Andhra Pradesh State Council of Higher Education

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

Question Paper Name :	Electrical Engineering 29th May 2023 Shift 2
Duration :	120
Total Marks :	120
Display Marks:	No
Share Answer Key With Delivery Engine :	Yes
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console?	Yes
Change Font Color :	No
Change Background Color :	No
Change Theme :	No
Help Button :	No
Show Reports :	No

Show Progress Bar :	No
Is this Group for Examiner? :	No
Examiner permission :	Cant View
Show Progress Bar? :	No

Electrical Engineering

Section Id :	78773224
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	120
Section Marks :	120
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Is Section Default? :	null

Question Number : 1 Question Id : 7877322761 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A circuit has 1000 turns enclosing a magnetic circuit 20 m^2 cross section with 5 A current. The flux density is 1 Wb/m^2 with this and 1.4 Wb/m^2 with 10 A current. Find the emf induced if the current fell uniformly from 10 A to 5 A in 0.1 sec.

Options :

1. ✖ 12 V

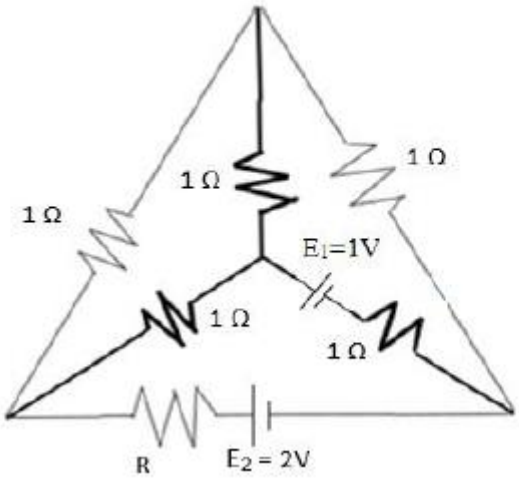
2. ✔ 8 V

3. ✖ 16 V

4. ✖ 10 V

Question Number : 2 Question Id : 7877322762 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of R if $E_1 = 0$ in the following circuit is ____ Ω.



Options :

1. ✖ 2

2. ✖ 4

3. ✖ ½

4. ✔ 1

Question Number : 3 Question Id : 7877322763 Display Question Number : Yes Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A wire carries a current which is a combination of direct current 20 A and a sinusoidal current of 20 A peak. The RMS value of the current is ____.

Options :

1. ✖ 2.45 A

2. ✖ 20 A

3. ✔ 24.5 A

4. ✖ 28.28 A

Question Number : 4 Question Id : 7877322764 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A circuit with R, L and C in series is resonant at f_0 Hz, and bandwidth is Δf. If the component values of all of them are quadrupled, the new resonant frequency and bandwidth would be

Options :

1. ✖ $f_0, \frac{\Delta f}{4}$

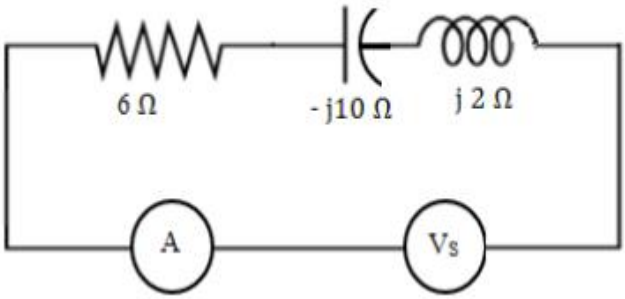
2. ✖ $\frac{f_0}{2}, 2\Delta f$

3. ✔ $\frac{f_0}{4}, \Delta f$

4. ✖ $\frac{f_0}{16}, \frac{\Delta f}{2}$

Question Number : 5 Question Id : 7877322765 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The ammeter in the circuit reads 20 A. The supply voltage of the circuit is



Options :

1. ✖ 40 V

2. ✖ 100 V

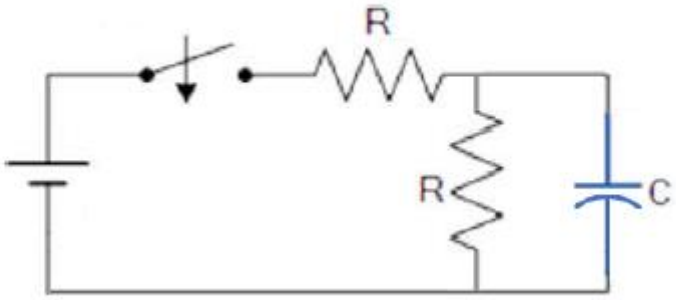
3. ✖ 120 V

4. ✔ 200 V

Question Number : 6 Question Id : 7877322766 Display Question Number : Yes Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The time constant of the following circuit is



Options :

1. ✖ 3RC

2. ✖ $\frac{RC}{2}$

3. ✖ 2RC

4. ✔ $\frac{2RC}{3}$

Question Number : 7 Question Id : 7877322767 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A 3-Ø 3 wire supply feeds a load consisting of three equal resistors connected in star. If one of the resistors is opened the percentage reduction of the load is

Options :

1. ✖ 33.33

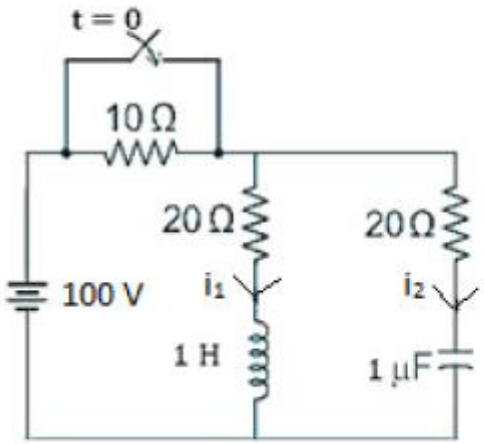
2. ✔ 50

3. ✖ 66

4. ✖ 75

Question Number : 8 Question Id : 7877322768 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For the circuit shown in the figure the value of $\frac{di_2}{dt}|_{t=0^+}$ is



Options :

1. ✖ -83 A/s

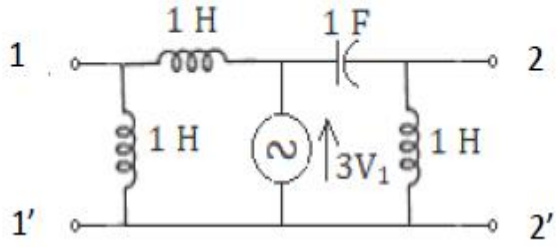
2. ✖ -830 A/s

3. ✖ -8300 A/s

4. ✔ -83000 A/s

Question Number : 9 Question Id : 7877322769 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The z-parameters of the following network is



Options :

1. ✔ $\begin{bmatrix} -s & 0 \\ \frac{-3s}{1+s^2} & \frac{s}{1+s^2} \end{bmatrix}$

2. ✖ $\begin{bmatrix} 0 & s \\ \frac{3s}{1+s^2} & \frac{-s}{1+s^2} \end{bmatrix}$

3. ✖ $\begin{bmatrix} \frac{-s}{1+s^2} & -s \\ 0 & \frac{3s}{1+s^2} \end{bmatrix}$

4. ✖ $\begin{bmatrix} s & \frac{3s}{1+s^2} \\ 0 & \frac{s}{1+s^2} \end{bmatrix}$

Question Number : 10 Question Id : 7877322770 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The Y- parameters of a two-port network are $Y_{11} = 0.4\,\mho, Y_{21} = Y_{12} = -0.1\,\mho,$ $Y_{22} = 0.2\,\mho$. The transmission parameters of the system are

Options :

1. ✖ $\begin{bmatrix} 10 & 2 \\ 0.7 & -4 \end{bmatrix}$

2. ✖ $\begin{bmatrix} 20 & 1 \\ -0.7 & -8 \end{bmatrix}$

3. ✔ $\begin{bmatrix} 2 & 10 \\ 0.7 & 4 \end{bmatrix}$

4. ✖ $\begin{bmatrix} 4 & 10 \\ 1.4 & 8 \end{bmatrix}$

Question Number : 11 Question Id : 7877322771 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If a capacitor is energised by a symmetrical square wave current source, then the voltage across the capacitor will be

Options :

