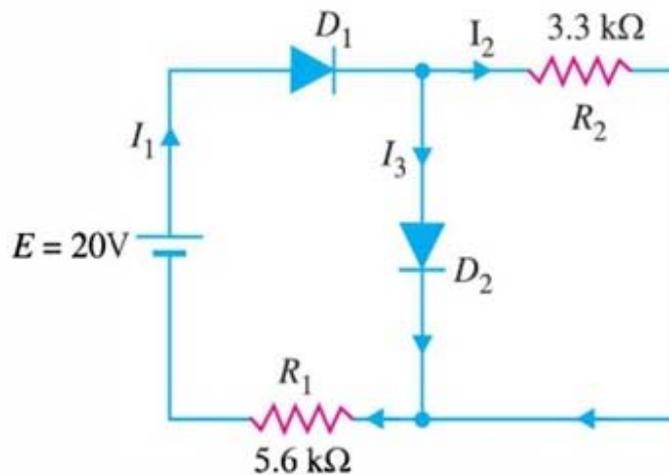


Options :

- 1. ✘ 19.3 V
- 2. ✔ 19.7 V
- 3. ✘ 20 V
- 4. ✘ 0 V
- 5. ✘ 19 V

Question Number : 16 Question Id : 3475353717 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical  
Correct : 2 Wrong : 0

Determine the currents  $I_1, I_2$  and  $I_3$  for the network. Take the diodes as Si, and zero internal resistance.

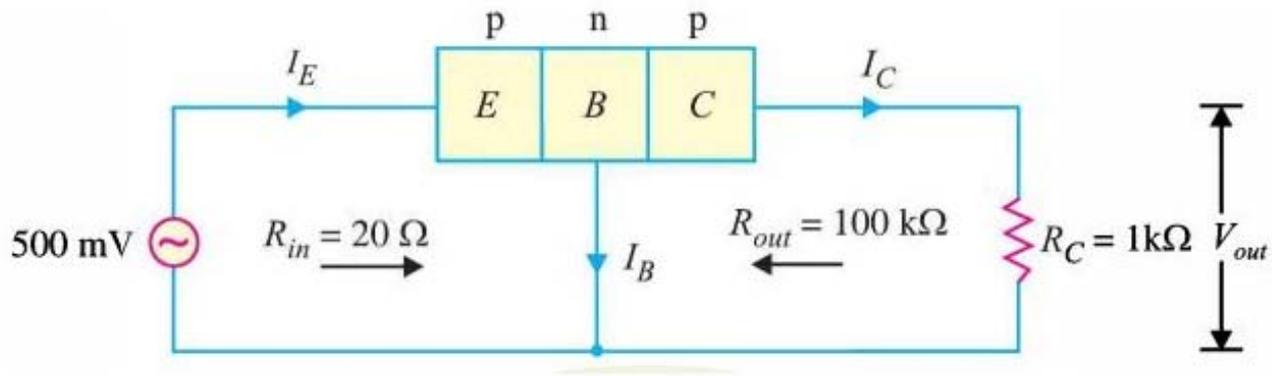


Options :

1. ✘  $I_1 = 3.32 \text{ mA}$ ,  $I_2 = 3.108 \text{ mA}$  and  $I_3 = 0.212 \text{ mA}$
2. ✘  $I_1 = 3.32 \text{ mA}$ ,  $I_2 = 1.212 \text{ mA}$  and  $I_3 = 2.108 \text{ mA}$
3. ✘  $I_1 = 3.32 \text{ mA}$ ,  $I_2 = 2.212 \text{ mA}$  and  $I_3 = 1.108 \text{ mA}$
4. ✘  $I_1 = 3.12 \text{ mA}$ ,  $I_2 = 0.12 \text{ mA}$  and  $I_3 = 3.0 \text{ mA}$
5. ✔  $I_1 = 3.32 \text{ mA}$ ,  $I_2 = 0.212 \text{ mA}$  and  $I_3 = 3.108 \text{ mA}$

Question Number : 17 Question Id : 3475353718 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Correct : 2 Wrong : 0

Determine the voltage amplification for the transistor amplifier. Assume  $\alpha$  to be nearly one.



- Options :
1. ✘ 20
  2. ✘ 30
  3. ✘ 40
  4. ✔ 50
  5. ✘ 60

Question Number : 18 Question Id : 3475353719 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Correct : 2 Wrong : 0

A transistor has the following characteristics:  $I_B = 20 \mu\text{A}$ ,  $I_C = 2 \text{ mA}$  and  $\beta = 80$ . Find the  $I_{CBO}$ .

- Options :
1. ✘ 48 mA
  2. ✘ 4.8 mA

3. ✘ 0.48 mA

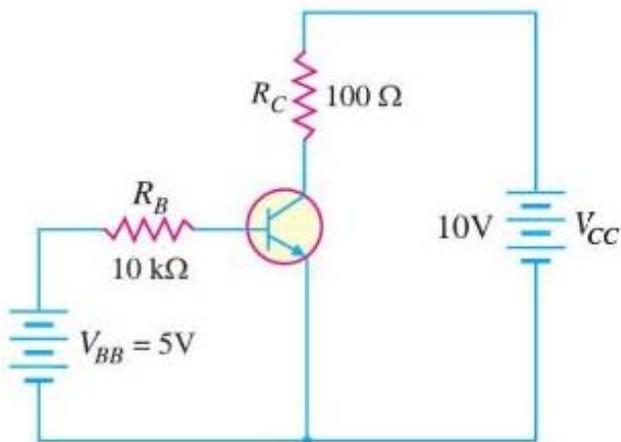
4. ✔ 4.8  $\mu$ A

5. ✘ 0.48  $\mu$ A

Question Number : 19 Question Id : 3475353720 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Determine  $V_{CB}$  for the following circuit. Take  $\beta = 150$ .



Options :

1. ✔ 2.85 V

2. ✘ 5.85 V

3. ✘ 3.85 V

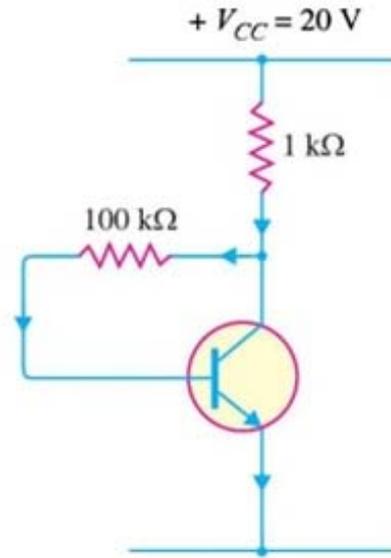
4. ✘ 4.85 V

5. ✘ 5.5 V

Question Number : 20 Question Id : 3475353721 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Determine the operating point for the following collector feedback amplifier. Take  $\beta = 100$ .



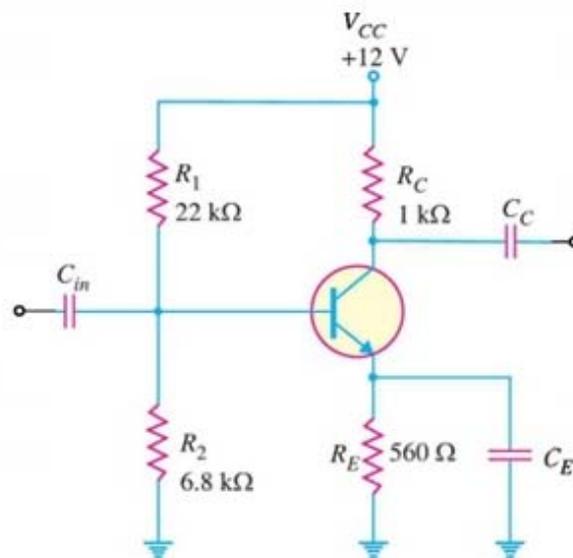
Options :

1. ✘ 9.6 V, 10.4 mA
2. ✔ 10.4 V, 9.6 mA
3. ✘ 9.8 V, 10.2 mA
4. ✘ 9.5 V, 10.2 mA
5. ✘ 9.8 V, 10.4 mA

Question Number : 21 Question Id : 3475353722 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Select a suitable value for  $C_E$ , if the amplifier is to operate over a frequency range of 2 kHz to 10 kHz.



Options :

1. ✘ 2.42  $\mu$ F

2. ✘  $3.42 \mu F$

3. ✔  $1.42 \mu F$

4. ✘  $4.42 \mu F$

5. ✘  $5.42 \mu F$

Question Number : 22 Question Id : 3475353723 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 3-stage amplifier has voltage gain of 100, 200, and 400 from first to third. Find the total voltage gain in db.

Options :

1. ✔ 138 db

2. ✘ 128 db

3. ✘ 78 db

4. ✘ 80 db

5. ✘ 90 db

Question Number : 23 Question Id : 3475353724 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

When negative voltage feedback is applied to an amplifier of gain 100, the overall gain falls to 25. Find the fraction of the output voltage feedback.

