

# 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.

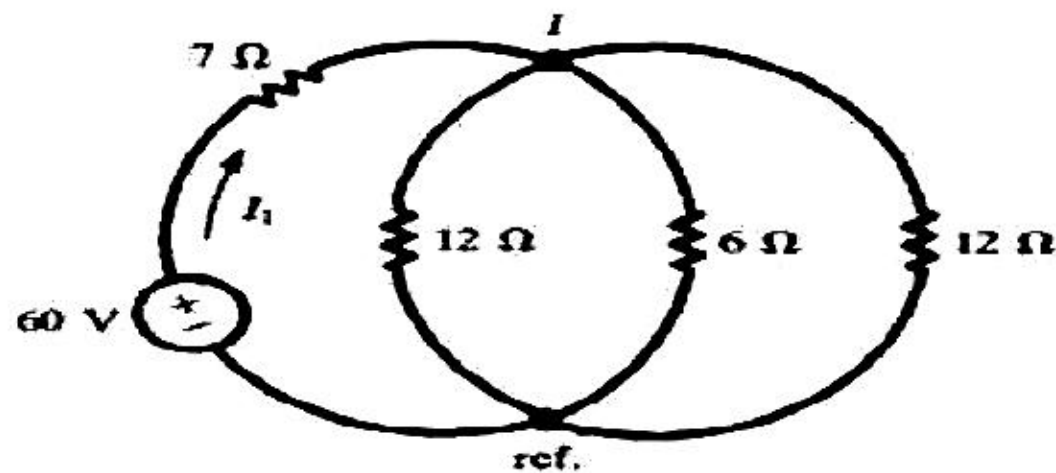
<b>Question Paper Name :</b>	Electrical Engineering 19th July 2022 Shift 2
<b>Duration :</b>	120
<b>Total Marks :</b>	120
<b>Display Marks:</b>	No
<b>Share Answer Key With Delivery Engine :</b>	Yes
<b>Calculator :</b>	None
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser Required? :</b>	No
<b>Scratch Pad Required? :</b>	No
<b>Rough Sketch/Notepad Required? :</b>	No
<b>Protractor Required? :</b>	No
<b>Show Watermark on Console? :</b>	Yes
<b>Highlighter :</b>	No
<b>Auto Save on Console?</b>	Yes
<b>Change Font Color :</b>	No
<b>Change Background Color :</b>	No
<b>Change Theme :</b>	No
<b>Help Button :</b>	No
<b>Show Reports :</b>	No
<b>Show Progress Bar :</b>	No
<b>Is this Group for Examiner? :</b>	No
<b>Examiner permission :</b>	Cant View
<b>Show Progress Bar? :</b>	No

## Electrical Engineering

Section Id :	90030015
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

Question Number : 1 Question Id : 9003001681 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 voltage at node 1 of the figure shown below is

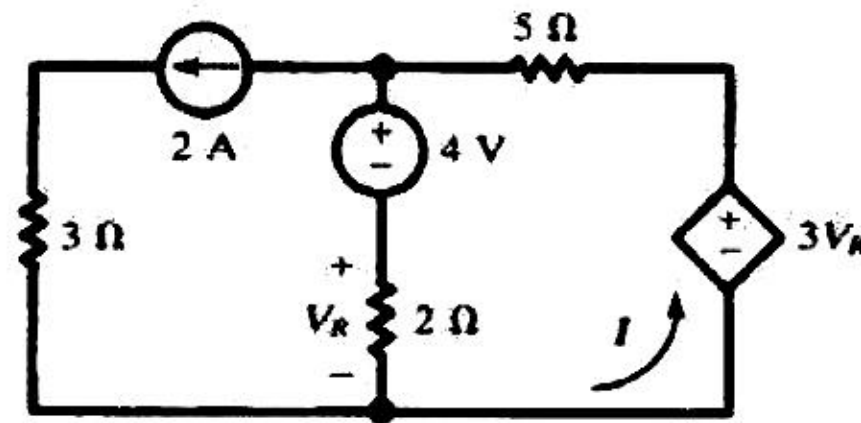


Options :

1. ✘ 9 V
2. ✔ 18 V
3. ✘ 6 V
4. ✘ 60 V

Question Number : 2 Question Id : 9003001682 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The current (I) flowing through the network given below is \_\_\_\_\_ Amps



Options :

1. ✘ 12
2. ✘ 2
3. ✘ -2
4. ✔ -12

Question Number : 3 Question Id : 9003001683 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Under no-load condition a dc generator has a terminal voltage of 120 V. When delivering its rated current of 40 A, the terminal voltage drops to 112 V. The Norton's current in amperes is

Options :

1. ✘ 40

- 2. ✘ 60
- 3. ✔ 600
- 4. ✘ 240

Question Number : 4 Question Id : 9003001684 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

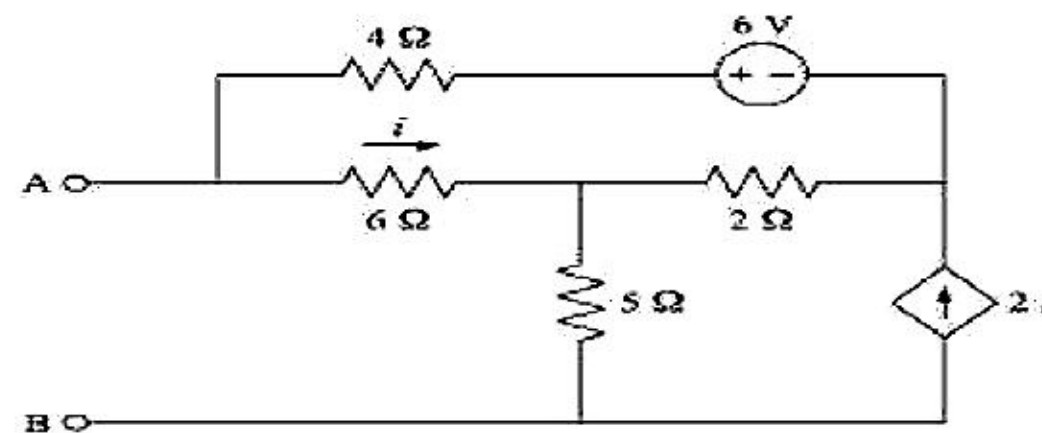
Which of the following statement is correct?