1. ✖ impulse function

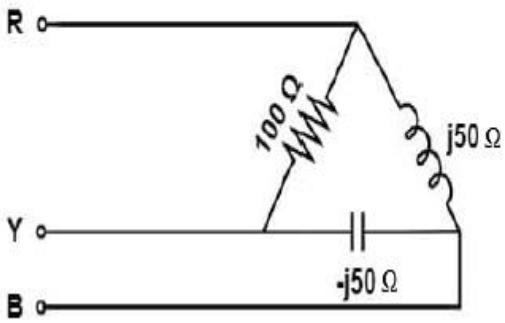
2. ✖ step function

3. ✖ square wave

4. ✔ triangular wave

Question Number : 12 Question Id : 7877322772 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A set of three equal resistors of R_x are connected in star consumes the same power as the unbalanced delta connected load as shown in the figure. The value of R_x is



Options :

1. ✖ 10

2. ✖ 150

3. ✔ 100

4. ✖ 50

Question Number : 13 Question Id : 7877322773 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The electric flux density in a static electric field is $x^2\overline{a_x} + xy\overline{a_y} + z^2\overline{a_z}\ C/m^2$. The volume charge desnsity at x = 1.0 m, y = 2.0 m, z = 3 m is

Options :

1. ✖ $12\ C/m^3$

2. ✖ $10\ C/m^3$

3. ✖ $8\ C/m^3$

4. ✔ $9\ C/m^3$

Question Number : 14 Question Id : 7877322774 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The highest possible potential of an isolated spherical conductor of radius 0.8 m (when the maximum strength of air is 80 KV/m) is

Options :

1. ✖ 89 KV

2. ✖ 98 KV

3. ✔ 64 KV

4. ✖ 100 KV

Question Number : 15 Question Id : 7877322775 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If $\bar{J} = 100^3 sin\theta\ \overline{a_r}\ A/m^2$ in spherical coordinates, the current that crosses a spherical shell of radius 0.04 m is

Options :

1. ✖ 4.2 mA

2. ✖ 10 mA

3. ✔ 1.58 mA

4. ✖ 2.72 mA

Question Number : 16 Question Id : 7877322776 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following statements is true in case of the boundary conditions for two perfect dielectric materials

Options :

1. ✖ $Etan1 \neq Etan2, D_{N1} = D_{N2}$

2. ✔ $Etan1 = Etan2, D_{N1} - D_{N2} = \rho_S$

3. ✖ $Etan1 = Etan2, D_{N1} = D_{N2}$

4. ✖ $\frac{Etan1}{Etan2} = \frac{\epsilon_2}{\epsilon_1}, \quad D_{N1} + D_{N2} = \rho_S$

Question Number : 17 Question Id : 7877322777 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A capacitor is composed of two parallel plates separated by a sheet of insulating material 3 mm thickness and a relative permittivity 4. The distance between the plates is increased to allow the insulator of a second sheet of 5 mm thickness and a relative permittivity ϵ_r. If the resultant capacitance is $1/3^{rd}$ of the original capacitance. The value of ϵ_r is

Options :

1. ✖ 2.33

2. ✔ 3.33

3. ✖ 3

4. ✖ $2/3$

Question Number : 18 Question Id : 7877322778 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The vector magnetic potential $\overline{A} = 10xy\,\overline{a_x} + 10y^2\,\overline{a_y}$. The value of $\overline{B}$ at (1,0,-1) is

Options :

1. ✖ $-10\overline{a_x}$

2. ✖ 0

3. ✔ $10\overline{a_z}$

4. ✖ $-10\overline{a_y}$

Question Number : 19 Question Id : 7877322779 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A conductor is bent in the form of a regular hexagon inscribed in a circle of radius 10 cm.

The magnetic flux density at the centre of hexagon if the current in the conductor is 10 A, be

Options :

1. ✖ $73.87\ \mu_0\ \text{Wb/m}^2$

2. ✖ $62.23\ \mu_0$ Wb/m^2

3. ✖ $47.85\ \mu_0$ Wb/m^2

4. ✔ $55.16\ \mu_0$ Wb/m^2

Question Number : 20 Question Id : 7877322780 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A circular loop of current 10 A, located on $x^2 + y^2 = 9, z = 0$. The value of $\vec{H}$ at (0,0,4) and (0,0,-4) respectively is (in A/m)

Options :

1. ✔ $0.36\ \overline{a_z}$, $0.36\ \overline{a_z}$

2. ✖ $0.36\ \overline{a_z}$, $-0.36\ \overline{a_z}$

3. ✖ $-0.36\ \overline{a_z}$, $0.36\ \overline{a_z}$

4. ✖ $-0.36\ \overline{a_z}$, $-0.36\ \overline{a_z}$

Question Number : 21 Question Id : 7877322781 Display Question Number : Yes Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A conductor of length 5 m with current flowing in $\overline{a_y}$ direction of 10 A, lies along y-axis between Y = $\pm$2.5 m in the field of 0.05 $\overline{a_x}$ Tesla. The work done in moving the conductor parallel to it at constant speed to x = z = 2 m, is

Options :

1. ✖ 2.5 J

2. ✖ 3 J

3. ✖ 4.5 J

4. ✔ 5 J

Question Number : 22 Question Id : 7877322782 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Moist soil has conductivity of $10^{-3}\,\mho/m$ and $\epsilon_r = 2.5$. The value of $|\overline{J_D}|$ where $|\overline{E}| = 6\text{x}10^{-6}\sin(9\text{x}10^{9})\text{t}$ V/m is

Options :

1. ✖ $6\text{x}10^{-9}\sin(9\text{x}10^{9})\text{t}$ A/m^2

2. ✖ $0.6\text{x}10^{-6}\cos(9\text{x}10^{9})\text{t}$ A/m^2

3. ✖

$1.2x10^{-9}\sin(9x10^{9})t\ A/m^2$

4. ✔ $1.2x10^{-9}\cos(9x10^{9})t\ A/m^2$

Question Number : 23 Question Id : 7877322783 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A three phase full wave converter is fed by three phase source with peak line to neutral voltage as Vm then the peak inverse voltage rating of a thyristor is

Options :

1. ✔ $\sqrt{3}\ Vm$

2. ✖ $\sqrt{2}\ Vm$

3. ✖ $\frac{Vm}{\sqrt{3}}$

4. ✖ $\frac{Vm}{\sqrt{2}}$

Question Number : 24 Question Id : 7877322784 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A phase controlled converter with R-L load and operated with firing angle α , whether the current is continuous or discontinuous depends on

Options :

1. ✖ R only

2. ✖ α and L

3. ✔ R, L and α

4. ✖ L and R

Question Number : 25 Question Id : 7877322785 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The output voltage and frequency of sinusoidal pulse width modulated inverter can be varied by

Options :

1. ✔ By varying the reference signal amplitude and frequency

2. ✖ By varying the reference signal frequency only

3. ✖ By varying the carrier signal frequency

4. ✖ By varying the reference signal voltage amplitude only

Question Number : 26 Question Id : 7877322786 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The distortion factor of a single phase full bridge inverter is

Options :

1. ✖ 0.1

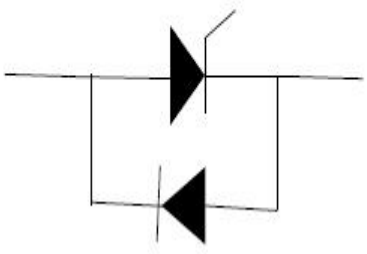
2. ✔ 0.9

3. ✖ 0.8

4. ✖ 0.6

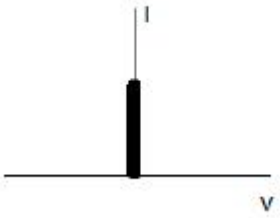
Question Number : 27 Question Id : 7877322787 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Choose the ideal characteristics of composite power semiconductor device shown below



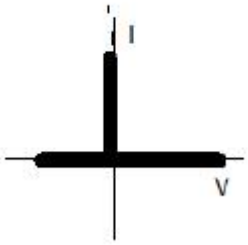
Options :

1. ✖

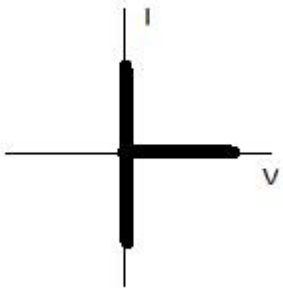


2. ✖

3. ✖



4. ✔



Question Number : 28 Question Id : 7877322788 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The device which is very popular in switched mode power supplies is

Options :

1. ✖

SCR

2. ✔ MOSFET

3. ✖ BJT

4. ✖ IGBT

Question Number : 29 Question Id : 7877322789 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In case of a three phase full converter, load current is 10A and ripple free, then the average and r.m.s values of thyristor currents are respectively

Options :

1. ✖ 10, 5

2. ✖ 5, $10/\sqrt{2}$

3. ✔ $10/3$, $10/\sqrt{3}$

4. ✖ 5, 3

Question Number : 30 Question Id : 7877322790 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A step-up chopper has input voltage as 100V and output voltage is 300V. What is the conduction time of chopper if the total time period is 300 µsec.