Options :

1. ✘ 0.01

2. ✘ 0.02

3. ✔ 0.03

4. ✘ 0.04

5. ✘ 0.05

Question Number : 24 Question Id : 3475353725 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Octal number system representation of  $(1A7)_{16}$  is:

Options :

1. ✘  $(1647)_8$

2. ✔  $(647)_8$

3. ✘  $(657)_8$

4. ✘  $(667)_8$

5. ✘  $(646)_8$

Question Number : 25 Question Id : 3475353726 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Simplify the following Boolean function.

$$Y = AB \bar{C} \bar{D} + \bar{A} B \bar{C} \bar{D} + \bar{A} B C \bar{D} + A B C \bar{D}$$

Options :

1. ✘  $Y = C \bar{D}$

2. ✘  $Y = \bar{A} \bar{D}$

3. ✘  $Y = \bar{B} \bar{D}$

4. ✘  $Y = A \bar{D}$

5. ✔  $Y = B \bar{D}$

Question Number : 26 Question Id : 3475353727 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Determine the complement of the following function.

$$Y = AB + A(B + C) + B(B + C)$$

Options :

1. ✘  $\bar{Y} = \bar{B} + A\bar{C}$

2. ✘  $\bar{Y} = \bar{B} + \bar{A}\bar{C}$

3. ✔  $\bar{Y} = \bar{B}(\overline{AC})$

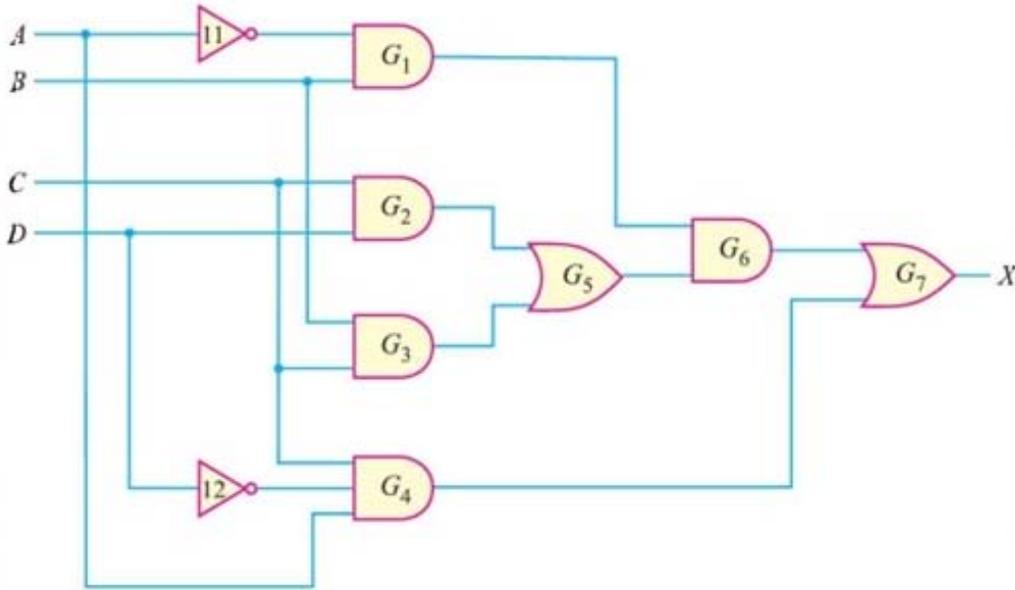
4. ✘  $\bar{Y} = \bar{B} + (\overline{AC})$

5. ✘  $\bar{Y} = \bar{B}(A + C)$

Question Number : 27 Question Id : 3475353728 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the simplified Boolean function for the following circuit.



Options :

1. ✘  $X = AC\bar{D} + \bar{A}B\bar{C}$

2. ✔  $X = AC\bar{D} + \bar{A}BC$

3. ✘  $X = \bar{D} + \bar{A}B\bar{C}$

4. ✘  $X = AC + \bar{A}B\bar{C}$

5. ✘  $X = A\bar{D} + \bar{A}B\bar{C}$

Question Number : 28 Question Id : 3475353729 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The minimum number of flip-flops required to design a frequency divider to divide a frequency by 25 is:

Options :

1. ✘ 2

2. ✘ 3

3. ✘ 4

4. ✔ 5

5. ✘ 6

Question Number : 29 Question Id : 3475353730 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The maximum number of possible interrupts in 8086 is:

Options :

1. ✘ 5

2. ✘ 12

3. ✘ 128

4. ✔ 256

5. ✘ 56

Question Number : 30 Question Id : 3475353731 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In 8051, serial communication with 8-bit, variable baud is configured as mode:

Options :

1. ✘ 0

2. ✔ 1

3. ✘ 2

4. ✘ 3

5. ✘ 4

Question Number : 31 Question Id : 3475353732 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

An SCR has a straight-line slope of 130 for the gate-cathode characteristic. Find the gate-source resistance for trigger source voltage of 15 V and allowable gate dissipation of 0.5 W.

Options :

1. ✘ 110.5  $\Omega$

2. ✘ 121.5  $\Omega$

3. ✘ 120.5  $\Omega$

4. ✓ 111.9  $\Omega$

5. ✗ 130.5  $\Omega$

Question Number : 32 Question Id : 3475353733 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

ON state voltage drop in SCR is of the order of:

Options :

1. ✓ 1 to 1.5 V

2. ✗ 10 to 15 V

3. ✗ 100 to 150 V

4. ✗ 0.1 to 1 V

5. ✗ 0.1 to 0.5 V

Question Number : 33 Question Id : 3475353734 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

An SCR has half-cycle surge current rating of 3 kA for 50 Hz supply. Find its  $I^2t$  rating.

Options :

1. ✓ 45000 amp<sup>2</sup> -sec

2. ✗ 4000 amp<sup>2</sup> -sec

3. ✗ 5500 amp<sup>2</sup> -sec

4. ✗ 4500 amp<sup>2</sup> -sec

5. ✗ 55000 amp<sup>2</sup> -sec

Question Number : 34 Question Id : 3475353735 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Forced commutation of SCR is in:

Options :

1. ✗ Class A

2. ✗ Class A and E

3. ✓ Class B, C and D

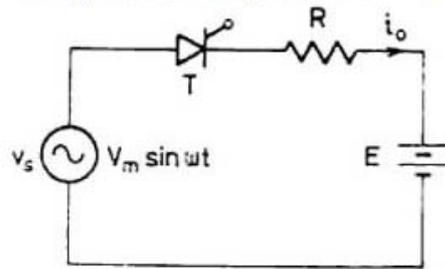
4. ✗ Class E

5. ✗ Class F

Question Number : 35 Question Id : 3475353736 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find average charging current for the following battery charger circuit. Take  $V_s = 230$  V, 50 Hz;  $R = 8 \Omega$ ; and  $E = 150$  V.



Options :

1. ✓ 4.96 A

2. ✗ 5.97 A

3. ✗ 12.2 A

4. ✗ 10.2 A

5. ✗ 8.5 A

Question Number : 36 Question Id : 3475353737 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 230 V, 50 Hz single-phase full converter bridge is connected to RLE load. The average load current of 10 A is constant over the working range. Take  $R = 0.4 \Omega$ ,  $L = 2$  mH, and  $E = 120$  V. Find the firing angle delay.

Options :

1. ✗  $73.21^\circ$

2. ✗  $23.21^\circ$

3. ✗  $43.21^\circ$

4. ✗  $63.21^\circ$

5. ✓  $53.21^\circ$

Question Number : 37 Question Id : 3475353738 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 230 V, 50 Hz single-phase full converter bridge is connected to RLE load with  $R = 6 \Omega$ ,  $L = 6 \text{ mH}$ , and  $E = 60 \text{ V}$ . Find the average value of load current for a firing angle delay of  $50^\circ$  under continuous conduction.

Options :

1. ✘ 22.18 A
2. ✔ 12.18 A
3. ✘ 2.18 A
4. ✘ 32.18 A
5. ✘ 5.18 A

Question Number : 38 Question Id : 3475353739 Question Type : MCQ Display Question Number : Yes Single Line Question

Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 230 V DC step-down chopper is driving a load resistance of  $10 \Omega$ . It has a voltage drop of 2 V across chopper when it is on. Find the average output voltage for a duty cycle of 0.4.

Options :

1. ✘ 81.2 V
2. ✔ 91.2 V
3. ✘ 51.2 V
4. ✘ 61.2 V
5. ✘ 71.2 V

Question Number : 39 Question Id : 3475353740 Question Type : MCQ Display Question Number : Yes Single Line Question

Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A step-up chopper has input voltage of 220 V and output voltage of 660 V. If the conducting time of thyristor chopper is  $100 \mu\text{s}$ , find the pulse width of output voltage.

Options :

1. ✘  $200 \mu\text{s}$
2. ✘  $20 \mu\text{s}$
3. ✔  $150 \mu\text{s}$
4. ✘  $50 \mu\text{s}$
5. ✘  $100 \mu\text{s}$

Question Number : 40 Question Id : 3475353741 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A voltage-commutated chopper has the following parameters:  $V_s = 220 \text{ V}$ ,  $R = 0.5 \Omega$ ,  $L = 2 \text{ mH}$ ,  $E = 40 \text{ V}$ .

Commutation circuit parameters are:  $L = 20 \mu\text{H}$ ,  $C = 50 \mu\text{F}$ ,  $T_{\text{ON}} = 800 \mu\text{s}$ ,  $T = 2 \text{ ms}$ . Find effective ON period for a constant load current of 80 A.

Options :

1. ✘ 1.375 ms

2. ✘ 1.275 ms

3. ✔ 1.075 ms

4. ✘ 0.875 ms

5. ✘ 1.475 ms

Question Number : 41 Question Id : 3475353742 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A single phase auto-sequential commutated CSI is fed from a 220 V DC source to a load of  $10 \Omega$  resistor.  $T_{\text{OFF}} = 20 \mu\text{s}$ , and output frequency is 50 Hz. Take a factor of safety of 2, and find a suitable value of source inductance, assuming  $\frac{di}{dt} = 25 \text{ A/s}$  in one cycle.