Options :

- 1. ✘ Superposition theorem is applicable for power calculations in a network.
- 2. ✘ Superposition theorem is not applicable for linear circuits
- 3. ✔ Superposition theorem is not applicable for power calculations in a network.
- 4. ✘ Thevenin's' theorem is dual of Tellegen's' theorem

Question Number : 5 Question Id : 9003001685 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Thevenin's voltage across A and B terminals of the figure shown below is \_\_\_ V



**Options :**

1. ✓ 12
2. ✗ 6
3. ✗ 0
4. ✗ 10

**Question Number : 6 Question Id : 9003001686 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The efficiency of a linear active network to deliver maximum power from source to load is

**Options :**

1. ✗ 75%
2. ✗ 25%
3. ✗ 100%
4. ✓ 50%

**Question Number : 7 Question Id : 9003001687 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A series R-L circuit has a constant voltage  $V$  applied at  $t = 0$ . At what time does  $v_R = v_L$ ?

**Options :**

1. ✗  $2(L/R) \ln 2$

2. ✓  $(L/R) \ln 2$
3. ✗  $(R/L) \ln 2$
4. ✗  $0.5 (R/L) \ln 2$

**Question Number : 8 Question Id : 9003001688 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a passive two port network, the open circuit impedance matrix is  $\begin{bmatrix} 2 & 1 \\ 1 & 8 \end{bmatrix} \Omega$ . If input port is

interchanged with the output port, then the open circuit impedance matrix will be

Options :

1. ✗  $\begin{bmatrix} 2 & 1 \\ 8 & 1 \end{bmatrix} \Omega$
2. ✓  $\begin{bmatrix} 8 & 1 \\ 1 & 2 \end{bmatrix} \Omega$
3. ✗  $\begin{bmatrix} 1 & 2 \\ 1 & 8 \end{bmatrix} \Omega$
4. ✗  $\begin{bmatrix} 1 & 1 \\ 2 & 8 \end{bmatrix} \Omega$

**Question Number : 9 Question Id : 9003001689 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The line to line input voltage to the 3-phase, 50 Hz, a.c circuit of star connected load of  $5 \angle 60^\circ \Omega$  is 200 V (r.m.s). The two wattmeters would read for phase sequence of RYB is

Options :

1. ✘  $W_1 = 1000 \text{ W}$  and  $W_2 = 1000 \text{ W}$
2. ✘  $W_1 = 886 \text{ W}$  and  $W_2 = 8860 \text{ W}$
3. ✘  $W_1 = 0 \text{ W}$  and  $W_2 = 1000 \text{ W}$
4. ✔  $W_1 = 0 \text{ W}$  and  $W_2 = 2000 \text{ W}$

**Question Number : 10 Question Id : 9003001690 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A 10 Amps current source, a closed switch, a resistance of  $R = 10 \Omega$  and an inductance of 5H are all connected across a supply of "V" volts. Suddenly, the switch is opened at  $t = 0$ , the first derivative of voltage at  $t = 0^+$  is

Options :

1. ✘ 50 V/Sec
2. ✘ - 50 V/Sec
3. ✘ 200 V/Sec
4. ✔ -200 V/Sec

**Question Number : 11 Question Id : 9003001691 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The ratio of cut off frequency ( $f_c$ ) of constant “k” low pass filter to constant “k” high pass filter is

**Options :**

1. ✘ 1:1
2. ✘ 1:2
3. ✔ 4:1
4. ✘ 1:4

**Question Number : 12 Question Id : 9003001692 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A Series R-L-C circuit has a resonant frequency of 60 Hz. If, all the component values are

halved, the new resonant frequency is \_\_\_\_\_ Hz

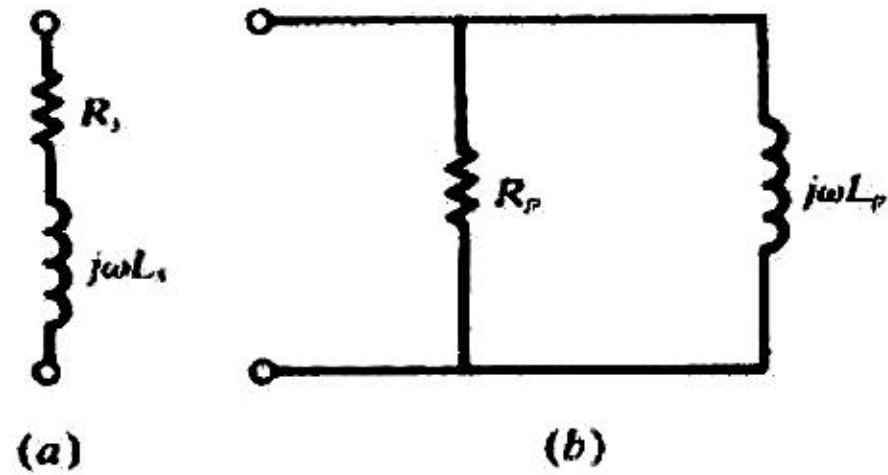
**Options :**

1. ✘ 60
2. ✔ 120
3. ✘ 30
4. ✘ 240

**Question Number : 13 Question Id : 9003001693 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**



A practical coil contains resistance as well as inductance and can be represented by either a Series or parallel circuit as shown in figure (a) and (b). The value of  $R_p$  in terms of  $R_s$  and  $L_s$



Options :

1. ✓  $R_s + \frac{(\omega L_s)^2}{R_s}$

2. ✗  $L_s + \frac{(\omega R_s)^2}{L_s}$

3. ✗  $R_s + \frac{R_s}{(\omega L_s)^2}$

4. ✗  $R_s + \frac{(\omega L_s)^2}{(R_s^2)}$

Question Number : 14 Question Id : 9003001694 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For a 4-node graph, with every node connected to every other node with exactly one branch,

the number of trees will be

Options :

1. ✗ 4

2. ✘ 64

3. ✔ 16

4. ✘ 32

**Question Number : 15 Question Id : 9003001695 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 a singly excited magnetic system?

**Options :**

1. ✔ Reluctance Motor

2. ✘ Loudspeaker

3. ✘ Tachometer

4. ✘ Synchronous machine

**Question Number : 16 Question Id : 9003001696 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The approximate values of armature current ( $I_a$ ) and speed (N) of a d.c shunt Motor would be \_\_\_\_\_ and \_\_\_\_\_ respectively, if the terminal voltage is halved, field current and power output are kept constant

**Options :**

1. ✘ halved; halved

2. ✘ doubled; doubled
3. ✔ doubled; halved
4. ✘ halved; constant

**Question Number : 17 Question Id : 9003001697 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 statement is false, with respect to the reactance voltage in a d.c machine?