Options :

1. ✖ 300 µsec

2. ✔ 200 µsec

3. ✖ 100 µsec

4. ✖ 50 µsec

Question Number : 31 Question Id : 7877322791 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Choose the advantages of slip power recovery scheme for speed control of induction motor

Options :

1. ✖ lower rating of power converters

2. ✖ Wide range of speed control

3. ✖ slip power is recovered

4. ✔ All the above

Question Number : 32 Question Id : 7877322792 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A single phase separately excited dc motor fed by single phase full converter with $\alpha = 60^0$, the speed is 600 rpm. When this motor fed from single phase half controlled converter with the same firing angle the speed would be

Options :

1. ✖ 600 rpm

2. ✔ 900 rpm

3. ✖ 800 rpm

4. ✖ 200 rpm

Question Number : 33 Question Id : 7877322793 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Induction motor with 2 poles fed by 50 Hz frequency voltages, the rated slip is 2700 rpm. The speed of induction motor is controlled by v/f method using inverter. The inverter frequency is set at 40Hz and run at rated speed. What is the running speed of motor?

Options :

1. ✖ 2000 rpm

2. ✖ 2400 rpm

3. ✔ 2160 rpm

4. ✖ 2280 rpm

Question Number : 34 Question Id : 7877322794 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A single phase full bridge inverter is operated in square wave mode with inductive load and the inverter frequency of operation is f then the total feedback diodes conduction time is

Options :

1. ✖ 1/f

2. ✔ 1/(2f)

3. ✖ 1/(4f)

4. ✖ 1/(8f)

Question Number : 35 Question Id : 7877322795 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

When the induction motor is operated in constant torque and constant power regions

Options :

1. ✔ air-gap flux is constant, air-gap flux is weakened respectively

2. ✖ air-gap flux is weakened and air-gap flux is constant respectively

3. ✖ stator frequency is always below the rated frequency

4. ✖ stator frequency is always above the rated frequency

Question Number : 36 Question Id : 7877322796 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A dc chopper is used to implement regenerative braking of a separately excited dc motor.

The dc supply is 200V.The armature resistance r_a = 0.1 Ω and motor constant is 0.1 v-s/rad.

The average armature current during the regenerative braking is kept constant at 100A.The minimum braking speed is ----- if the duty cycle of chopper is 0.5.

Options :

1. ✔ 100 rad/sec

2. ✖ 200 rad/sec

3. ✖ 50 rad/sec

4. ✖ 400 rad/sec

Question Number : 37 Question Id : 7877322797 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A rectangular pulse of high amplitude and narrow width is used as gating pulse for SCR

Options :

1. ✖ to increase turn on time

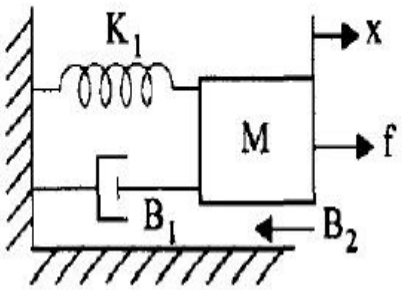
2. ✔ to reduce turn on time

3. ✖ to increase turn off time

4. ✖ to decrease turn off time

Question Number : 38 Question Id : 7877322798 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The transfer function for the following mechanical translational system X(s)/F (s) is.



Options :

1. ✔ $\frac{1}{s^2M + s\,(B_1 + B_2) + k_1}$

2. ✖ $\frac{1}{s^2M + s\,(B_1 - B_2) + k_1}$

3. ✖ $\frac{1}{s^2M + 2s\,(B_1 + B_2) + k_1}$

4. ✖ $\frac{1}{s^2M + s\,(B_1 + B_2) + K_1^2}$

Question Number : 39 Question Id : 7877322799 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Sensitivity of overall transfer function for a small change in forward path transfer function G(s), for open loop system is

Options :

1. ✖ 0

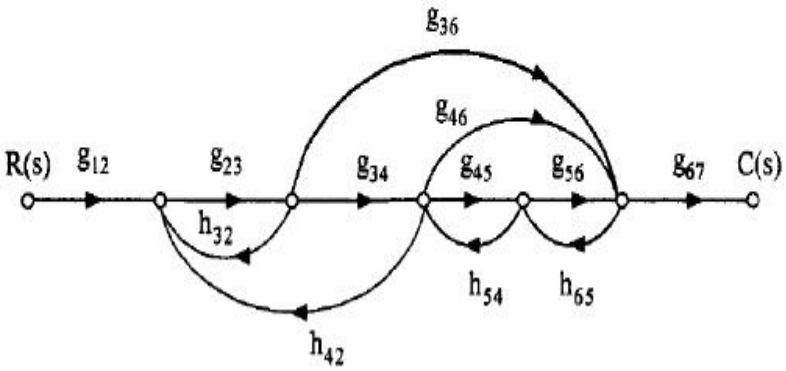
2. ✔ 1

3. ✖ ∞

4. ✖ -1

Question Number : 40 Question Id : 7877322800 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For the following signal graph, the number of forward paths and the number of Combinations of two non touching loops are respectively



Options :

1. ✖ 3 ; 4

2. ✖ 3 ; 2

3. ✖ 2 ; 3

4.

3 ; 3

Question Number : 41 Question Id : 7877322801 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The normalized peak time of a second order system if $\delta = 0.8$ is

Options :

1. π

2. $0.6\,\pi$

3. $1.67\,\pi$

4. 0.8π

Question Number : 42 Question Id : 7877322802 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The root locus of a unity feedback system for the following open loop transfer function

$G(s) = \frac{K(s+2)}{s(s+1)(s+4)}$, the angles made by asymptotes are respectively

Options :

1. 0^0 & 180^0

2. 90^0 & 180^0

3. ✔ 90^0 & 270^0

4. ✖ 0^0 & 270^0

Question Number : 43 Question Id : 7877322803 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Open loop transfer function of a system having one zero with a positive real value is called

Options :

1. ✖ zero phase function

2. ✖ positive phase function

3. ✖ negative phase function

4. ✔ non-minimum phase function

Question Number : 44 Question Id : 7877322804 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following are the advantages of Nyquist stability test?

(A) it guides in stabilizing an unstable system

(B) it is unable to predict closed loop stability from open loop results

(C) it is applicable to experimental results of frequency response of open loop system

Options :

1. ✖ A and B only

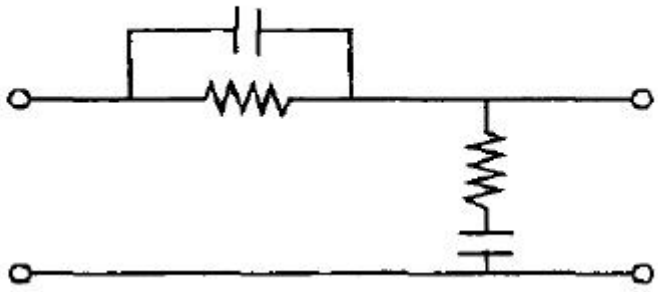
2. ✖ B and C only

3. ✔ C and A only

4. ✖ A, B and C only

Question Number : 45 Question Id : 7877322805 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The following network represents



Options :

1. ✖ Lag network

2. ✔ Lag-lead network

3. ✖ Lead network

4. ✖ Lead-lag network

Question Number : 46 Question Id : 7877322806 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of A matrix in $\dot{X} = AX$ for the system described by the differential equation:

$\ddot{y} + 2\dot{y} + 3y = 0$ form is

Options :

1. ✖ $\begin{bmatrix} 1 & 0 \\ -2 & -1 \end{bmatrix}$

2. ✔ $\begin{bmatrix} 0 & 1 \\ -3 & -2 \end{bmatrix}$

3. ✖ $\begin{bmatrix} 1 & 0 \\ -1 & -2 \end{bmatrix}$

4. ✖ $\begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$

Question Number : 47 Question Id : 7877322807 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A linear time invariant system is described by the following dynamic equation

$\dot{X} = AX + Bu$ and $Y = CX$; $A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$; $B = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$; $C = [1 \quad 1]$

The system is

Options :

1. ✔ Controllable but unobservable

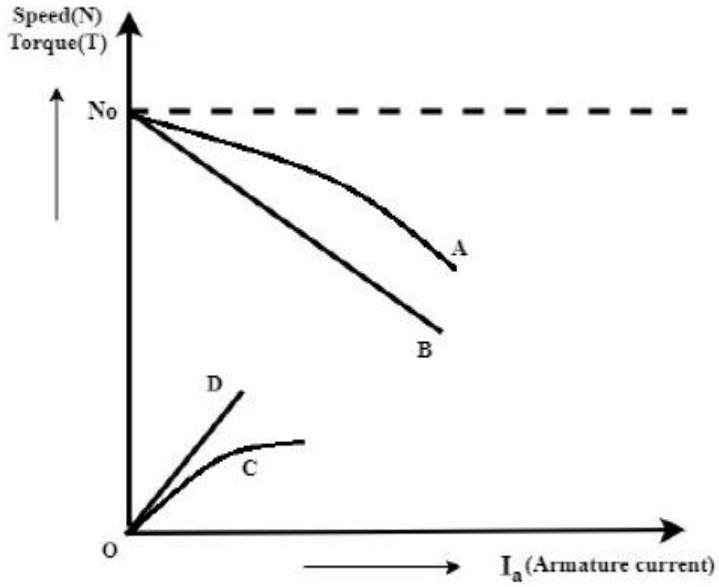
2. ✖ Both controllable and observable

3. ✖ Observable but not controllable

4. ✖ Both unobservable and uncontrollable

Question Number : 48 Question Id : 7877322808 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The characteristics of d.c shunt motor for constant V_t (terminal voltage) and I_f (field current) is given below.



Which of the above curves represent N versus I_a and T versus I_a respectively with armature reaction neglected?

Options :

1. ✖ A and D

2. ✖ B and C

3. ✔ B and D

4. ✖ A and C

Question Number : 49 Question Id : 7877322809 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Identify the correct statement from the following?

Options :

1. ✔ For a simplex progressive lap winding the commutator pitch and winding pitch are 1 and 2 respectively

2. ✖ For a simplex progressive lap winding the commutator pitch and winding pitch are 1 and -2 respectively

3. ✖ For a simplex progressive wave winding the commutator pitch and winding pitch are 1 and 2 respectively

4. ✖ For a simplex progressive wave winding the commutator pitch and winding pitch are 1 and - 2 respectively

Question Number : 50 Question Id : 7877322810 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In a d.c machine, the commutator is used to

(i) Convert a.c to d.c

(ii) Convert d.c to a.c

(iii) Keep the armature m.m.f stationary in space

(iv) Keep the armature m.m.f revolving in space

Which of the following statements are correct?

Options :

1. ✖ (i) & (ii)

2. ✔ (i) (ii) & (iii)

3. ✖ (i) (ii) & (iv)

4. ✖ (i) & (iv)

Question Number : 51 Question Id : 7877322811 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In an electromagnetic relay, the relation between the current 'i' in the exciting coil, the position of armature "x" and the flux linkages 'ψ' is given by ψ = ix. The magnetic force on the armature is

Options :

1. ✔ $(\frac{\psi}{x})^2$

2. ✖ $\left(\frac{\psi}{x}\right)$

3. ✖ $\frac{\psi^2}{x}$

4. ✖ $\frac{\psi}{x^2}$

Question Number : 52 Question Id : 7877322812 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A 200 V d.c series motor develops its rated output at 900 r.p.m while taking 20 A. The armature and series field resistances are 0.6 Ω and 0.4 Ω respectively. By neglecting saturation, the resistance that must be added to obtain rated torque at 600 r.p.m is

Options :

1. ✔ 1 Ω

2. ✖ 2 Ω

3. ✖ 3 Ω

4. ✖ 4 Ω

Question Number : 53 Question Id : 7877322813 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

When a two winding transformer is connected as an auto transformer with transformation ratio of "k", which of the following quantities have same ratio in comparing the above transformers?

(i) ratings (ii) losses (iii) impedance drop (iv) voltage regulation

Options :

1. ✖ (i) (ii) & (iii)

2. ✔ (ii) (iii) & (iv)

3. ✖ (i) (ii) & (iv)

4. ✖ (i) (iii) & (iv)

Question Number : 54 Question Id : 7877322814 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Match the following:

(Type of transformer)	(Scheme of connection)
A) Distribution transformers	L) star-star
B) Large low voltage transformers	M) delta – star
C) Small high voltage transformers	N) delta – delta
	O) star- delta

Options :

1. ✔ A- M ; B-N ; C-L

2. ✖ A- O ; B-M ; C-N

3. ✖ A- N ; B-M ; C-L

4. ✖ A- O ; B-N ; C-M

Question Number : 55 Question Id : 7877322815 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Three, two winding transformers have the following leakage impedances:

Transformer 1: 100 KVA, 0.02 p.u

Transformer 2: 75 KVA, 0.03 p.u

Transformer 3: 50 KVA, 0.025 p.u

The greatest KVA load that can be supplied by three transformers in parallel, without over loading of any transformer is

Options :

1. ✖ 175

2. ✖ 150

3. ✖ 225

4. ✔ 190

Question Number : 56 Question Id : 7877322816 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Identify the correct statements from the following with respect to 3-phase Induction Motor:

A) Air gap flux is almost constant with slip

B) As slip decreases, rotor m.m.f decreases

C) As slip increases, rotor m.m.f decreases

D) At starting, rotor power factor is high

Options :

1. ✖ D and A only

2. ✖ B and D only

3. ✖ C and D only

4. ✔ A and B only

Question Number : 57 Question Id : 7877322817 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A 3-phase squirrel cage Induction Motor has a full load slip of 0.04. The motor starting current at rated voltage is 5 times of its full load current. The tapping on the auto-transformer starter which should give full load torque at the time of starting is

Options :

1. ✖ 75%

2. ✔ 100%

3. ✖ 50 %

4. ✖ 57.7%

Question Number : 58 Question Id : 7877322818 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A 3-phase, 6 pole, 50 Hz, Induction Motor has a full load speed of 960 r.p.m with its slip rings short circuited. The motor drives a constant torque load. The rotor ohmic loss at a speed of 800 r.p.m after inserting external resistance in rotor is ____ times the full load rotor ohmic loss.

Options :

1. ✖ equal

2. ✖ 15

3. ✔ 5

4. ✖ 2

Question Number : 59 Question Id : 7877322819 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A salient pole type synchronous motor has $X_d = 0.8$ p.u and $X_q = 0.5$ p.u. It is connected to busbar of 1.0 p.u voltage, while its excitation is adjusted to $\sqrt{2}$ p.u. the power output that the motor can supply at a load angle (δ) of 45^0 is

Options :

1. ✖ 1.25 p.u

2. ✖ 1.435 p.u

3. ✔ 1.625 p.u

4. ✖ 1.5 p.u

Question Number : 60 Question Id : 7877322820 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

An alternator is running at synchronous speed. If its field winding is now energized from an a.c source at rated frequency, then

Options :

1. ✖ No E.M.F is generated in the armature

2. ✖ E.M.F is generated in the armature with rated frequency

3. ✔ E.M.F is generated in the armature with double the rated frequency

4. ✖ E.M.F is generated in the armature with reduced rated frequency

Question Number : 61 Question Id : 7877322821 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Match the following with respect to armature reaction of a 3-phase alternator.