Options :

1. ✘ 8.8 m H

2. ✘ 1.2 H

3. ✔ 8.8 H

4. ✘ 1.2 m H

5. ✘ 2.2 H

Question Number : 42 Question Id : 3475353743 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A series inverter has a  $L = 6 \text{ mH}$ ,  $C = 1.2 \mu\text{F}$ ,  $R = 100 \Omega$  and  $T_{\text{off}} = 0.2 \text{ ms}$ . Find the output frequency.

Options :

1. ✘ 66.55 Hz

2. ✘ 666.55 Hz

3. ✘ 766.55 Hz

4. ✘ 86.55 Hz

5. ✔ 866.55 Hz

Question Number : 43 Question Id : 3475353744 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The current sensitivity of a meter is expressed in:

Options :

1. ✘ ampere

2. ✘ ohm/ampere

3. ✔ ohm/volt

4. ✘ ampere/division

5. ✘ division/ampere

Question Number : 44 Question Id : 3475353745 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is a time shifting property of the LT?

Options :

1. ✘ LT of  $e^{-at}f(t)$  is  $F(s + a)$

2. ✘ LT of  $e^{-at}f(t)$  is  $F(s - a)$

3. ✘ LT of  $e^{at}f(t)$  is  $F(s + a)$

4. ✔ LT of  $f(t - a)u(t - a)$  is  $e^{-as}F(s)$

5. ✘ LT of  $f(t - a)u(t - a)$  is  $e^{as}F(s)$

Question Number : 45 Question Id : 3475353746 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

What is the value of shunt resistance required to convert 0-1 mA meter to read 0-100 mA? The internal resistance of the meter is 100 ohms.

Options :

1. ✘  $0.1 \Omega$

2. ✓  $1 \Omega$

3. ✗  $10 \Omega$

4. ✗  $100 \Omega$

5. ✗  $1000 \Omega$

Question Number : 46 Question Id : 3475353747 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Anderson bridge is extended from:

Options :

1. ✗ Owen bridge

2. ✗ Hay's bridge

3. ✗ De Sauty bridge

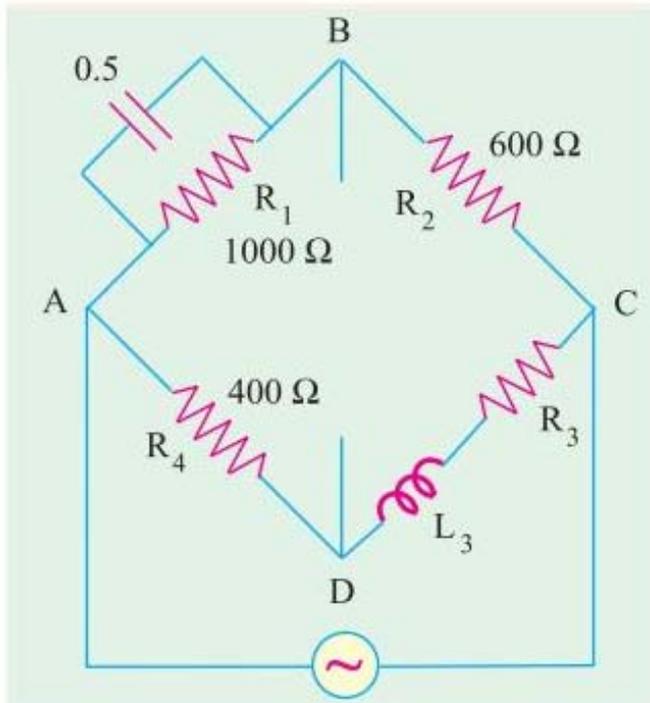
4. ✓ Maxwell-Wien bridge

5. ✗ H-bridge

Question Number : 47 Question Id : 3475353748 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the value of  $R_3$  for the balanced network shown below.



Options :

1. ✘  $200 \Omega$

2. ✔  $240 \Omega$

3. ✘  $\frac{1}{240} \Omega$

4. ✘  $1.5 k\Omega$

5. ✘  $20 \Omega$

Question Number : 48 Question Id : 3475353749 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Choose the wrong statement with respect to shunt design in measuring instruments.

Options :

1. ✘ Temperature co-efficient must be low.

2. ✘ Resistance should not vary with time.

3. ✘ They should carry the current without excessive temperature rise.

4. ✘ Resistance should have low thermal electromotive force.

5. ✔ Temperature co-efficient should be high.

Question Number : 49 Question Id : 3475353750 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the multiplying power of a shunt of 200 ohm resistance used with a galvanometer of 1 k-ohm resistance.

Options :

1. ✘ 2

2. ✘ 3

3. ✘ 4

4. ✘ 5

5. ✔ 6

Question Number : 50 Question Id : 3475353751 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Design a shunt resistance for an ammeter with internal resistance  $50 \Omega$  and full scale deflection current  $1 \text{ mA}$  to read the current in the range of  $0$  to  $100 \text{ mA}$ . Find the multiplying power  $m$ .

Options :

1. ✘  $0.1 \Omega$  and  $m = 20$
2. ✘  $0.2 \Omega$  and  $m = 10$
3. ✘  $0.15 \Omega$  and  $m = 10$
4. ✘  $0.506 \Omega$  and  $m = 50$
5. ✔  $0.506 \Omega$  and  $m = 100$

Question Number : 51 Question Id : 3475353752 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Transfer function is defined for:

Options :

1. ✘ linear systems only
2. ✘ all type of systems
3. ✘ non-linear systems only
4. ✔ linear time-invariant systems only
5. ✘ linear time-depended systems only

Question Number : 52 Question Id : 3475353753 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In a R-C series circuit, the transfer function  $\frac{I(s)}{V(s)}$  is equal to:

Options :

1. ✔  $\frac{Cs}{RCs + 1}$
2. ✘  $\frac{1}{\frac{C}{R}s + 1}$
3. ✘  $\frac{1}{Cs + R}$

4. ✘  $\frac{C}{Cs + R}$

5. ✘  $\frac{R}{Cs + R}$

Question Number : 53 Question Id : 3475353754 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A DC motor has  $L_a$  : armature inductor,  $R_a$  : armature resistance,  $J$  : rotor inertia,  $B$  : friction coefficient and  $K_T$  : torque constant,  $K_b$  : back emf constant,  $\omega(t)$  : angular velocity. The TF  $\frac{\Omega(s)}{V_s}$  for the armature controlled DC motor is:

Options :

1. ✔  $\frac{K_T}{(L_a s + R_a)(Js + B) + K_T K_b}$

2. ✘  $\frac{1}{(L_f s + R_f)(Js + B)}$

3. ✘  $\frac{K_T K_b}{(L_a s + R_a)(Js + B) + K_T K_b}$

4. ✘  $\frac{K_T}{s(L_a s + R_a)(Js + B)}$

5. ✘  $\frac{K_T}{(L_a s + R_a)(Js + B)}$

Question Number : 54 Question Id : 3475353755 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Steady state error of a first order system with TF  $\frac{1}{5s+1}$  for unit-ramp input  $R(s) = \frac{1}{s^2}$  is:

Options :

1. ✔  $\infty$

2. ✘ 0

3. ✘ 5

4. ✘ 1

5. ✘  $\frac{1}{5}$

Question Number : 55 Question Id : 3475353756 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

What is the time in which the unit step response of a first order system with TF  $\frac{1}{5s+1}$  reaches 63.21% of its final value?

Options :

1. ✘ 1 sec

2. ✔ 5 sec

3. ✘ 10 sec

4. ✘ 0.2 sec

5. ✘ 15 sec

Question Number : 56 Question Id : 3475353757 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

What is the undamped frequency of oscillations for a system with TF:  $\frac{C(s)}{R(s)} = \frac{100}{s^2+10s+100}$  ?

Options :

1. ✘ 8.66 rad/s

2. ✘ 8.66 Hz

3. ✔ 10 rad/s

4. ✘ 100 Hz

5. ✘ 100 rad/s

Question Number : 57 Question Id : 3475353758 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the settling time for 2% error tube of a unit step response of a unity feedback control system with  $G = \frac{100}{(s^2+10s)}$ .

Options :

1. ✘ 0.6 sec

2. ✘ 8 sec

3. ✘ 1 sec

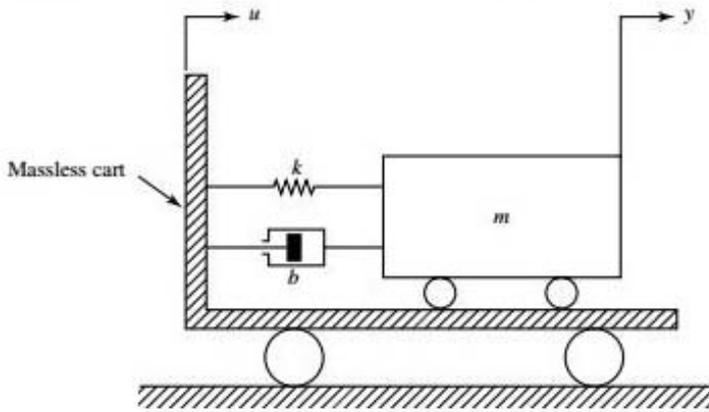
4. ✘ 10 sec

5. ✔ 0.8 sec

Question Number : 58 Question Id : 3475353759 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Number of state variables required for the following system is:



Options :

1. ✘ 1

2. ✔ 2

3. ✘ 3

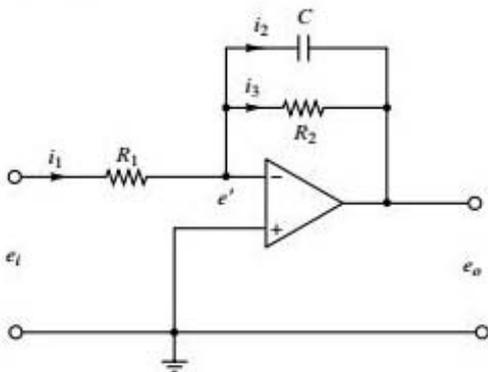
4. ✘ 4

5. ✘ 5

Question Number : 59 Question Id : 3475353760 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the TF for the following circuit.