**Options :**

1. ✘ is proportional to core length
2. ✔ can not be compensated by voltage commutation
3. ✘ causes delayed commutation
4. ✘ is proportional to armature current

**Question Number : 18 Question Id : 9003001698 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 1200 r.p.m while taking 25 Amps. Armature and series field resistances are  $0.7 \Omega$  and  $0.3 \Omega$  respectively. By neglecting saturation, the resistance that must be added to obtain rated torque at the time of starting is

**Options :**

1. ✘  $11 \Omega$

2. ✘  $9 \Omega$

3. ✘  $8 \Omega$

4. ✔  $7 \Omega$

**Question Number : 19 Question Id : 9003001699 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 D.C machine:

Part of D.C machine

P) Field pole core

Q) Commutator segments

R) Brushes

S) Field winding

Material used

a) Hard drawn copper

b) Copper

c) Cast Steel

d) Electro graphite

**Options :**

1. ✘ P ---- d; Q ----- c; R ---- a; S ----- b

2. ✘ P ---- c; Q ----- d; R ---- b; S -----a

3. ✘ P ---- d; Q ----- c; R ---- b; S -----a

4. ✓ P ---- c; Q ----- a; R ---- d; S ----- b

**Question Number : 20 Question Id : 9003001700 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a 3-phase Induction Motor, the starting current is six times the full load current to have starting torque equals to the full load torque, the corresponding slip is

**Options :**

1. ✓  $\frac{1}{36}$

2. ✗  $\frac{1}{6}$

3. ✗  $\frac{1}{25}$

4. ✗  $\frac{1}{64}$

**Question Number : 21 Question Id : 9003001701 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The power input to a 3-phase Induction Motor is 30 kW at a slip of 4%. By neglecting stator impedance, the torque developed in synchronous watts is

**Options :**

1. ✗ 30 kW

- 2. ✓ 28.8 kW
- 3. ✗ 31.2 kW
- 4. ✗ 32 kW

**Question Number : 22 Question Id : 9003001702 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the air gap length of a 3-phase Induction Motor is increased, the effect is

**Options :**

- 1. ✗ Reduction in the air gap flux
- 2. ✗ Improvement in power factor
- 3. ✗ Increase in the torque
- 4. ✓ Worsen the power factor

**Question Number : 23 Question Id : 9003001703 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Consider the following statements:

A) 3-phase Induction Motor running stably at lower speeds is called as Crawling

B) Crawling can be reduced by skewing

From the above statements, which is of the following is correct?

**Options :**

1. ✘ A and B are true
2. ✘ A and B are not true
3. ✘ A is not true, but B is true
4. ✔ A is true, but B is not true

**Question Number : 24 Question Id : 9003001704 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 the characteristic of the two value capacitor run 1-phase Induction Motor from the following?

P) High starting torque

Q) Better running power factor

R) Low efficiency

S) Less expensive

**Options :**

1. ✘ P, Q and R only
2. ✔ P and Q only
3. ✘ Q and R only
4. ✘ P, Q and S only

**Question Number : 25 Question Id : 9003001705 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Consider the following:

- A) Transformers with large turn's ratio, are tapped on the High Voltage winding
- B) Transformers with large turn's ratio, are tapped on the Low Voltage winding
- C) Tapping's on Low Voltage winding is difficult as it is placed next to the core
- D) Tapping's on High Voltage winding is to handle more currents

Which of the above are correct?

**Options :**

- 1. ✘ A and B only
- 2. ✘ B and C only
- 3. ✘ C and D only
- 4. ✔ A and C only

**Question Number : 26 Question Id : 9003001706 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 3- phase Transformer connection has oscillatory neutral problems?

**Options :**



1. ✘ Star – Delta
2. ✘ Delta –Star
3. ✔ Star- Star
4. ✘ Open Delta

**Question Number : 27 Question Id : 9003001707 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A transformer is operated at rated frequency but at a voltage higher than its rated value. The no-load current, hysteresis loss and eddy current loss would be respectively

**Options :**

1. ✘ Increases; Decreases; and Decreases
2. ✔ Increases; Increases and Increases
3. ✘ Decreases; Increases and Increases
4. ✘ Decreases; Increases and Decreases

**Question Number : 28 Question Id : 9003001708 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

When a voltage,  $v = 250 \sin 314t$  is applied to the transformer on no-load, the resulting current is,  $i = 2 \sin (314t - 60^\circ)$  amps. The core loss of the transformer is

**Options :**

1. ✘ 150 W
2. ✘ 500 W
3. ✔ 125 W
4. ✘ 250 W

**Question Number : 29 Question Id : 9003001709 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

“X” kVA rating of a 1-phase transformer of 2000 / 200 V is to be used as an auto transformer of

1100 kVA rating for stepping up the voltage from 2000 V to 2200 V. The value of “X” is

**Options :**

1. ✔ 100
2. ✘ 1100
3. ✘ 2000
4. ✘ 110

**Question Number : 30 Question Id : 9003001710 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a salient pole type synchronous machine, the reluctance torque will be maximum, if the torque angle is

Options :

1.   $45^{\circ}$
2.   $90^{\circ}$
3.  Slightly less than  $90^{\circ}$
4.  Slightly greater than  $90^{\circ}$

Question Number : 31 Question Id : 9003001711 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A synchronous machine is operating in a Motoring mode and the machine draws a leading power factor current, the armature reaction is

Options :

1.  Cross magnetizing
2.  Partly demagnetizing and partly cross magnetizing
3.  Partly magnetizing and partly cross magnetizing
4.  Demagnetizing

Question Number : 32 Question Id : 9003001712 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 with respect to synchronous machine?

Options :

1. ✘  $P_{sy}$  (synchronizing power coefficient) is inversely proportional to excitation voltage ( $E_f$ )
2. ✔  $P_{sy}$  is positive for stable operating region
3. ✘  $P_{sy}$  (synchronizing power coefficient) is proportional to  $X_s$  (Synchronous reactance)
4. ✘  $P_{sy}$  is negative for stable operating region

Question Number : 33 Question Id : 9003001713 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Zero Power Factor (ZPF) characteristic of an alternator is a plot between

Options :

1. ✘  $V_t$  (armature terminal voltage) Versus  $I_a$  (armature current) at constant field current and speed
2. ✘  $E_r$  (air gap voltage) Versus  $I_f$  (field current) at constant armature current and speed
3. ✔  $V_t$  (armature terminal voltage) Versus  $I_f$  (field current) at constant armature current and speed
4. ✘  $E_r$  (air gap voltage) Versus  $I_a$  (armature current) at constant field current and speed

Question Number : 34 Question Id : 9003001714 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 Motors are used in wrist watches?