Nature of power factor of load	Angle between armature m.m.f and field m.m.f
A) UPF	L) 180^0
B) Zero p.f lagging	M) 0^0
C) Zero p.f leading	N) $> 90^0$
D) Lagging p.f	O) 90^0

Options :

1. ✖ A--- O ; B--- M ; C---- L; D---N

2. ✔ A--- O ; B--- L ; C---- M; D---N

3. ✖ A--- M ; B--- O ; C---- L; D---N

4. ✖ A--- M ; B--- O ; C---- N; D---L

Question Number : 62 Question Id : 7877322822 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The full load voltage drops in a single phase transformer are 3% and 4% due to resistance and leakage reactance respectively. The load p.f at which voltage drop is zero is

Options :

1. ✖ 0.8 lag

2. ✔ 0.8 lead

3. ✖ 0.6 lag

4. ✖ 0.6 lead

Question Number : 63 Question Id : 7877322823 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Pick up the wrong statement from the following?

Options :

1. ✔ Pin insulators are economical beyond 33 KV operating voltage

2. ✖ Length of cross arm for suspension insulators is more compared to pin type insulators

3. ✖ The strain insulators are exactly identical in shape with the suspension insulators

4. ✖ The discs of suspension insulators are in vertical plane

Question Number : 64 Question Id : 7877322824 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The maximum allowable temperature value of a oil filled and gas pressure cables is _____ ^{0}C

Options :

1. ✖ 60

2. ✖ 120

3. ✔ 85

4. ✖ 100

Question Number : 65 Question Id : 7877322825 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A unit step voltage travelling along a line of surge impedance 400 Ω is terminated into a cable of surge impedance 40 Ω. The reflection coefficient for line to cable is

Options :

1. ✖ $\frac{9}{11}$

2. ✔ $-\frac{9}{11}$

3. ✖ $\frac{1}{11}$

4. ✖ $-\frac{1}{11}$

Question Number : 66 Question Id : 7877322826 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following circuit breaker (C.B) is preferred for high voltage operations?

Options :

1. ✖ Oil C.B

2. ✖ Vacuum C.B

3. ✖ Air C.B

4. ✔ SF_6 C.B

Question Number : 67 Question Id : 7877322827 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following statements are not correct?

W) Carrier current protection is used for EHV and UHV transmission lines

X) MHO relay is a non-directional relay

Y) Reactance relay needs a MHO relay as a starting relay

Z) Reactance relays are never preferred for ground fault relaying

Options :

1. ✖ W and X

2. ✖ X and Y

3. ✔ X and Z

4. ✖ Y and Z

Question Number : 68 Question Id : 7877322828 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A 3-phase transformer rated for 33 kV / 6.6 kV is connected in star/delta and the protecting Current Transformer (C.T) on the High Voltage side is $80 : \frac{5}{\sqrt{3}}$. The ratio of Current Transformer on the Low Voltage side is

Options :

1. ✖ $400 : \frac{5}{\sqrt{3}}$

2. ✔ $400 : 5$

3. ✖ $400 : 5\sqrt{3}$

4. ✖ $200 : 5$

Question Number : 69 Question Id : 7877322829 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Match the following for a long transmission lines (with usual notations) :

(i)	A = D	a) $Z_C \sinh\gamma l$
(ii)	B	b) $\frac{1}{Z_C} \cosh\gamma l$
(iii)	C	c) $\cosh\gamma l$
		d) $\frac{1}{Z_C} \sinh\gamma l$
		e) $\sinh\gamma l$

Options :

1. ✖ (i) --- e ; (ii) --- d ; (iii) --- b

2. ✖ (i) --- c ; (ii) --- d ; (iii) --- e

3. ✖ (i) --- e ; (ii) --- b ; (iii) --- d

4. ✔ (i) --- c ; (ii) --- a ; (iii) --- d

Question Number : 70 Question Id : 7877322830 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following type of load has minimum power loss for a given feeder with a same current value?

Options :

1. ✖ Uniformly increasing load from sending end

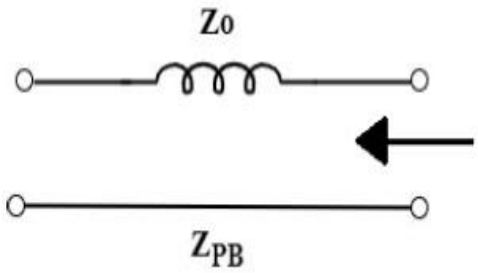
2. ✖ Load at the end of the feeder

3. ✔ Uniformly decreasing load from sending end

4. ✖ Uniformly distributed load

Question Number : 71 Question Id : 7877322831 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which type of 3-phase transformer connection represents the below zero sequence equivalent circuit?



Options :

1. ✔ Star –Star with star points earthed

2. ✖ Delta-Delta

3. ✖ Star –Star with star with primary star point is earthed

4. ✖ Star –Delta with star point earthed

Question Number : 72 Question Id : 7877322832 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following method is uneconomical and normally not used in improving the transient stability of the power system?

Options :

1. ✔ High value of Moment of Inertia of machine

2. ✖ Higher system voltages

3. ✖ Use of parallel lines

4. ✖ Use of high speed Circuit breakers

Question Number : 73 Question Id : 7877322833 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Identify the correct statements with respect to HVDC transmission?

A) Corona loss is less

B) HVDC link cannot operate between two a.c systems whose frequencies are unequal

C) No charging current

D) Skin effect is more

Options :

1. ✖ A and B only

2. ✖ B and C only

3. ✖ C and D only

4. ✔ A and C only

Question Number : 74 Question Id : 7877322834 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In a two plant system, the entire load is located at plant 2, which connected to plant 1 by a transmission line. The plant 1 supplies 100 MW of power with a corresponding transmission loss of 5 MW. The penalty factor at plant 1 is

Options :

1. ✖ 1

2. ✔ 1.11

3. ✖ 0.9

4. ✖ 2

Question Number : 75 Question Id : 7877322835 Display Question Number : Yes Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A 500 MVA synchronous machine has $H_1 = 4.6$ MJ / MVA and 1500 MVA machine has $H_2 = 3$ MJ / MVA. The two machines operate in parallel in a power station. The equivalent H constant for the two machines relative to a 200 MVA base is

Options :

1. ✖ 68 MJ / MVA

2. ✖ 6.8 MJ / MVA

3. ✔ 34 MJ / MVA

4. ✖ 3.4 MJ / MVA

Question Number : 76 Question Id : 7877322836 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Identify the wrong statement from the following:

Options :

1. ✖ Real and Reactive powers are the quantities to be obtained in slack bus

2. ✖ At load bus, the Real and Reactive powers are the quantities to be specified

3. ✖ In Gauss Siedel iterative method, voltage at all buses except at the slack bus are assumed

4. ✔ Newton Raphson method is best suited for load flow solution to smaller systems

Question Number : 77 Question Id : 7877322837 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A generating station has a maximum demand of 25 MW, a load factor of 60%, a plant capacity factor of 50% and a plant use factor of 72%. The reserve capacity of the plant is

Options :

1. ✔ 5 MW

2. ✖ 15 MW

3. ✖ 30 MW

4. ✖ 10 MW

Question Number : 78 Question Id : 7877322838 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following digital voltmeter (DVM) uses a voltage to frequency conversion technique?

Options :

1. ✔ Integrating type

2. ✖ Ramp type

3. ✖ Potentiometric type

4. ✖ Continuous balance type

Question Number : 79 Question Id : 7877322839 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Match the following:

Bridge	Quantity to be measured
L) Owen Bridge	P) High "Q" of coils
M) Campbell Bridge	Q) Dissipation factor
N) Hays Bridge	R) Inductance in terms of Capacitance
O) Schering Bridge	S) Mutual Inductance
	T) Low "Q" of coils

Options :

1. ✖ L - S; M – R; N - T; O - P

2. ✔ L - R; M – S; N - P; O - Q

3. ✖ L - P; M – R; N - Q; O - S

4. ✖ L - R; M – S; N - Q; O - T

Question Number : 80 Question Id : 7877322840 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following is not true with respect to PMMC instruments?