Options :

1. ✘  $\frac{E_o(s)}{E_i(s)} = \frac{R_1}{R_2(R_1Cs + 1)}$

2. ✘  $\frac{E_o(s)}{E_i(s)} = \frac{R_1 Cs}{R_2(R_1 Cs + 1)}$

3. ✘  $\frac{E_o(s)}{E_i(s)} = \frac{Cs}{R_2(R_1 Cs + 1)}$

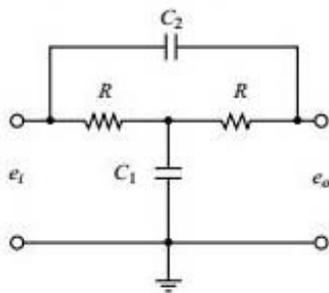
4. ✘  $\frac{E_o(s)}{E_i(s)} = \frac{1}{R_2(R_1 Cs + 1)}$

5. ✔  $\frac{E_o(s)}{E_i(s)} = \frac{-R_2}{R_1(R_2 Cs + 1)}$

Question Number : 60 Question Id : 3475353761 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The transfer function of the following circuit has:



Options :

1. ✘ 3 number of poles and 1 number of zeros

2. ✘ 2 number of poles and 0 number of zeros

3. ✘ 1 number of poles and 0 number of zeros

4. ✘ 2 number of poles and 1 number of zeros

5. ✔ 2 number of poles and 2 number of zeros

Question Number : 61 Question Id : 3475353762 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

What are the hardware interrupts in 8086?

Options :

1. ✘ NMI and INT n

2. ✔ NMI and INTR

3. ✘ INT n and INTO
4. ✘ INT n and INT3
5. ✘ INT n , INTO and INT3

Question Number : 62 Question Id : 3475353763 Question Type : MCQ Display Question Number : Yes Single Line Question  
 Option : No Option Orientation : Vertical  
 Correct : 2 Wrong : 0

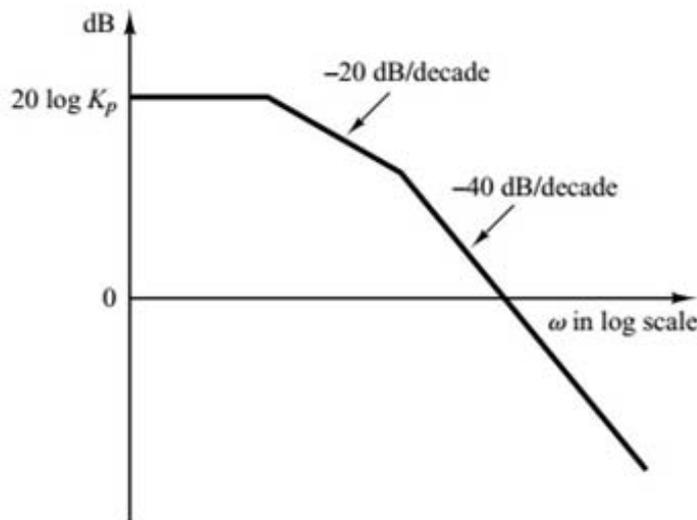
For a unity feedback control system with  $G = \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s}$ , find the resonant frequency.

Options :

1. ✔  $\omega_n\sqrt{1 - 2\zeta^2}$ , for  $0 \leq \zeta \leq 0.707$
2. ✘  $\omega_n\sqrt{1 - \zeta^2}$ , for  $0 \leq \zeta$
3. ✘  $\omega_n\sqrt{1 - \zeta^2}$ , for  $0 \leq \zeta \leq 0.707$
4. ✘  $\omega_n\sqrt{1 - 2\zeta^2}$ , for  $0 \leq \zeta$
5. ✘  $\omega_n\sqrt{1 - \frac{\zeta^2}{2}}$ , for  $0 \leq \zeta$

Question Number : 63 Question Id : 3475353764 Question Type : MCQ Display Question Number : Yes Single Line Question  
 Option : No Option Orientation : Vertical  
 Correct : 2 Wrong : 0

If a system has the following ABM plot, what is the order of the system?



Options :

1. ✘ 1

2. ✓ 2

3. ✗ 3

4. ✗ 4

5. ✗ 5

Question Number : 64 Question Id : 3475353765 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which lamp/s does/do not have separate choke?

- (a) Sodium vapour lamp
- (b) Fluorescent lamp
- (c) Mercury vapour lamp

Options :

1. ✓ (a) only

2. ✗ (b) only

3. ✗ (a) and (b)

4. ✗ (b) and (c)

5. ✗ (a) and (c)

Question Number : 65 Question Id : 3475353766 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following fuel has more carbon?

Options :

1. ✗ Lignite

2. ✗ Bituminous coal

3. ✓ Anthracite coal

4. ✗ Heavy oil

5. ✗ Petrol

Question Number : 66 Question Id : 3475353767 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the calorific value of fuel to a steam power station with an overall efficiency of 20% and 0.6 kg of coal being burnt per kWh of electrical energy generated.

Options :

1. ✘ 5166.67 kcal/kg
2. ✘ 6166.67 kcal/kg
3. ✘ 8166.67 kcal/kg
4. ✘ 1766.67 kcal/kg
5. ✔ 7166.67 kcal/kg

Question Number : 67 Question Id : 3475353768 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Thermal and electrical efficiency of a 100 MW steam station are 30% and 92% respectively. Find the coal consumption per hour when the station is delivering its full rated output and using coal of calorific value 6400 kcal/kg.

Options :

1. ✘ 78687 kg
2. ✘ 84867 kg
3. ✘ 84687 kg
4. ✘ 48786 kg
5. ✔ 48687 kg

Question Number : 68 Question Id : 3475353769 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Load factor in a power system is:

Options :

1. ✘ a maximum demand
2. ✘ average demand
3. ✔ the ratio of the average load to maximum demand

4. ✘ the ratio of the maximum demand to average load

5. ✘ the ratio of the area under the load curve to the total number of hours

Question Number : 69 Question Id : 3475353770 Question Type : MCQ Display Question Number : Yes Single Line Question

Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

If a plant, having an installed capacity of 20 MW, produces annual output of  $7.35 \times 10^6$  kWh and remains in operation for 2190 hours in a year, then the plant use factor is:

Options :

1. ✔ 16.7%

2. ✘ 20.2%

3. ✘ 30.2%

4. ✘ 80.5%

5. ✘ 65.2%

Question Number : 70 Question Id : 3475353771 Question Type : MCQ Display Question Number : Yes Single Line Question

Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which type of system has 3-phase 132 kV rating?

Options :

1. ✔ Primary transmission

2. ✘ Secondary transmission

3. ✘ Primary distribution

4. ✘ Secondary distribution

5. ✘ Traction system

Question Number : 71 Question Id : 3475353772 Question Type : MCQ Display Question Number : Yes Single Line Question

Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

When does the efficiency of transmission increase?

Options :

1. ✘ When the resistivity of conductor increases

2. ✘ When the area of cross-section of conductor decreases

3. ✘ When the length of the line increases
4. ✔ When the line voltage increases
5. ✘ When the current density of the conductor increases

Question Number : 72 Question Id : 3475353773 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The volume of conductor material required in a single phase, 2-wire system with mid-point earthed is  $x$  times that required in a 2-wire DC system. Then  $x$  is equal to:

Options :

1. ✘  $\cos^2 \phi$
2. ✘  $\frac{1}{\cos^2 \phi}$
3. ✘ 2
4. ✘  $2 \cos^2 \phi$
5. ✔  $\frac{2}{\cos^2 \phi}$

Question Number : 73 Question Id : 3475353774 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The system which requires more conductor-material with same maximum voltage to earth is:

Options :

1. ✔ single phase system with 2-wire
2. ✘ single phase system with 3-wire
3. ✘ three phase system with 3-wire
4. ✘ two phase system with 3-wire
5. ✘ three phase system with 4-wire

Question Number : 74 Question Id : 3475353775 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A conductor with which of the following properties is not preferred for T&D?

Options :

1. ✘ High electrical conductivity
2. ✘ High tensile strength
3. ✘ Low cost
4. ✔ High electrical resistivity
5. ✘ Low specific gravity

Question Number : 75 Question Id : 3475353776 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following properties is not suitable for line supports in T&D?