Options :

1. ✓ Stepper Motor
2. ✗ Servo Motor
3. ✗ Shaded pole Motor
4. ✗ Universal Motor

Question Number : 35 Question Id : 9003001715 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:

<u>Bridge</u>	<u>Quantity of measurement</u>
L) Schering bridge	A) Frequency in the audio range
M) Wien bridge	B) Self inductance
N) Maxwell's bridge	C) Dielectric loss and power factor of a lossy capacitor
O) De sauty bridge	D) Capacitance

Options :

1. ✓ L - C; M - A; N - B; O - D

2. ✖ L - A; M - C; N - B; O - D
3. ✖ L - C; M - A; N - D; O - B
4. ✖ L - D; M - B; N - A; O - C

**Question Number : 36 Question Id : 9003001716 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In Moving Instruments, the error due to stray magnetic fields are minimized by shielding the working part of the instrument by

**Options :**

1. ✔ an iron case
2. ✖ copper case
3. ✖ an aluminum case
4. ✖ steel case

**Question Number : 37 Question Id : 9003001717 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Pickup wrong statement from the following?

**Options :**

1. ✔ Potential Transformer has large Volt- Ampere ratings

2. ✘ Potential Transformer is a step down Transformer
3. ✘ Current Transformer must never be operated on open circuit
4. ✘ Current Transformer is a step up Transformer

**Question Number : 38 Question Id : 9003001718 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In an electrodynamicometer type wattmeter

**Options :**

1. ✔ Current coil is fixed whereas pressure coil is movable
2. ✘ Current coil is movable whereas pressure coil is fixed
3. ✘ Both the coils are fixed
4. ✘ Both the coils are movable

**Question Number : 39 Question Id : 9003001719 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The function of the Schmitt trigger in a digital frequency meter is

**Options :**

1. ✘ Amplifying the sinusoidal waveforms

2. ✘ Providing time base
3. ✔ Converting the sinusoidal waveforms into rectangular pulses
4. ✘ Attenuating the sinusoidal waveforms

**Question Number : 40 Question Id : 9003001720 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a CRO, the horizontal amplifier is designed for

**Options :**

1. ✘ Low amplitude signals with a fast rise time
2. ✔ High amplitude signals with a slow rise time
3. ✘ High amplitude signals with a fast rise time
4. ✘ High frequency signals with a slow rise time

**Question Number : 41 Question Id : 9003001721 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

(With usual notations) when a synchronous motor is connected through inductive impedance under steady state conditions with constant  $E_f$ ,  $V_t$  and  $Z_s$ , the maximum power output is given by

**Options :**



1. ✓  $\frac{E_f V_t}{Z_s} - \frac{V_t^2}{Z_s^2} r_a$

2. ✗  $\frac{E_f V_t}{Z_s} - \frac{E_f^2}{Z_s^2} r_a$

3. ✗  $\frac{E_f V_t}{Z_s} + \frac{E_f^2}{Z_s^2} r_a$

4. ✗  $\frac{E_f V_t}{Z_s} + \frac{V_t^2}{Z_s^2} r_a$

Question Number : 42 Question Id : 9003001722 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:

<u>Nature of load</u>	<u>Angle between Armature m.m.f and field m.m.f</u>
(i) U.P.F	(L) $0^0$
(ii) Z.P.F lag	(M) $90^0$
(iii) Z.P.F lead	(N) $180^0$
(iv) Lagging p.f	(O) more than $90^0$

Options :

1. ✗ (i) - (N) ; (ii) - (L) ; (iii) - (M) ; (iv) - (O)

2. ✗ (i) - (N) ; (ii) - (L) ; (iii) - (O) ; (iv) - (M)

3. ✓ (i) – (M) ; (ii) – (N) ; (iii) – (L) ; (iv) - (O)

4. ✗ (i) – (N) ; (ii) – (M) ; (iii) – (O) ; (iv) - (L)

**Question Number : 43 Question Id : 9003001723 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Pitch factor of a 3-phase alternator having 36 stator slots, 4 poles and coil span of 1 to 8 is

**Options :**

1. ✗  $\cos 10^\circ$

2. ✓  $\cos 20^\circ$

3. ✗  $\cos 15^\circ$

4. ✗  $\cos 30^\circ$

**Question Number : 44 Question Id : 9003001724 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A cylindrical rotor synchronous generator having synchronous reactance of 1.2 p.u is running overexcited with  $E_f = 1.2$  p.u., is delivering a synchronous power of 0.5 to the bus. The stiffness of coupling is

**Options :**

1. ✗ 0.5

2. ✗ 1

3. ✓ 0.866

4. ✗ 0

**Question Number : 45 Question Id : 9003001725 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 statement is correct with respect to 3-phase synchronous motor?

- (i) Non-Self starting motor
- (ii) At the time of starting its field winding is open circuited
- (iii) Damper winding prevents hunting
- (iv) At synchronous speed damping torque is produced

**Options :**

1. ✗ (i) and (ii)

2. ✗ (ii) and (iii)

3. ✗ (ii) and (iv)

4. ✓ (i) and (iii)

**Question Number : 46 Question Id : 9003001726 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 representing doubly and singly excited magnetic systems respectively?

**Options :**

1. ✘ Solenoids and d.c shunt machines
2. ✔ Synchronous motors and reluctance motors
3. ✘ Tachometers and loud speakers
4. ✘ M.I instruments and synchronous motors

**Question Number : 47 Question Id : 9003001727 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For a two-phase servo motor which one of the following statements is not true?

**Options :**

1. ✘ The rotor diameter is small
2. ✔ The rotor resistance is low
3. ✘ The applied voltages are seldom balanced
4. ✘ The torque speed characteristics are linear

**Question Number : 48 Question Id : 9003001728 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A 400 V, 20 kW d.c shunt motor takes 2.5 A when running light. For an armature resistance of  $0.5\Omega$ , field resistance of  $800\Omega$  and brush drop of 2V, the total constant losses are

**Options :**

1. ✘ 794 W
2. ✘ 894 W
3. ✔ 994 W
4. ✘ 800 W

**Question Number : 49 Question Id : 9003001729 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 statement is correct with respect to speed control of d.c motors?

**Options :**

1. ✘ Field control method facilitates speed control below base speed
2. ✘ Field control method is suitable for constant torque drives
3. ✘ Armature resistance control method is more efficient than Ward Leonard method
4. ✔ Ward Leonard method is suitable for constant power drive

**Question Number : 50 Question Id : 9003001730 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The armature reaction m.m.f in a d.c machine makes

**Options :**

1.  An angle of  $90^0$  with the main pole axis and triangular in shape
2.  An angle of  $90^0$  with the main pole axis and trapezoidal in shape
3.  An angle of  $180^0$  with the main pole axis and trapezoidal in shape
4.  An angle of  $10^0$  with the main pole axis and triangular in shape

**Question Number : 51 Question Id : 9003001731 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The average pitch of a six pole wave wound d.c armature having 16 slots with 2 coil sides per slot. each coil has single turn is

**Options :**

1.  6
2.  11
3.  7
4.  5

**Question Number : 52 Question Id : 9003001732 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Identify the Incorrect statements from the following?