Options :

1. ✖ The scale is uniform

2. ✖ The power consumption is very low

3. ✔ The accuracy is high due to low torque –weight ratio

4. ✖ Due to large operating flux densities, errors due to stray magnetic fields are small

Question Number : 81 Question Id : 7877322841 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Two sine waves of same magnitude and frequency are applied simultaneously to the vertical and horizontal deflection plates of CRO with phase difference of $0^0 < \Phi < 90^0$. The pattern on the screen of the CRO is

Options :

1. ✖ Circle

2. ✖ Semicircle

3. ✖ Straight line

4. ✔ Ellipse

Question Number : 82 Question Id : 7877322842 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A 5A, "X" Volts, Mercury ampere hour meter was run at full load for 30 minutes and had registered 0.56 KWH. If the meter was used as 220 V, the error of the meter and the value of "X' is

Options :

1. ✖ 1.82% (slow) & 220 V

2. ✔ 1.82% (fast) & 224V

3. ✖ 0.91% (slow) & 220V

4. ✖ 0.91% (fast) & 224 V

Question Number : 83 Question Id : 7877322843 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In which of the instrument the controlling torque is absent?

Options :

1. ✖ PMMC Ammeter

2. ✔ 1-phase M.I type power factor meter

3. ✖ M.I voltmeter

4. ✖ Three phase electrodynamometer type wattmeter

Question Number : 84 Question Id : 7877322844 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Current Transformer is___ and Potential Transformer is___ transformer respectively.

Options :

1. ✔ Step up ; Step down

2. ✖ Step up ; Step up

3. ✖ Step down ; Step down

4. ✖ Step down ; Step up

Question Number : 85 Question Id : 7877322845 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For the below characteristics of a traction motor, which is the most efficient electrical characteristic?

Options :

1. ✖ Running characteristics

2. ✔ Starting characteristics

3. ✖ Speed control

4. ✖ Braking characteristics

Question Number : 86 Question Id : 7877322846 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For which of the factors, the specific energy consumption will be less?

Options :

1. ✖ Distance between the stops is less

2. ✖ Low values of acceleration and retardation

3. ✖ Steep gradient

4. ✔ Overall efficiency of the train equipment is more

Question Number : 87 Question Id : 7877322847 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A train runs with average speed of 40 kmph. Distance between the stations is 2 Km. The values of acceleration and retardation are 1.5 Kmphps and 2.5 Kmphps respectively. The approximate maximum speed of train assuming trapezoidal speed time curve is

Options :

1. ✖ 48 Kmph

2. ✖ 52 Kmph

3. ✔ 46 Kmph

4. ✖ 56 Kmph

Question Number : 88 Question Id : 7877322848 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which among the following statements related to p-n junction diodes is/are true?

(A) Breakdown Voltage is the minimum reverse bias voltage at which p-n junction breaks down with sudden rise in reverse current

(B) Knee Voltage is the forward voltage at which the current through the junction starts to increase rapidly

(C) Peak Inverse Voltage is the maximum reverse voltage that can be applied to the p-n junction, without damaging it

(D) Reverse breakdown voltage is the minimum steady-state reverse voltage at which breakdown will occur

Options :

1. ✖ Only (A) and (B) are correct

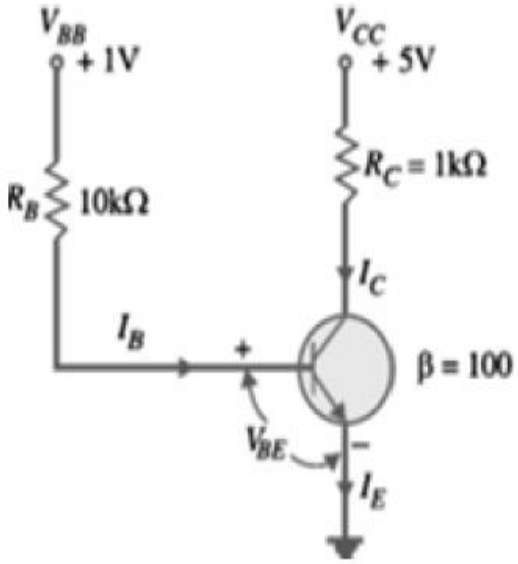
2. ✔ (A), (B), (C) and (D) are correct

3. ✖ (B), (C) and (D) are correct

4. ✖ Only (C) and (D) are correct

Question Number : 89 Question Id : 7877322849 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What is the power dissipated in the transistor if $I_B = 0.03$ mA, in the following circuit?



Options :

1. ✔ 6 mW

2. ✖ 5 mW

3. ✖ 4 mW

4. ✖ 3 mW

Question Number : 90 Question Id : 7877322850 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

When V_{GS} of JFET changes from –3.2 V to –3.1 V, the drain current changes from 1.1 mA to 1.4 mA. What is the value of transconductance?

Options :

1. ✖ 3000 $p\mho$

2. ✖ $3000\ m\mho$

3. ✖ $300\ \mu\mho$

4. ✔ $3000\ \mu\mho$

Question Number : 91 Question Id : 7877322851 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

With respect to BJT amplifiers, identify the correct statement(s).

(A) Maximum theoretical voltage gain is 1 for common collector amplifier

(B) Minimum theoretical current gain is 1 for common base amplifier

(C) There is a phase inversion from input to output for common emitter amplifier

(D) Input is at the base, output is at the emitter for common collector amplifier

Options :

1. ✖ (A), (B), (C) and (D) are correct

2. ✖ Only (A) and (B) are correct

3. ✔ Only (A), (C) and (D) are correct

4. ✖ Only (C) and (D) are correct

Question Number : 92 Question Id : 7877322852 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A necessary but not a sufficient criterion for oscillation, given by the Barkhausen stability criterion includes which of the following statement(s)?

(A) The magnitude of the gain (amplification) around the loop at oscillation frequency must be unity

(B) The phase shift around the loop at the oscillation frequency must be zero or a multiple of 2π radians (360°)

Options :

1. ✖ Neither (A) nor (B)

2. ✔ Both (A) and (B)

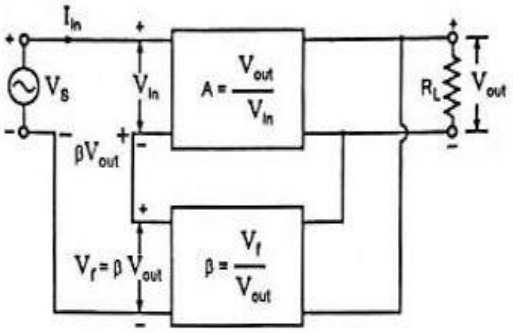
3. ✖ Only (A)

4. ✖ Only (B)

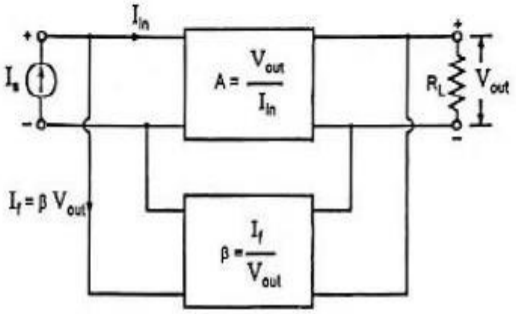
Question Number : 93 Question Id : 7877322853 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Identify the correct combination of feedback configurations using the Lists I and II.

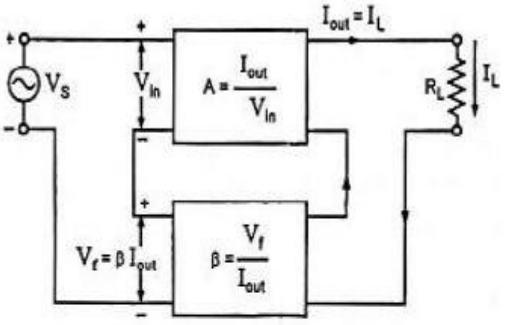
List – I (Configuration) List – II (Feedback)

(A) 

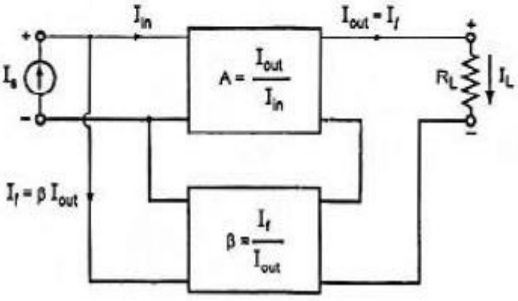
(I) Voltage Series

(B) 

(II) Voltage Shunt

(C) 