Options :

1. ✘ High mechanical strength
2. ✔ High in weight with loss of mechanical strength
3. ✘ Cheap in cost and economical to maintain
4. ✘ Longer life
5. ✘ Easy accessibility of conductors for maintenance

Question Number : 76 Question Id : 3475353777 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Corona in conductors is not affected by:

Options :

1. ✘ atmosphere
2. ✘ conductor size
3. ✘ spacing between conductors
4. ✘ line voltage
5. ✔ power factor

Question Number : 77 Question Id : 3475353778 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

When the length of an overhead power transmission line is about 50 km to 150 km, it is classified as a:

Options :

1. ✘ short transmission line
2. ✔ medium transmission line
3. ✘ long transmission line
4. ✘ short distribution line
5. ✘ medium distribution line

Question Number : 78 Question Id : 3475353779 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 100-km long, 3-phase, 50-Hz transmission line has  $R/\text{phase}/\text{km} = 0.1 \Omega$ ,  $X/\text{phase}/\text{km} = 0.5 \Omega$ ,

susceptance/phase/km =  $10 \times 10^{-6} \text{ S}$ . If the line supplies load of 20 MW at 0.9 p.f. lagging at 66 kV at the receiving end, calculate sending end line voltage by nominal  $\pi$  method.

Options :

1. ✔ 76 kV
2. ✘ 44 kV
3. ✘ 33 kV
4. ✘ 60 kV
5. ✘ 90 kV

Question Number : 79 Question Id : 3475353780 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A balanced 3-phase load of 30 MW is supplied at 132 kV, 50 Hz and 0.85 p.f. lagging by means of a transmission line. The series impedance of a single conductor is  $(20 + j52) \Omega$  and the total phase-neutral admittance is  $315 \times 10^{-6}$  siemen. Using nominal T method, find the B and C constants of the line.

Options :

1. ✔  $B = 55.5 \angle 69^\circ$  and  $C = 0.000315 \angle 90^\circ$
2. ✘  $B = 55.5 \angle -69^\circ$  and  $C = 0.000315 \angle 90^\circ$
3. ✘  $B = 55.5 \angle 69^\circ$  and  $C = 0.000315 \angle -90^\circ$

4. ✘  $C = 55.5 \angle -69^\circ$  and  $B = 0.000315 \angle 90^\circ$

5. ✘  $C = 55.5 \angle 69^\circ$  and  $B = 0.000315 \angle -90^\circ$

Question Number : 80 Question Id : 3475353781 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The dielectric strength of Empire tape insulation is about:

Options :

1. ✘ 4 kV/m

2. ✔ 4 kV/mm

3. ✘ 40 kV/mm

4. ✘ 40 kV/m

5. ✘ 4 V/mm

Question Number : 81 Question Id : 3475353782 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In SCADA, data loggers perform the:

Options :

1. ✘ input scanning

2. ✘ signal amplification

3. ✘ A/D conversion

4. ✘ recording

5. ✔ relay tripping

Question Number : 82 Question Id : 3475353783 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 220-V, 20 A DC machine has an armature resistance of  $0.5 \Omega$ . Find the induced e.m.f. when the machine acts as generator at rated load.

Options :

1. ✘ 210 V

2. ✘ 200 V

3. ✓ 230 V

4. ✗ 220 V

5. ✗ 205 V

Question Number : 83 Question Id : 3475353784 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 50 Hz IM, which is operated at rated load and voltage, runs at 290 r.p.m.. Find the slip.

Options :

1. ✗ 5%

2. ✗ 2.5%

3. ✓ 3.33%

4. ✗ 6.66%

5. ✗ 10%

Question Number : 84 Question Id : 3475353785 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 250-W, single-phase, 50-Hz, 220-V universal motor runs at 2000 r.p.m. and takes 1.0 A when supplied from a 220-V DC supply. If the motor is connected to a 220-V AC supply and takes 1.0 A (r.m.s), calculate the torque. Take  $R_a = 20 \Omega$  and  $L_a = 0.4$  H.

Options :

1. ✓ 0.955 Nm

2. ✗ 95.5 Nm

3. ✗ 9.55 Nm

4. ✗ 955 Nm

5. ✗ 9.55 mNm

Question Number : 85 Question Id : 3475353786 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 3-phase, 50-Hz transformer has a delta-connected primary and star-connected secondary, the line voltages being 22,000 V and 400 V respectively. The secondary has a star connected balanced load at 0.8 power factor lagging. Find the output of the transformer in kW.

Options :

1. ✘ 1.4

2. ✘ 13.24

3. ✘ 12.24

4. ✘ 1.524

5. ✔ 15.24

Question Number : 86 Question Id : 3475353787 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 3- $\Phi$ , 6.6 kV/ 415 V, 2 MVA transformer has a per unit R of 0.02 and per unit leakage reactance of 0.1. Find the regulation at full-load with 0.8 p.f.

Options :

1. ✘ 72%

2. ✘ 7.1%

3. ✔ 7.6%

4. ✘ 8.2%

5. ✘ 8.5%

Question Number : 87 Question Id : 3475353788 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 200 V shunt motor with  $R_a = 0.06 \Omega$  and  $R_{sh} = 50 \Omega$  develops an output of 17.158 kW at input of 20.2 kW. Find the power input if it develops 7.46 kW.

Options :

1. ✘ 12 kW

2. ✔ 10 kW

3. ✘ 14 kW

4. ✘ 8 kW

5. ✘ 16 kW

Question Number : 88 Question Id : 3475353789 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 250 V, DC shunt motor has an armature resistance of  $0.5 \Omega$  and a field resistance of  $250 \Omega$ . When driving a load of constant torque at 600 r.p.m., the armature current is 20 A. What resistance should be inserted in the shunt field circuit to raise the speed from 600 to 800 r.p.m.?

Options :

1. ✘  $57.5 \Omega$
2. ✘  $78.5 \Omega$
3. ✔  $87.5 \Omega$
4. ✘  $8.5 \Omega$
5. ✘  $7.5 \Omega$

Question Number : 89 Question Id : 3475353790 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 4-pole DC motor with 774 conductors, two parallel paths, 24 mWb of pole-flux draws a current of 50 A. Find the developed torque.

Options :

1. ✘ 300 Nm
2. ✔ 295.4 Nm
3. ✘ 305.2 Nm
4. ✘ 400.5 Nm
5. ✘ 205 Nm

Question Number : 90 Question Id : 3475353791 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 12-pole, 3-phase alternator driven at a speed of 500 r.p.m. supplies power to an 8-pole, 3-phase induction motor. If the slip of the motor at full-load is 3%, calculate the full-load speed of the motor.

Options :

1. ✘ 737.5 r.p.m.
2. ✘ 757.5 r.p.m.
3. ✘ 747.5 r.p.m.
4. ✘ 767.5 r.p.m.
5. ✔ 727.5 r.p.m.

Question Number : 91 Question Id : 3475353792 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 3- $\Phi$ , slip-ring, induction motor with Y-connected rotor has an induced e.m.f. of 120 V between slip-rings, at standstill, with normal voltage applied to the stator. The rotor winding has a resistance per phase of 0.3  $\Omega$  and standstill leakage reactance per phase of 1.5  $\Omega$ . Find the rotor current/ph when running SC rotor with 4% slip.

Options :

1. ✘ 3 A

2. ✘ 5 A

3. ✘ 7 A

4. ✔ 9 A

5. ✘ 11 A

Question Number : 92 Question Id : 3475353793 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 3- $\Phi$  induction motor is driving full-load torque which is independent of speed. If line voltage drops to 90% of the rated value, find the increase in motor copper losses.

Options :

1. ✘ 12%

2. ✘ 10%

3. ✘ 20%

4. ✘ 21%

5. ✔ 23%

Question Number : 93 Question Id : 3475353794 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 50-Hz, 8-pole induction motor has F.L. slip of 4%. The rotor resistance/phase is 0.01  $\Omega$  and standstill reactance/phase is 0.1  $\Omega$ . Find the ratio of maximum to full-load torque and the speed at which the maximum torque occurs.

Options :

1. ✘ 1.35 and 700 r.p.m.

2. ✘ 1.75 and 700 r.p.m.

3. ✘ 1.45 and 550 r.p.m.

4. ✘ 1.65 and 700 r.p.m.

5. ✔ 1.45 and 675 r.p.m.

Question Number : 94 Question Id : 3475353795 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 4-pole, 50-Hz, 3- $\Phi$  induction motor develops a maximum torque of 162.8 N-m at 1365 r.p.m. The resistance of the star-connected rotor is 0.2  $\Omega$ /phase. Calculate the value of the resistance that must be inserted in series with each rotor phase to produce a starting torque equal to half the maximum torque.

Options :

1. ✘ 0.1  $\Omega$

2. ✘ 0.2  $\Omega$

3. ✘ 0.3  $\Omega$

4. ✔ 0.4  $\Omega$

5. ✘ 0.5  $\Omega$

Question Number : 95 Question Id : 3475353796 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 440-V, 50-Hz, 4-pole, 3-phase IM develops a torque of 100 N-m at a speed of 1200 r.p.m. If the stator supply frequency is reduced by half, calculate the new speed at a torque of 100 Nm.

Options :

1. ✘ 1000 r.p.m.

2. ✘ 1500 r.p.m.

3. ✔ 1050 r.p.m.

4. ✘ 1100 r.p.m.

5. ✘ 750 r.p.m.

Question Number : 96 Question Id : 3475353797 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 400-V, 60-Hz, 8-pole, 3- $\Phi$  induction motor runs at a speed of 1140 r.p.m. when connected to a 440-V line. Calculate the speed if voltage increases to 550V.

Options :

1. ✘ 861.6 r.p.m.

2. ✓ 1161.6 r.p.m.

3. ✗ 1061.6 r.p.m.