- i) A transformer can have zero voltage regulation at lagging power factor
- ii) A transformer can have zero voltage regulation at leading power factor
- iii) The resistance between primary and secondary windings of a transformer is Zero ohms.
- iv) The resistance between primary and secondary windings of a transformer is infinite ohms.

Options :

- 1. ✓ (i) and (iii)
- 2. ✗ (ii) and (iii)
- 3. ✗ (i) and (iv)
- 4. ✗ (ii) and (iv)

Question Number : 53 Question Id : 9003001733 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The core shape of a transformer is Cruciform to

Options :

- 1. ✗ Reduce copper material used for winding
- 2. ✓ Reduce core reluctance

3. ✖ Reduce core loss
4. ✖ Provide mechanical strength

**Question Number : 54 Question Id : 9003001734 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

To account for power system interconnections, a Y/  $\Delta$  connected 3-phase transformer has a phase shift of

**Options :**

1. ✖  $\pm 45^\circ$
2. ✖  $\pm 60^\circ$
3. ✔  $\pm 30^\circ$
4. ✖  $\pm 15^\circ$

**Question Number : 55 Question Id : 9003001735 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

When a 2-winding transformer is connected as an auto transformer with transformation ratio "k", the ratio of per unit full load losses as auto transformer to two winding transformer is

**Options :**



1. ✘  $\frac{1}{k}$

2. ✔  $1-k$

3. ✘  $\frac{1}{k+1}$

4. ✘  $\frac{1}{1-k}$

**Question Number : 56 Question Id : 9003001736 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The torque developed in synchronous watts, if the power input to a 3-phase Induction motor is 40 kW running at a slip of 5% is \_\_\_\_\_ (by neglecting stator losses)

**Options :**

1. ✘ 40 kW

2. ✘ 2 kW

3. ✘ 42 kW

4. ✔ 38 kW

**Question Number : 57 Question Id : 9003001737 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For a 2-value capacitor single phase Induction motor, at the time of starting the phase difference between main and auxiliary winding currents is

Options :

1. ✘  $45^{\circ}$
2. ✘  $90^{\circ}$
3. ✘  $30^{\circ}$
4. ✔  $> 90^{\circ}$

Question Number : 58 Question Id : 9003001738 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

When the supply voltage to a 3-phase squirrel cage Induction Motor (SCIM) is reduced by 20%, the maximum torque will be decreased by

Options :

1. ✘ 40%
2. ✘ 64%
3. ✔ 36%
4. ✘ 20%

Question Number : 59 Question Id : 9003001739 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, 4 pole, 50 Hz induction motor has a full load speed of 1440 r.p.m. The speed of rotor field with respect to rotor structure and stator structure respectively are

Options :

1.  60 and 1500 r.p.m
2.  Zero and 1500 r.p.m
3.  1440 and 60 r.p.m
4.  zero and 1400 r.p.m

Question Number : 60 Question Id : 9003001740 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

When the load on a 3-phase Induction Motor is decreased from Full load to No- load

Options :

1.  Both p.f and slip increases
2.  Both p.f and slip decreases
3.  p.f increases but slip decreases
4.  p.f decreases but slip increases

Question Number : 61 Question Id : 9003001741 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 Instruments are used as standard and transfer instruments?

Options :

1. ✘ Moving Iron type
2. ✘ Moving Coil type
3. ✘ Induction type
4. ✔ Electrodynamometer type

**Question Number : 62 Question Id : 9003001742 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 deflecting plates of CRO with phase difference of  $150^\circ$  between them. The Lissajous figure obtained is

Options :

1. ✘ Circle
2. ✘ Straight line
3. ✔ Ellipse
4. ✘ Parabola

**Question Number : 63 Question Id : 9003001743 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 correct with respect to M.I instruments?

- i) Repulsion type instruments are much more common than the attraction type
- ii) Attraction type instrument will usually have a more inductance than the corresponding repulsion instrument
- iii) Scale is uniform
- iv) For low voltage range, the power consumption is more

Options :

- 1. ✘ (i) and (ii)
- 2. ✔ (ii) and (iii)
- 3. ✘ (iii) and (iv)
- 4. ✘ (iv) and (i)

Question Number : 64 Question Id : 9003001744 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A circuit consisting of an unknown coil, a resistance and a variable capacitor connected in series is tuned to resonance using a Q- meter. If the frequency is  $\frac{400}{2\pi}$  kHz and the resonant capacitor is set at 200 pF, then the effective inductance of the unknown coil is

Options :

1.   $\frac{1}{32} H$

2.   $\frac{1}{64} H$

3.   $\frac{1}{16} H$

4.   $\frac{1}{8} H$

**Question Number : 65 Question Id : 9003001745 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a single phase M.I power factor meter, the controlling torque is provided by

**Options :**

1.  Gravity control

2.  Spring control

3.  No control is needed

4.  Stiffness of suspension

**Question Number : 66 Question Id : 9003001746 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 statement is correct?

**Options :**

1.  Owen's bridge is used for measurement of inductance in terms of capacitance
2.  Hay's bridge is used for measurement of inductance for low Q- coils
3.  Maxwell's Inductance capacitance bridge is used for measurement of inductance for high Q- coils
4.  Campbell's bridge measures inductance in terms of standard mutual inductance

**Question Number : 67 Question Id : 9003001747 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

How would 16.95 V be displayed on a 10 V range of  $4\frac{1}{2}$  digit Voltmeter?

**Options :**

1.  16.95
2.  16.950
3.  16.9500
4.  16.9

**Question Number : 68 Question Id : 9003001748 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The disc of an Energy meter makes 600 revolutions per unit of energy. When a 1kW load is connected, the disc rotates at 10.2 r.p.m. If the load is ON for 12 hours, how many units are recorded as error?

Options :

1.  0.24 (extra)
2.  0.24 (less)
3.  0.2 (extra)
4.  0.2 (less)

Question Number : 69 Question Id : 9003001749 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Pantograph collector is used where the vehicles run at \_\_\_\_\_ speeds and \_\_\_\_\_ currents are to be collected respectively in railways

Options :

1.  Low ; Small
2.  Low; Large
3.  High; Small
4.  High; Large

Question Number : 70 Question Id : 9003001750 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 factors will cause less specific energy consumption in the movement of electric train?



Options :

1. ✘ The distance between the stops is less
2. ✘ For a given scheduled speed, low values of acceleration and retardation
3. ✔ For a given scheduled speed, more values of acceleration and retardation
4. ✘ Steep gradient

Question Number : 71 Question Id : 9003001751 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For a D/A converter (DAC), if  $V_{fs}$  is the ideal full-scale output voltage and  $V_{ref}$  is the output reference voltage when all the digital inputs are all 1. Which among the following equations is valid?