(III) Current Series

(D) 

(IV) Current Shunt

Options :

1. ✔ (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

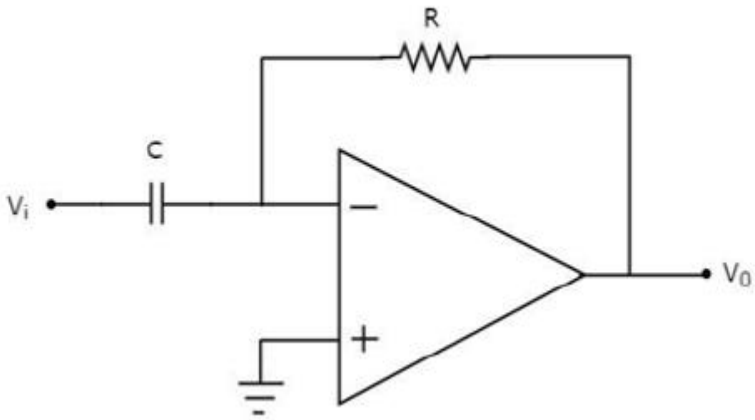
2. ✖ (A)-(II), (B)-(I), (C)-(III), (D)-(IV)

3. ✖ (A)-(I), (B)-(II), (C)-(IV), (D)-(III)

4. ✖ (A)-(IV), (B)-(I), (C)-(III), (D)-(II)

Question Number : 94 Question Id : 7877322854 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The circuit shown below acts as a/an



Options :

1. ✖ Integrator, with $V_0 = -\frac{1}{RC}\int \frac{dV_i}{dt}$

2. ✔ Differentiator, with $V_0 = -RC\frac{dV_i}{dt}$

3. ✖ Differentiator, with $V_0 = -\frac{1}{RC}\frac{dV_i}{dt}$

4. ✖ Integrator, with $V_0 = RC\int \frac{dV_i}{dt}$

Question Number : 95 Question Id : 7877322855 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The gain of the first order low pass filter

Options :

1. ✖ Increases at the rate 20dB/decade

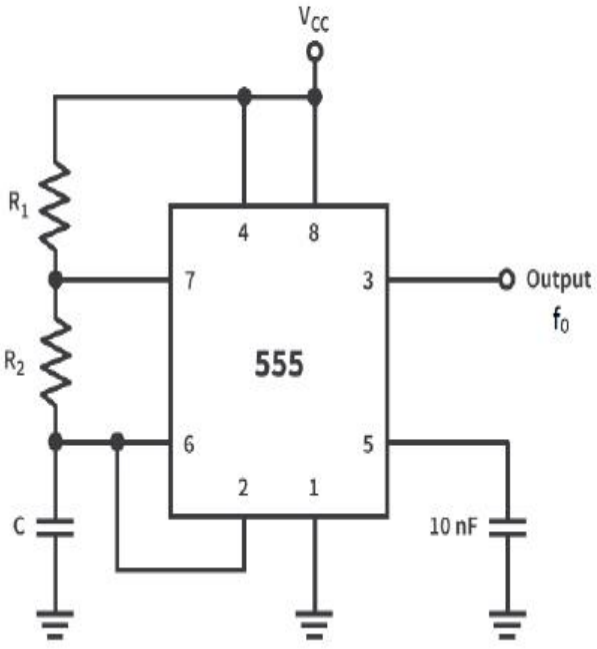
2. ✖ Increases at the rate 40dB/decade

3. ✔ Decreases at the rate 20dB/decade

4. ✖ Decreases at the rate 40dB/decade

Question Number : 96 Question Id : 7877322856 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Assuming that the following circuit is intended for IC 555 as an astable multivibrator, the frequency of oscillation of the free running output is given by



Options :

1. ✖ $f_0 = \frac{0.69}{(R_1+R_2)C}$

2. ✖ $f_0 = \frac{1.44}{(R_1+R_2)C}$

3. ✖ $f_0 = \frac{0.69}{(R_1+2R_2)C}$

4. ✔ $f_0 = \frac{1.44}{(R_1+2R_2)C}$

Question Number : 97 Question Id : 7877322857 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Choose the correct option based on the two statements given below.

Statement I: A voltage-controlled oscillator (VCO) is an electronic oscillator whose output frequency is proportional to its input voltage

Statement II: An oscillator produces a periodic AC signal, and in VCOs, the oscillation frequency is determined by voltage

Options :

1. ✖ Only Statement I is correct

2. ✖ Only Statement II is correct

3. ✔ Both Statements I and II are correct

4. ✖ Both Statements I and II are incorrect

Question Number : 98 Question Id : 7877322858 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

While designing a particular combinational circuit with P and Q as inputs, it is found that "$PQ = 0$" then "P XOR Q" is equal to

Options :

1. ✔ $P+Q$

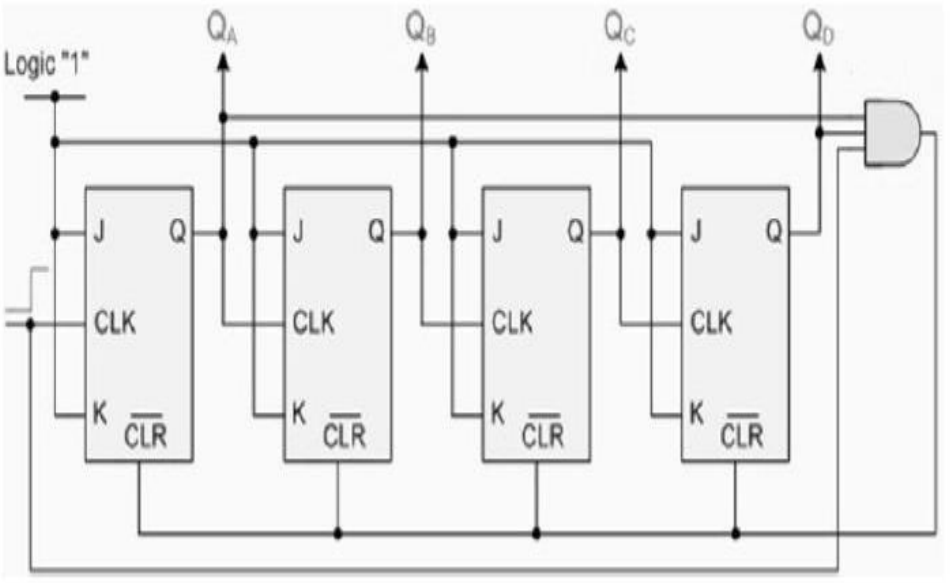
2. ✖ $P+\overline{Q}$

3. ✖ $\overline{P}+Q$

4. ✖ $\overline{P+Q}$

Question Number : 99 Question Id : 7877322859 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The sequential circuit made up of J-K flip-flops and NAND gate shown below behaves as a



Options :

1. ✔ Asynchronous decade counter

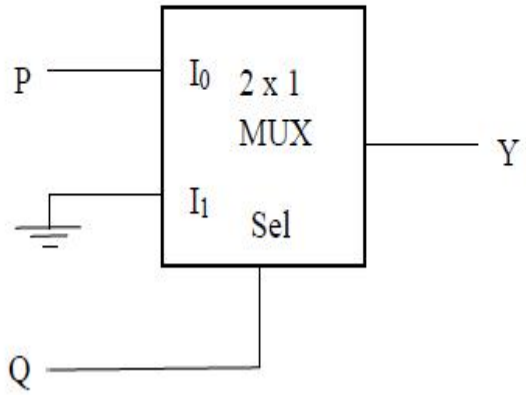
2. ✖ Synchronous decade counter

3. ✖ Asynchronous Mod-16 counter

4. ✖ Synchronous Mod-16 counter

Question Number : 100 Question Id : 7877322860 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In the circuit shown below, P and Q are the inputs. The logical function realized by the circuit shown below is



Options :

1. ✖ $Y = PQ$

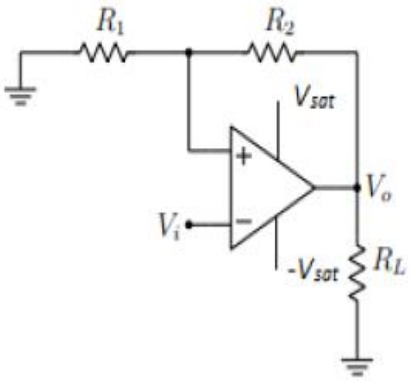
2. ✖ $Y = P + Q$

3. ✔ $Y = P\overline{Q}$

4. ✖ $Y = \overline{P} + \overline{Q}$

Question Number : 101 Question Id : 7877322861 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For the op-amp based inverting Schmitt trigger shown, the upper threshold voltage (V_{UT}) is given by



Options :

1. ✖ $\frac{R_1}{R_1+R_2}.(-V_{sat})$

2. ✔ $\frac{R_1}{R_1+R_2}.V_{sat}$

3. ✖ $\frac{R_2}{R_1+R_2}.V_{sat}$

4. ✖ $\frac{R_2}{R_1+R_2}.(-V_{sat})$

Question Number : 102 Question Id : 7877322862 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which among the following statement(s) is/are true for multivibrator(s)?