4. ✗ 961.6 r.p.m.

5. ✗ 1261.6 r.p.m.

Question Number : 97 Question Id : 3475353798 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 230 V, 960 r.p.m. and 200 A separately excited DC motor has  $R_a = 0.02 \Omega$ . The motor is fed from a chopper with source of 230 V which provides both motoring and braking operations. What is the duty ratio of chopper for motoring operation at rated torque and 350 r.p.m.?

Options :

1. ✗ 0.576

2. ✗ 0.45

3. ✗ 0.275

4. ✓ 0.376

5. ✗ 0.475

Question Number : 98 Question Id : 3475353799 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 33 kW, 220 V, 175 A, 1000 r.p.m. DC motor has  $R_a = 0.08 \Omega$ . The rheostatic braking was applied to bring a separately excited DC motor to rest from its initial speed of 1050 along with a load torque equal to 15% of rated value. What is the braking resistance value so as to limit the braking current to twice the rated value, while neglecting the effect of armature inductance?

Options :

1. ✗  $R_b = 0.138 \Omega$

2. ✗  $R_b = 1.538 \Omega$

3. ✓  $R_b = 0.538 \Omega$

4. ✗  $R_b = 5.38 \Omega$

5. ✗  $R_b = 7.38 \Omega$

Question Number : 99 Question Id : 3475353800 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Buchholz's relay is used in the protection of:

Options :

1. ✓ transformers
2. ✗ generators
3. ✗ motors
4. ✗ transmission lines
5. ✗ DC machines

Question Number : 100 Question Id : 3475353801 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which starting method is NOT used in squirrel cage induction motors?

Options :

1. ✓ External resistance in rotor circuit
2. ✗ Resistance in stator circuit
3. ✗ Auto-transformer starting
4. ✗ Star-delta starting
5. ✗ DOL

Question Number : 101 Question Id : 3475353802 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which motor is generally used in third mills, paper and cement industries?

Options :

1. ✗ DC shunt motor
2. ✗ Double squirrel cage motor
3. ✗ Slip-ring induction motor
4. ✓ Three-phase synchronous motor
5. ✗ DC series motor

Question Number : 102 Question Id : 3475353803 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which among the following is NOT a fusion type welding?

Options :

1. ✘ Carbon arc welding
2. ✘ Electron beam welding
3. ✘ Electro-Slag welding
4. ✘ Electro-Gas welding
5. ✔ Resistance welding

Question Number : 103 Question Id : 3475353804 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Candela is a unit of which of the following?

Options :

1. ✘ Luminous Flux
2. ✔ Luminous Intensity
3. ✘ Illumination
4. ✘ Luminance
5. ✘ Luminous Exitance

Question Number : 104 Question Id : 3475353805 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Each electrode of a capacitor of the electrolytic type has an area of 0.02 sq. m. The relative permittivity of the dielectric film is 2.8. If the capacitor has a capacitance of 10  $\mu\text{F}$ , estimate the thickness of the dielectric film.

Options :

1. ✔  $4.95 \times 10^{-8}$  m
2. ✘  $2.95 \times 10^{-8}$  m
3. ✘  $3.95 \times 10^{-8}$  m
4. ✘  $6.95 \times 10^{-8}$  m

5. ✘  $5.95 \times 10^{-8}$  m

Question Number : 105 Question Id : 3475353806 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

If 18.258 gm of nickel is deposited by 100 A flowing for 10 min, how much copper would be deposited by 50 A in 6 min? Atomic weight of nickel = 58.6 and that of copper is 63.18. Valency of both is 2.

Options :

1. ✔ 5.905 gm

2. ✘ 7.905 gm

3. ✘ 2 gm

4. ✘ 4.3 gm

5. ✘ 7.2 gm

Question Number : 106 Question Id : 3475353807 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Crest speed in electric train is the:

Options :

1. ✘ minimum speed during the run

2. ✔ maximum speed attained by a train during the run

3. ✘ distance between stops/actual time of run

4. ✘ maximum speed / time taken

5. ✘ minimum speed / time taken

Question Number : 107 Question Id : 3475353808 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 230 V, 960 r.p.m. and 200 A separately excited dc motor has  $R_a = 0.02 \Omega$ . The motor is operated in dynamic braking with chopper control with a braking resistance of  $2 \Omega$ . What is the duty ratio of chopper for motor speed of 600 r.p.m. and braking torque of twice the rated value?

Options :

1. ✔  $1 - \left( \frac{2260}{16 \times 800} - 0.01 \right)$

2. ✘  $\left(\frac{2260}{16 \times 800} + 0.01\right)$

3. ✘  $1 - \left(\frac{2260}{16 \times 800} + 0.01\right)$

4. ✘  $1 - \left(\frac{2260}{16 \times 800}\right)$

5. ✘  $\left(\frac{2260}{16 \times 800} - 0.01\right)$

Question Number : 108 Question Id : 3475353809 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the dot product of the following two vectors  $5\hat{i} - \hat{j} + 3\hat{k}$  and  $-\hat{i} + 3\hat{j} + \hat{k}$ .

Options :

1. ✘ 5

2. ✔ -5

3. ✘ 11

4. ✘ -11

5. ✘ -8

Question Number : 109 Question Id : 3475353810 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The line integral of the magnetic field intensity  $H$  around a closed path is equal to:

Options :

1. ✔ the total current linked by the contour

2. ✘ the total flux

3. ✘ flux density

4. ✘ area of the conductor

5. ✘ mmf

Question Number : 110 Question Id : 3475353811 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The current in a circuit element is  $i(t) = 4(1 - e^{-5t})$  when  $t \geq 0$  and  $i(t) = 0$  when  $t < 0$ . Find the total charge that has entered the circuit element for  $t \geq 0$ .

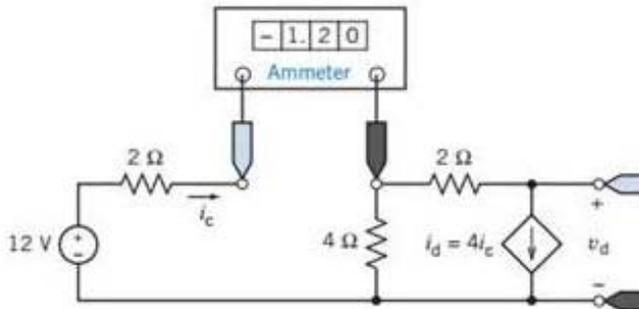
Options :

1. ✘  $q(t) = 4t - 0.8 e^{-5t} + 0.8 \text{ C}$
2. ✘  $q(t) = -4t + 0.8 e^{-5t} - 0.8 \text{ C}$
3. ✘  $q(t) = 4t - 0.8 e^{-5t} - 0.8 \text{ C}$
4. ✘  $q(t) = 4t + 0.8 e^{-5t} + 0.8 \text{ C}$
5. ✔  $q(t) = 4t + 0.8 e^{-5t} - 0.8 \text{ C}$

Question Number : 111 Question Id : 3475353812 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Determine the voltage  $v_d$  in the following circuit.



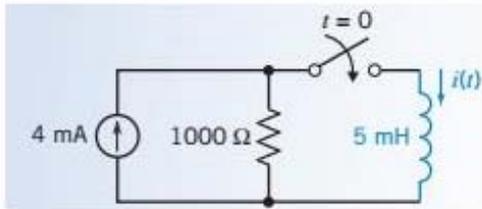
Options :

1. ✘ 12 V
2. ✘ -12 V
3. ✔ 24 V
4. ✘ -24 V
5. ✘ 10 V

Question Number : 112 Question Id : 3475353813 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the inductor current after the switch closes in the circuit.



Options :

1. ✓  $i(t) = 4 - 4e^{-t/5}$  mA
2. ✗  $i(t) = 4 + 4e^{-t/5}$  mA
3. ✗  $i(t) = 4 - 2e^{-t/5}$  mA
4. ✗  $i(t) = 4 - 4e^{-t/5000}$  mA
5. ✗  $i(t) = 4 - 4e^{-t/1000}$  mA

Question Number : 113 Question Id : 3475353814 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Laplace transform of  $e^{-at} \cos(\omega t)$  is:

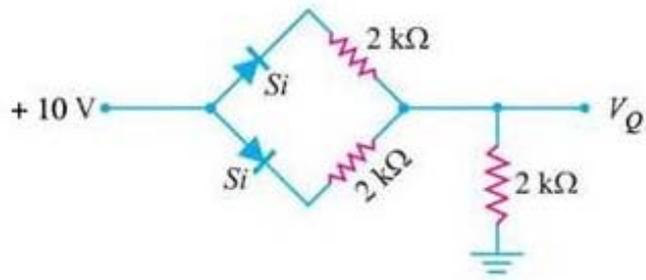
Options :

1. ✗  $\frac{\omega}{(s+a)^2 + \omega^2}$
2. ✗  $\frac{\omega}{(s-a)^2 + \omega^2}$
3. ✓  $\frac{s+a}{(s+a)^2 + \omega^2}$
4. ✗  $\frac{s-a}{(s-a)^2 + \omega^2}$
5. ✗  $\frac{\omega}{s^2 + \omega^2}$

Question Number : 114 Question Id : 3475353815 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find  $V_Q$  in the following circuit.



Options :

1. ✓ 6.2 V

2. ✗ 7 V

3. ✗ 7.2 V

4. ✗ 8.2 V

5. ✗ 9.3 V

Question Number : 115 Question Id : 3475353816 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In a common base connection,  $I_E = 1$  mA, and  $I_C = 0.95$  A. Find  $I_B$  .