Options :

1. ✔  $V_{fs} = V_{ref} \left(1 - \frac{1}{2^n}\right)$
2. ✘  $V_{fs} = V_{ref} \left(\frac{1}{2^n} - 1\right)$
3. ✘  $V_{ref} = V_{fs} \left(1 - \frac{1}{2^n}\right)$
4. ✘  $V_{ref} = V_{fs} \left(\frac{1}{2^n} - 1\right)$

**Question Number : 72 Question Id : 9003001752 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Match A/D converter (ADC) features in List I with the corresponding ADC types in List II

**List I**

(a) Simplest type of ADC

(b) Fastest ADC

(c) Slowest ADC

(d) Most widely used ADC

**List II**

(i) Flash - type ADC

(ii) Dual - Slope type ADC

(iii) Counter - type ADC

(iv) Successive - Approximation type ADC

Choose the correct answer from the options given below:

**Options :**

1. ✓ (a) - (iii), (b) - (i), (c) - (ii), (d) - (iv)

2. ✗ (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)

3. ✗ (a) - (iv), (b) - (ii), (c) - (iii), (d) - (i)

4. ✗ (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

**Question Number : 73 Question Id : 9003001753 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $X(z) = z + 1 - 2z^{-1}$ , the inverse z-transform of  $X(z)$  will be

**Options :**

1. ✗  $x[n] = d[n - 1] + d[n] + 2 d[n - 1]$

2. ✘  $x[n] = d[n - 1] + d[n] - 2d[n + 1]$

3. ✘  $x[n] = d[n + 1] + d[n] + 2d[n + 1]$

4. ✔  $x[n] = d[n + 1] + d[n] - 2d[n - 1]$

**Question Number : 74 Question Id : 9003001754 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

After execution of the following 8085 microprocessor program, the content of the register "A" is

MVI A, 55 h

MVI C, 35 h

ADD C

DAA

**Options :**

1. ✘ 22 h

2. ✘ 50 h

3. ✔ 90 h

4. ✘ 7Ah

**Question Number : 75 Question Id : 9003001755 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Following are the flags in the flag register of 8085 microprocessor.

- (a) Parity flag                      (b) Carry flag                      (c) Zero flag                      (d) Sign flag

Arrange them in the ascending order starting from LSB to MSB.

Options :

1. ✘ (c), (a), (b), (d)
2. ✘ (b), (d), (c), (a)
3. ✔ (b), (a), (c), (d)
4. ✘ (a), (c), (b), (d)

Question Number : 76 Question Id : 9003001756 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Following statements are given for Laplace transforms:

$$(a) L[x(t)] = \int_{-\infty}^{\infty} x(t)e^{st} dt$$

$$(b) L[x(t)] = \int_{-\infty}^{\infty} x(t)e^{-st} dt$$

$$(c) L[te^{-at}u(t)] = \frac{1}{(s+a)^2}$$

$$(d) L[te^{-at}u(t)] = \frac{1}{(s-a)^2}$$

Out of the above, the following is the correct answer:

Options :

1. ✘ (a) and (c) are correct
2. ✔ (b) and (c) are correct

3. ✘ (a) and (d) are correct

4. ✘ (b) and (d) are correct

**Question Number : 77 Question Id : 9003001757 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For the signal,  $x(n) = \left(\frac{1}{2}\right)^n u(n) + \left(\frac{1}{3}\right)^n u(n)$ , Z transforms and ROC are given below.

(a)  $Z[x(n)] = \frac{z}{z-\frac{1}{2}} + \frac{z}{z-\frac{1}{3}}$

(b) ROC:  $|z| > \frac{1}{2}$  and  $|z| > \frac{1}{3}$

(c)  $Z[x(n)] = \frac{z}{z+\frac{1}{2}} + \frac{z}{z+\frac{1}{3}}$

(d) ROC:  $|z| < \frac{1}{2}$  and  $|z| < \frac{1}{3}$

Out of the above given statements which are correct?

**Options :**

1. ✘ (b) and (c) are correct

2. ✔ (a) and (b) are correct

3. ✘ (c) and (d) are correct

4. ✘ (a) and (d) are correct

**Question Number : 78 Question Id : 9003001758 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If differential amplifier has a differential gain of 20,000. CMRR = 80 dB, then common mode gain is

Options :

- 1. ✓ 2
- 2. ✗ 1
- 3. ✗  $\frac{1}{2}$
- 4. ✗ 0

Question Number : 79 Question Id : 9003001759 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 comes under the class of combinational logic circuits?

- I. Full Adder                      II. Full Subtractor                      III. Counter                      IV. Multiplexer

Options :

- 1. ✗ I and II are correct.
- 2. ✓ I, II and IV are correct.
- 3. ✗ II, III and IV are correct.
- 4. ✗ I, III and IV are correct.

Question Number : 80 Question Id : 9003001760 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 correct?

1. Race around condition occurs in a JK flip-flop when both the inputs are one.
2. A flip-flop is used to store one bit of information.
3. A transparent latch consists of D-type flip-flop.
4. Master-Slave configuration is used in flip-flop to store two bits of information.

Options :

1. ✓ 1, 2 and 3 only
2. ✗ 1, 3 and 4 only
3. ✗ 1, 2 and 4 only
4. ✗ 2, 3 and 4 only

Question Number : 81 Question Id : 9003001761 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Match standard IC numbers in List I with their corresponding functionality in List II

**List – I**

**List – II**

- |          |                                 |
|----------|---------------------------------|
| a. 74148 | i. Digital Multiplexer          |
| b. 7490  | ii. Demultiplexer               |
| c. 74155 | iii. 8-to3 bit Priority Encoder |
| d. 74151 | iv. Decade Counter              |

Options :

1. ✓ a-iii; b-iv; c-ii; d-i

- 2. ✘ a-i; b-ii; c-iii; d-iv
- 3. ✘ a-ii; b-iii; c-iv; d-i
- 4. ✘ a-iii; b-i; c-ii; d-iv

**Question Number : 82 Question Id : 9003001762 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Regarding an Op-Amp:

- 1. All types of negative feedback reduce nonlinear distortion.
- 2. All types of negative feedback reduce the output offset voltage.
- 3. Non-inverting (current and voltage) feedback increases the input impedance.
- 4. Inverting (current and voltage) feedback decreases input impedance.