A. Bistable multivibrator is basically a flip-flop with no stable states to produce a single pulse neither HIGH nor LOW in value

B. One-shot multivibrators convert short sharp pulses into much wider ones for timing applications

C. A monostable multivibrator is a free running oscillator that has no permanent "meta" or "steady" state

D. Bistable multivibrators are best used in circuits such as Latches and Counters

Options :

1. ✖ (A), (B), (C) and (D) are correct

2. ✖ Only (A) and (B) are correct

3. ✖ (B), (C) and (D) are correct

4. ✔ Only (B) and (D) are correct

Question Number : 103 Question Id : 7877322863 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A simple sample and hold circuit consists of which of the following?

(A) Analog switch (B) Holding capacitor (C) Memristor (D) SCR

Options :

1. ✖ (B) and (D) only

2. ✖

(A) and (C) only

3. ✖ (B) and (C) only

4. ✔ (A) and (B) only

Question Number : 104 Question Id : 7877322864 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which among the following statements is not true for given A/D converters?

A. Flash ADC facilitates ultra-high speed data rates. However, it is large in size

B. No need for anti-aliasing filters in $\Delta - \Sigma$ ADC. However, the circuit is complex

C. SAR ADC gives high resolution and accuracy. However, the speed is limited

D. Parallelism in Pipeline ADC causes lower power consumption as well as latency

Options :

1. ✖ Only (A) and (B) are correct

2. ✔ (A), (B), (C) and (D) are correct

3. ✖ (B), (C) and (D) are correct

4. ✖ Only (C) and (D) are correct

Question Number : 105 Question Id : 7877322865 Display Question Number : Yes Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For an input code of 10110011, an 8-bit DAC produces 3.58 V. The same DAC produces 2 V as output for _____ input code?

Options :

1. ✖ 11100100

2. ✖ 01100101

3. ✖ 01100110

4. ✔ 01100100

Question Number : 106 Question Id : 7877322866 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The status of the microprocessor before/after an operation is shown by its flags. Thus, the correct representation of 8085 microprocessor flag register is

Options :

1. ✔

S	Z	x	AC	x	P	x	C

2. ✖

C	AC	F0	RS1	RS0	OV	-	P

3. ✖

x	x	x	x	OV	D	I	T	S	Z	x	AC	x	P	x	C

4. ✖

x	x	x	N	OV	Z	DC	C

Question Number : 107 Question Id : 7877322867 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What is the outcome of the following 8085 program?

```
LDA   9100H
MOV   C, A
LDA   9150H
STA   9100H
MOV   A, C
STA   9150H
HLT
```

Options :

1. ✖ The content of memory location 9100H gets subtracted with that of 9150H

2. ✖ The content of memory location 9100H gets added with that of 9150H

3. ✔ The contents of memory locations 9100H and 9150H get exchanged

4. ✖ No change in the memory locations 9100H and 9150H

Question Number : 108 Question Id : 7877322868 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

LVDT is

Options :

1. ✖ a capacitive transducer

2. ✖ a resistive transducer

3. ✔ an inductive transducer

4. ✖ a rotary transducer

Question Number : 109 Question Id : 7877322869 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Electronic device which is used as a voltage variable resistor is

Options :

1. ✖ TRIAC

2. ✖ BJT

3. ✖ UJT

4. ✔ JFET

Question Number : 110 Question Id : 7877322870 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Darlington pair has

Options :

1. ✖ low input impedance

2. ✔ high input impedance

3. ✖ high output impedance

4. ✖ low current gain

Question Number : 111 Question Id : 7877322871 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If 2, 3, 4 are the eigen values of A, then find the eigen values of adjA

Options :

1. ✖ 12, 8, 8

2. ✖ 12, 6, 6

3. ✔ 12, 8, 6

4. ✖ 12, 12, 6

Question Number : 112 Question Id : 7877322872 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For what values of λ, μ the following equations $x + y + z = 6, x + 2y + 3z = 10,$ $x + 2y + \lambda z = \mu$ have a unique solution.

Options :

1. ✖ $\lambda = 3, \forall\ \mu$

2. ✔ $\lambda \neq 3, \forall\ \mu$

3. ✖ $\lambda \neq 1, \forall\ \mu$

4. ✖ $\lambda = 1, \forall\ \mu$

Question Number : 113 Question Id : 7877322873 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of $\iint xy(x+y)\,dx\,dy$, where the region bounded by the parabolas $y = x^2$ and $y = x$

Options :

1. ✖ $\frac{7}{56}$

2. ✖

$\frac{5}{56}$

3. ✖ $\frac{1}{56}$

4. ✔ $\frac{3}{56}$

Question Number : 114 Question Id : 7877322874 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If $\bar{a}$ is a constant vector then, Curl $(\bar{r} \times \bar{a}) =$

Options :

1. ✔ $-2\,\bar{a}$

2. ✖ $2\,\bar{a}$

3. ✖ $-3\,\bar{a}$

4. ✖ $3\,\bar{a}$

Question Number : 115 Question Id : 7877322875 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of $(1+y^2)dx = (tan^{-1}y - x)dy$

Options :

1. ✖ $y = tan^{-1}x - 1 + C\,e^{-tan^{-1}x}$

2. ✔ $x = tan^{-1}y - 1 + C\,e^{-tan^{-1}y}$

3. ✖ $x = tan^{-1}y - 1 + C\,e^{tan^{-1}2y}$

4. ✖ $y = tan^{-1}x - 1 + C\,e^{tan^{-1}2x}$

Question Number : 116 Question Id : 7877322876 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of $x^2\frac{d^2y}{dx^2} + 3x\frac{dy}{dx} + y = 0$

Options :

1. ✖ $y = x[C_1 + C_2\,logx]$

2. ✖ $y = x\left[C_1 + C_2\,log\frac{1}{x}\right]$

3. ✖ $x = \frac{1}{y}[C_1 + C_2 \, logy]$

4. ✔ $y = \frac{1}{x}[C_1 + C_2 \, logx]$

Question Number : 117 Question Id : 7877322877 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of $\oint_C \frac{z+4}{z^2+2z+5} dz$, where $C : |z-2i| = \frac{3}{2}$ is

Options :

1. ✖ $\frac{\pi}{2}(3 - 2i)$

2. ✖ $\frac{\pi}{3}(3 + 2i)$

3. ✔ $\frac{\pi}{2}(3 + 2i)$

4. ✖ $\frac{\pi}{3}(3 - 2i)$

Question Number : 118 Question Id : 7877322878 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If $f(z) = \frac{1 - e^{2z}}{z^4}$, then the residue at z = 0 is

Options :

1. ✔ $-\frac{4}{3}$

2. ✖ $\frac{4}{3}$

3. ✖ $-\frac{2}{3}$

4. ✖ $\frac{2}{3}$

Question Number : 119 Question Id : 7877322879 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A fair coin is tossed till a head appears for the first time. The Probability that the number of required tosses is Odd, is

Options :

1. ✖ 1/3

2. ✔ 2/3

3. ✖ 3/4

4. ✖ 1/2

Question Number : 120 Question Id : 7877322880 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

When the Newton-Raphson method is applied to solve the equation $f(x) = x^4 - x - 10 = 0$, the solution at the end of the first iteration with the initial guess value as $x = 2$ is

Options :

1. ✖ 3.871

2. ✖ 2.871

3. ✔ 1.871

4. ✖ 0.871