Options :

1. ✗ 0.5 mA

2. ✗ 5  $\mu$  A

3. ✗ 0.5  $\mu$  A

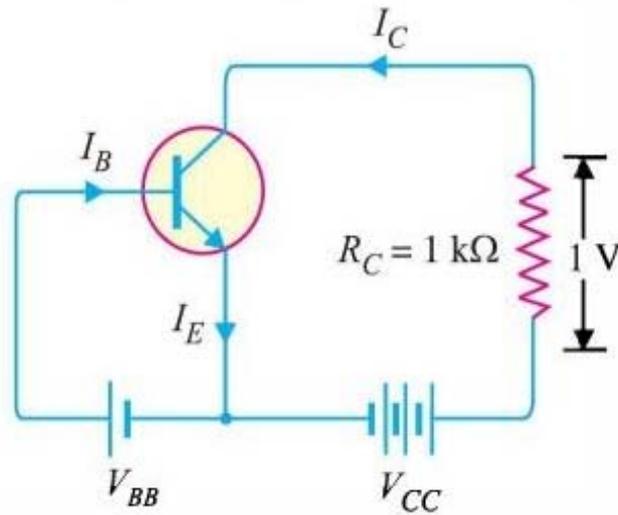
4. ✗ 0.05  $\mu$  A

5. ✓ 0.05 mA

Question Number : 116 Question Id : 3475353817 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the base current for the following amplifier. Take  $\beta = 45$  and voltage drop across  $1\text{ k}\Omega$  is  $1\text{ V}$ .



Options :

1. ✘ 0.22 mA
2. ✔ 0.022 mA
3. ✘ 2.2  $\mu\text{A}$
4. ✘ 33  $\mu\text{A}$
5. ✘ 3.3  $\mu\text{A}$

Question Number : 117 Question Id : 3475353818 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

An amplifier has voltage gain of 15 db. If the input signal voltage is 0.8 V, find the output voltage.

Options :

1. ✘ 2.2 V
2. ✔ 4.5 V
3. ✘ 6.2 V
4. ✘ 9.2 V
5. ✘ 8 V

Question Number : 118 Question Id : 3475353819 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Octal equivalent of the binary  $(100111010)_2$  is:

Options :

1. ✓  $(472)_8$

2. ✗  $(482)_8$

3. ✗  $(572)_8$

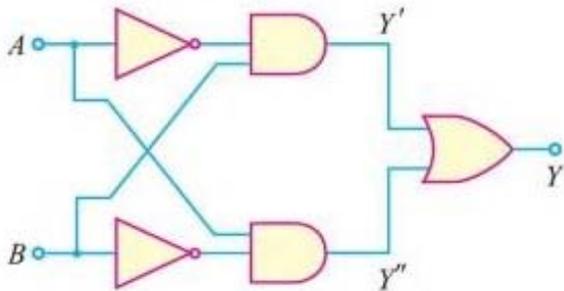
4. ✗  $(1472)_8$

5. ✗  $(432)_8$

Question Number : 119 Question Id : 3475353820 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The following circuit represents:



Options :

1. ✗ AND

2. ✗ NOR

3. ✓ XOR

4. ✗ NAND

5. ✗ XNOR

Question Number : 120 Question Id : 3475353821 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following is NOT a control register in 8051?

Options :

1. ✗ TCON

2. ✗ TMOD

3. ✗ SCON

4. ✘ IP

5. ✔ SBUF

Question Number : 121 Question Id : 3475353822 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

An SCR has half-cycle surge current rating of 3 kA for 50 Hz supply. Find its one-cycle surge current rating.

Options :

1. ✔ 2121.32 A

2. ✘ 1121.32 A

3. ✘ 2110.32 A

4. ✘ 3121.32 A

5. ✘ 4121.32 A

Question Number : 122 Question Id : 3475353823 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

External-pulse commutation of SCR is categorised in:

Options :

1. ✘ Class A

2. ✘ Class B

3. ✘ Class C

4. ✘ Class D

5. ✔ Class E

Question Number : 123 Question Id : 3475353824 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 230 V, 50 Hz single-phase half wave controlled rectifier is supply a power to a single phase 230 V, 1 kW heater. Find the power absorbed in the heater element when the firing angle is  $90^\circ$ .

Options :

1. ✔ 250 W

2. ✘ 500 W

3. ✘ 750 W

4. ✘ 1000 W

5. ✘  $\frac{1000}{\sqrt{2}}$  W

Question Number : 124 Question Id : 3475353825 Question Type : MCQ Display Question Number : Yes Single Line Question

Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 230 V dc step down chopper is driving a load resistance of  $10 \Omega$ . It has a voltage drop of 2 V across chopper when it is on. Find the r.m.s. value of output voltage for a duty cycle of 0.4.

Options :

1. ✘  $0.4 \times 228$  V

2. ✘  $\sqrt{0.4} \times 230$  V

3. ✘  $0.2 \times 228$  V

4. ✔  $\sqrt{0.4} \times 228$  V

5. ✘  $0.2 \times 230$  V

Question Number : 125 Question Id : 3475353826 Question Type : MCQ Display Question Number : Yes Single Line Question

Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A voltage-commutated chopper has the following parameters:  $V_s = 220$  V,  $R = 0.5 \Omega$ ,  $L = 2$  mH,  $E = 40$  V. Commutation circuit parameters:  $L = 20 \mu\text{H}$ , and  $C = 50 \mu\text{F}$ ,  $T_{ON} = 800 \mu\text{s}$ ,  $T = 2$  ms. Find peak currents through main thyristor for a constant load current of 80 A.

Options :

1. ✔  $80 + 220\sqrt{2.5}$  A

2. ✘  $220\sqrt{2.5}$  A

3. ✘ 80 A

4. ✘ 300 A

5. ✘ 480 A

Question Number : 126 Question Id : 3475353827 Question Type : MCQ Display Question Number : Yes Single Line Question

Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which element is measured using Maxwell-Wien bridge?

Options :

1. ✘ Capacitance
2. ✘ Dielectric loss
3. ✔ Inductance
4. ✘ Low resistance
5. ✘ High resistance

Question Number : 127 Question Id : 3475353828 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the shunt resistance required for a  $100 \mu\text{A}$  ammeter with internal resistance of  $100 \Omega$  to measure  $500 \mu\text{A}$ .

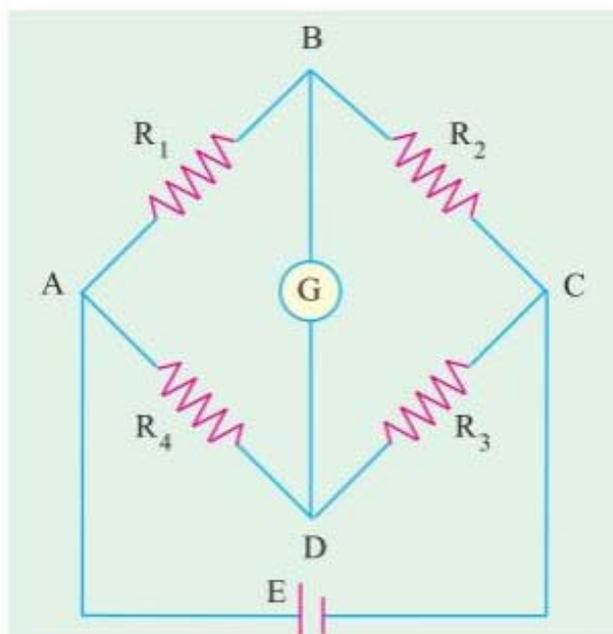
Options :

1. ✘  $100 \Omega$
2. ✘  $75 \Omega$
3. ✔  $25 \Omega$
4. ✘  $50 \Omega$
5. ✘  $125 \Omega$

Question Number : 128 Question Id : 3475353829 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

What is the condition for the network to get zero reading in the galvanometer?



Options :

1. ✘  $\frac{R_1}{R_3} = \frac{R_4}{R_2}$

2. ✘  $R_1 R_2 = R_3 R_4$

3. ✔  $R_1 R_3 = R_2 R_4$

4. ✘  $R_1 R_4 = R_2 R_3$

5. ✘  $\frac{R_1}{R_3} = \frac{R_2}{R_4}$

Question Number : 129 Question Id : 3475353830 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Find the value of shunt resistance to give a multiplying power of 50 for a galvanometer with 1 k-Ω resistance.

Options :

1. ✔ 20.4 Ω

2. ✘ 10.4 Ω

3. ✘ 18.4 Ω

4. ✘ 32.4 Ω

5. ✘ 25.4 Ω

Question Number : 130 Question Id : 3475353831 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In a R-L series circuit, the transfer function  $\frac{I(s)}{V(s)}$  is equal to:

Options :

1. ✔  $\frac{1}{Ls + R}$

2. ✘  $\frac{1}{\frac{L}{R}s + 1}$

3. ✘  $\frac{1}{Rs + L}$

4. ✘  $\frac{R}{Ls + R}$

5. ✘  $\frac{L}{Ls + R}$

Question Number : 131 Question Id : 3475353832 Question Type : MCQ Display Question Number : Yes Single Line Question  
 Option : No Option Orientation : Vertical  
 Correct : 2 Wrong : 0

Unit step response of a first order system with TF  $\frac{1}{5s+1}$  is:

Options :

1. ✘  $1 - e^{-t/5}$  for all time  $(-\infty, \infty)$

2. ✔  $1 - e^{-t/5}$  for  $t \geq 0$

3. ✘  $1 - e^{-5}$  for all time  $(-\infty, \infty)$

4. ✘  $1 - e^{-5}$  for  $t \geq 0$

5. ✘  $1 - e^{-5t}$  for  $t \geq 0$

Question Number : 132 Question Id : 3475353833 Question Type : MCQ Display Question Number : Yes Single Line Question  
 Option : No Option Orientation : Vertical  
 Correct : 2 Wrong : 0

A unity negative feedback system has forward path TF  $G(s) = \frac{1}{s^2(s+5)}$ . What is the steady state error for unit-step input?