Options :

- 1. ✘ 1 only
- 2. ✘ 2 and 3 only
- 3. ✘ 2 and 4 only
- 4. ✔ 1, 2, 3 and 4

**Question Number : 83 Question Id : 9003001763 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**



A digital multiplexer can be used for

A. Parallel-to-serial conversion

B. Many-to-one switch

C. To generate memory chip select

D. for code conversion

Options :

1. ✘ A, C and D only

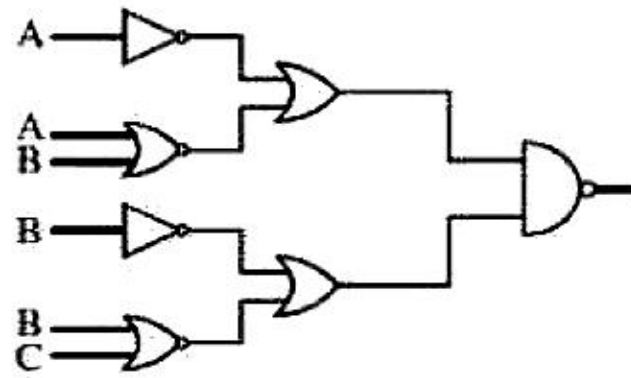
2. ✘ B, C and D only

3. ✔ A and B only

4. ✘ B and C only

Question Number : 84 Question Id : 9003001764 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The output of the circuit is given by



Options :

1. ✘  $A + C$

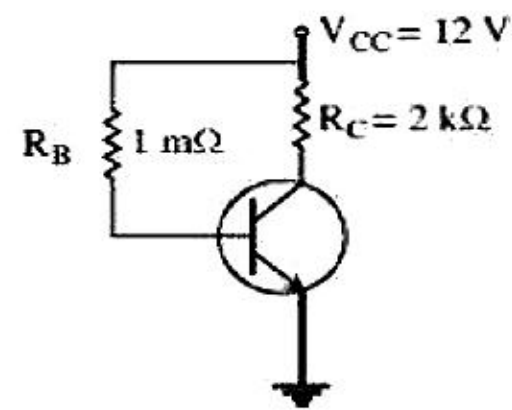
2. ✘  $B + C$

3. ✔  $A + B$

4. ✘  $A + \bar{C}$

**Question Number : 85 Question Id : 9003001765 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a circuit shown below, the base current is



**Options :**

1. ✘  $12 \mu\text{A}$

2. ✔  $11.3 \mu\text{A}$

3. ✘  $6 \mu\text{A}$

4. ✘  $0.7 \mu\text{A}$

**Question Number : 86 Question Id : 9003001766 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The simplified Boolean expression for the following K-map to find  $F(A,B,C,D)$  in SOP:

AB \ CD	00	01	11	10
00	0	0	1	0
01	1	1	1	0
10	0	1	1	1
11	0	1	0	0

Options :

1. ✓  $BD + \overline{A}B\overline{C} + \overline{A}C\overline{D} + A\overline{C}\overline{D} + ABC$
2. ✗  $BD + \overline{A}B\overline{D} + \overline{A}\overline{C}\overline{D} + A\overline{C}\overline{D}$
3. ✗  $\overline{A}B\overline{D} + \overline{A}\overline{C}\overline{D} + A\overline{C}\overline{D} + ABD$
4. ✗  $\overline{A}B\overline{C} + \overline{A}\overline{C}\overline{D} + A\overline{C}\overline{D} + ABC$

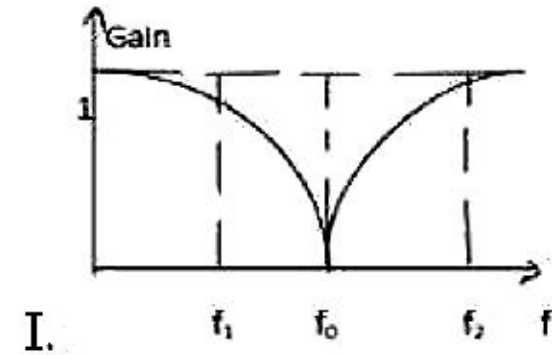
Question Number : 87 Question Id : 9003001767 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Match filters in List I with their corresponding frequency response in List II

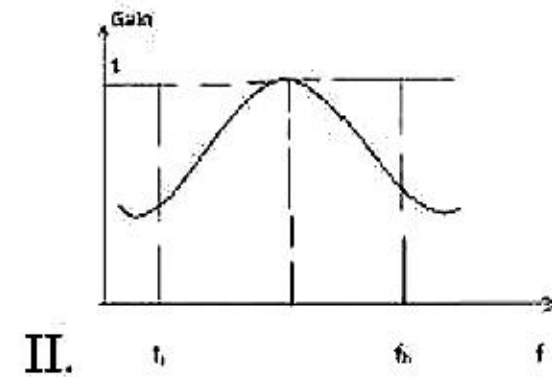
**List I**  
**(Filters)**

**List II**  
**(Frequency Response)**

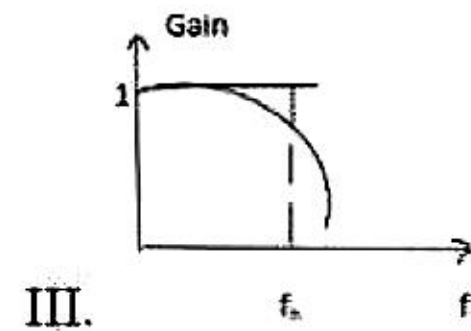
A. Low Pass Filter



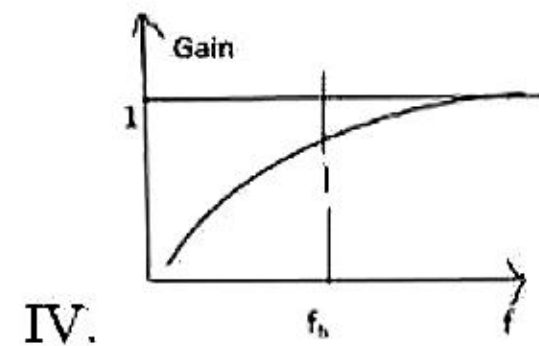
B. High Pass Filter



C. Band Pass Filter



D. Band Stop/Reject Filter



Options :

1. ✘ A - II, B - I, C - IV, D - III

2. ✘ A - II, B - III, C - IV, D - I
3. ✘ A - III, B - IV, C - I, D - II
4. ✔ A - III, B - IV, C - II, D - I

Question Number : 88 Question Id : 9003001768 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Match signals in List I with their corresponding Laplace transforms in List II