Options :

1. ✘ 0

2. ✘ 1

3. ✘ 2

4. ✔  $\infty$

5. ✘  $\frac{1}{5}$

Question Number : 133 Question Id : 3475353834 Question Type : MCQ Display Question Number : Yes Single Line Question  
 Option : No Option Orientation : Vertical  
 Correct : 2 Wrong : 0

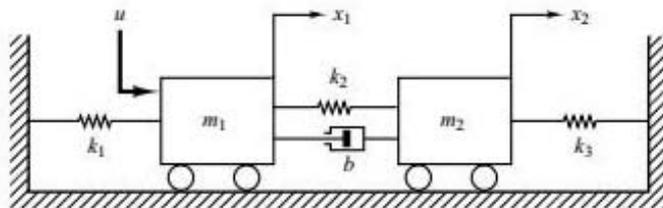
A unity negative feedback system has forward path TF  $G(s) = \frac{K}{s^2(s+1)}$ . The closed loop system is:

Options :

1. ✘ always stable
2. ✘ marginally stable
3. ✔ always unstable
4. ✘ asymptotically stable
5. ✘ stable for some positive value of  $K$

Question Number : 134 Question Id : 3475353835 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Correct : 2 Wrong : 0

Number of state variables required to represent the following system is:



Options :

1. ✘ 1
2. ✘ 2
3. ✘ 3
4. ✔ 4
5. ✘ 5

Question Number : 135 Question Id : 3475353836 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical Correct : 2 Wrong : 0

Which of the following fuel has more oxygen?

Options :

1. ✔ Lignite
2. ✘ Bituminous coal
3. ✘ Anthracite coal
4. ✘ Heavy oil

5. ✘ Petrol

Question Number : 136 Question Id : 3475353837 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

The thermal efficiency of a modern steam power station is about:

Options :

1. ✘ 20%

2. ✔ 30%

3. ✘ 40%

4. ✘ 50%

5. ✘ 60%

Question Number : 137 Question Id : 3475353838 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A hydro-electric generating station is supplied from a reservoir of capacity  $5 \times 10^6 \text{ m}^3$  at a head of 200 metres. Find the total energy available in kWh if the overall efficiency is 75%.

Options :

1. ✘  $1.44 \times 10^6$  kWh

2. ✘  $1.044 \times 10^6$  kWh

3. ✔  $2.044 \times 10^6$  kWh

4. ✘  $20.44 \times 10^6$  kWh

5. ✘  $2.44 \times 10^6$  kWh

Question Number : 138 Question Id : 3475353839 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Demand factor in power system is:

Options :

1. ✘ the maximum demand

2. ✔ the ratio of maximum demand to its connected load

3. ✘ the ratio of the average load to maximum demand

4. ✘ the ratio of the maximum demand to average load
5. ✘ the ratio of the area under the load curve to the total number of hours

Question Number : 139 Question Id : 3475353840 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

When does percentage of line drop decrease?

Options :

1. ✘ When resistivity of conductor increases
2. ✘ When area of  $X$ -section of conductor decreases
3. ✘ When length of the line increases
4. ✔ When line voltage increases
5. ✘ When current density of the conductor increases

Question Number : 140 Question Id : 3475353841 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In a long transmission line, the leakage current through shunt admittance is:

Options :

1. ✘ negligible at the sending end of the line
2. ✔ maximum at the sending end of the line
3. ✘ maximum at the receiving end of the line
4. ✘ constant over the line
5. ✘ always zero over the line

Question Number : 141 Question Id : 3475353842 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A balanced 3-phase load of 30 MW is supplied at 132 kV, 50 Hz and 0.85 p.f. lagging by means of a transmission line. The series impedance of a single conductor is  $(20 + j50) \Omega$  and the total phase-neutral admittance is  $300 \times 10^{-6}$  siemen. Using nominal T method, find the A, and D constants of the line.

Options :

1. ✘  $A = j0.003$  and  $D = 0.9925$

2. ✘  $A = 0.9925$  and  $D = j0.003$
3. ✘ A and D are equal to  $-0.9925 + j0.003$
4. ✔ A and D are equal to  $0.9925 + j0.003$
5. ✘ A and D are equal to  $0.992 - j0.003$

Question Number : 142 Question Id : 3475353843 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 132 kV, 50 Hz, 3-phase transmission line delivers a load of 50 MW at 0.8 p.f. lagging at the receiving end. The generalised constants of the transmission line are:  $A = D = 0.95 \angle 1.4^\circ$ ;  $B = 96 \angle 78^\circ$ ;  $C = 0.0015 \angle 90^\circ$ . Find the sending end current per phase using nominal T method.

Options :

1. ✘  $214 \angle 19.6^\circ$  A
2. ✔  $214 \angle 9.6^\circ$  A
3. ✘  $214 \angle -9.6^\circ$  A
4. ✘  $224 \angle 9.6^\circ$  A
5. ✘  $224 \angle -9.6^\circ$  A

Question Number : 143 Question Id : 3475353844 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Average e.m.f per turn in a transformer coil is equal to:

Options :

1. ✔  $4 f \phi_m$  V
2. ✘  $4.44 f \phi_m$  V
3. ✘  $2 f \phi_m$  V
4. ✘  $\sqrt{2} f \phi_m$  V
5. ✘  $f \frac{\phi_m}{2}$  V

Question Number : 144 Question Id : 3475353845 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

In a brake test the effective load on the branch pulley was 38.1 kg, the effective diameter of the pulley 63.5 cm and speed 12 r.p.s. The motor took 49 A at 220 V. Calculate the output power.

Options :

1. ✓  $24\pi \times 38.1 \times 0.3175 \times g$  Watts

2. ✗  $24\pi \times 38.1 \times 31.75 \times g$  Watts

3. ✗  $12\pi \times 38.1 \times 0.3175 \times g$  Watts

4. ✗  $24\pi \times 38.1 \times 0.3175$  Watts

5. ✗  $24\pi \times 38.1 \times 63.5 \times g$  Watts

Question Number : 145 Question Id : 3475353846 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 220-V, 10-kW, 2500 r.p.m. shunt motor draws 41 A when operating at rated conditions. The resistances of the armature, compensating winding, interpole winding and shunt field winding are respectively 0.2  $\Omega$ , 0.05  $\Omega$ , 0.1  $\Omega$  and 110  $\Omega$ . Calculate the back emf if pole flux is reduced by 25%, a 1  $\Omega$  resistance is placed in series with the armature and the load torque is reduced by 50%.

Options :

1. ✗  $220 - 29 \times 1.2$  V

2. ✗  $220 - 26 \times 1.2$  V

3. ✗  $220 - 26 \times 1.3$  V

4. ✗  $220 - 29 \times 1.35$  V

5. ✓  $220 - 26 \times 1.35$  V

Question Number : 146 Question Id : 3475353847 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 220-V, 20 A DC machine has an armature resistance of 0.5  $\Omega$ . Find the induced e.m.f. when the machine acts as motor at rated load.

Options :

1. ✓ 210 V

2. ✗ 200 V

3. ✗ 230 V

4. ✗ 220 V

5. ✘ 205 V

Question Number : 147 Question Id : 3475353848 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 50 Hz IM, operating at rated load and voltage, runs at 290 r.p.m. Find the number of poles in that machine.

Options :

1. ✘ 4

2. ✘ 8

3. ✘ 12

4. ✘ 16

5. ✔ 20

Question Number : 148 Question Id : 3475353849 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

A 250-W, single-phase, 50-Hz, 220-V universal motor runs at 2000 r.p.m. and takes 1.0 A when supplied from a 220-V DC supply. If the motor is connected to 220-V AC supply and takes 1.0 A (r.m.s), calculate the speed. Take  $R_a = 20 \Omega$  and  $L_a = 0.4 \text{ H}$ ,  $E_{b,ac} = 160.5 \text{ V}$

Options :

1. ✔ 1605 r.p.m.

2. ✘ 2000 r.p.m.

3. ✘ 1000 r.p.m.

4. ✘ 1200 r.p.m.

5. ✘ 1506 r.p.m.

Question Number : 149 Question Id : 3475353850 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct : 2 Wrong : 0

Which of the following electric heaters suffers from pinching effect?

Options :

1. ✔ Core type induction furnace

2. ✘ Electric heater

3. ✘ Coreless induction furnace
4. ✘ High frequency eddy current heating
5. ✘ Dielectric heating

Question Number : 150 Question Id : 3475353851 Question Type : MCQ Display Question Number : Yes Single Line Question  
Option : No Option Orientation : Vertical  
Correct : 2 Wrong : 0

Which of the following quantity has a unit of  $\text{cd}/\text{sq-m}$ ?

Options :

1. ✘ Luminous Flux
2. ✘ Luminous Intensity
3. ✘ Illumination
4. ✔ Luminance
5. ✘ Luminous Exitance