**List I**

**List II**

$(f(t))$

$(F(S))$

A.  $e^{-at}$

I.  $\frac{s}{s^2+\omega^2}$

B.  $te^{at}$

II.  $\frac{\omega}{s^2+\omega^2}$

C.  $\sin \omega t$

III.  $\frac{1}{(s-a)^2}$

D.  $\cos \omega t$

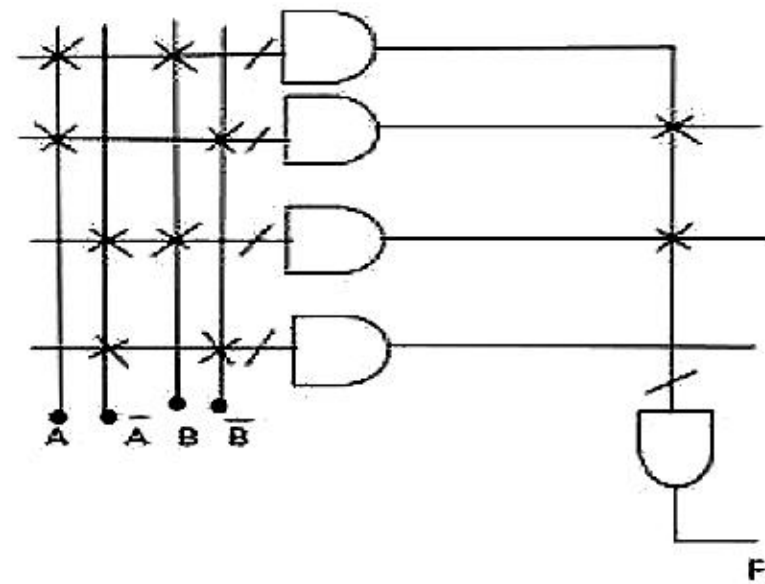
IV.  $\frac{1}{s+a}$

**Options :**

1. ✘ A - I, B - II, C - IV, D - III
2. ✘ A - III, B - II, C - I, D - IV
3. ✘ A - IV, B - III, C - I, D - II
4. ✔ A - IV, B - III, C - II, D - I

Question Number : 89 Question Id : 9003001769 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Determine the output of the logic array given in the following figure. The Xs represent connected link.



Options :

1. ✖  $\overline{A}B + \overline{A}\overline{B}$
2. ✖  $AB + \overline{A}\overline{B}$
3. ✔ 0
4. ✖ 1

Question Number : 90 Question Id : 9003001770 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Match logic gates in List I with their corresponding truth table in List II

List I  
(Logic Gate)

List II  
(Truth Table)

A. Negative OR

I.

X	Y	F
0	0	1
0	1	0
1	0	0
1	1	0

B. Exclusive NOR

II.

X	Y	F
0	0	1
0	1	1
1	0	1
1	1	0

C. Exclusive OR

III.

X	Y	F
0	0	1
0	1	0
1	0	0
1	1	1

D. Negative AND

IV.

X	Y	F
0	0	0
0	1	1
1	0	1
1	1	0

**Options :**

1. ✘ A - I, B - III, C - IV, D - II
2. ✘ A - I, B - IV, C - III, D - II
3. ✔ A - II, B - III, C - IV, D - I
4. ✘ A - IV, B - I, C - II, D - III

**Question Number : 91 Question Id : 9003001771 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Select a device which is suitable for lower-power and high frequency converter

**Options :**

1. ✘ BJT
2. ✔ MOSFET
3. ✘ IGBT
4. ✘ Thyristor

**Question Number : 92 Question Id : 9003001772 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**



Choose the suitable statements for IGBT

i) lower gate drive requirement

ii) higher switching losses

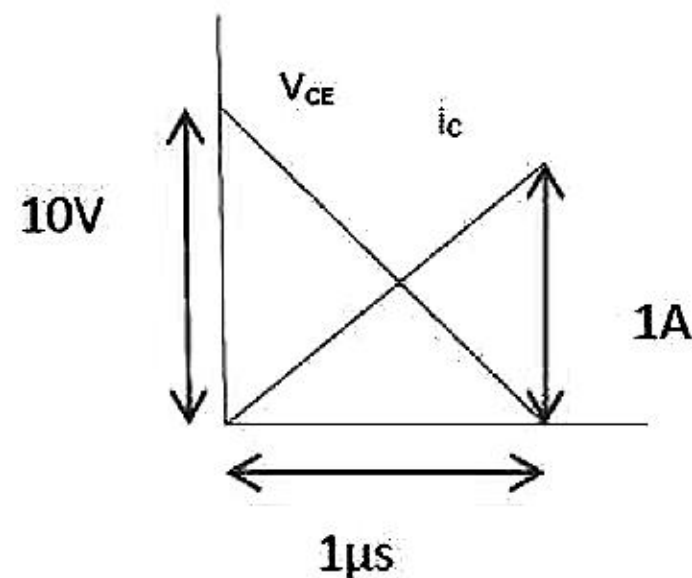
iii) smaller snubber circuit parameters

Options :

1. ✘ i and ii
2. ✘ ii and iii
3. ✔ i and iii
4. ✘ i, ii and iii

Question Number : 93 Question Id : 9003001773 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For the switching waveform of power transistor is shown below. The peak instantaneous power loss in watts is



Options :

1. ✘ 250
2. ✔ 2.5
3. ✘ 500
4. ✘ 5

**Question Number : 94 Question Id : 9003001774 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A Thyristor operating from a peak supply voltage of 200V has the following specifications:

Repetitive peak current  $I_p = 200A$ ,  $(di/dt)_{max} = 40 A/\mu s$ , Factor of safety = 2, calculate the value of inductance to be kept in series the thyristor to limit di/dt value beyond specified values

**Options :**

1. ✘ 25  $\mu H$
2. ✘ 5  $\mu H$
3. ✔ 10  $\mu H$
4. ✘ 50  $\mu H$

**Question Number : 95 Question Id : 9003001775 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Hard firing of thyristor results

Options :

1.  decreases turn on time and enhances di/dt capability
2.  increases turn on time and reduces di/dt capability
3.  decreases turn on time and reduces di/dt capability
4.  increases turn on time and enhances di/dt capability

Question Number : 96 Question Id : 9003001776 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For a three phase six pulse converter the ratio of average output voltage to the maximum value of line voltage for  $\alpha=0^\circ$

Options :

1.   $\frac{3\sqrt{2}}{\pi}$
2.   $\frac{3}{\pi}$
3.   $\frac{3\sqrt{3}}{2\pi}$
4.   $\frac{3\sqrt{3}}{\pi}$

**Question Number : 97 Question Id : 9003001777 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a single phase full converter ,if the load current is 10A and ripple free, the r.m.s source current is

**Options :**

1. ✘ 5 A
2. ✘ 20A
3. ✘ 40A
4. ✔ 10A

**Question Number : 98 Question Id : 9003001778 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 phase controlled converter feeding RLE load , extinction angle depends on

**Options :**

1. ✘ load emf E only
2. ✘ Firing angle  $\alpha$  only
3. ✘ load impedance and firing angle  $\alpha$
4. ✔ load emf E, firing angle  $\alpha$  and load impedance angle  $\phi$

Question Number : 99 Question Id : 9003001779 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Power factor of a three phase full converter is

Options :

1. ✘  $\frac{\sqrt{3}\cos\alpha}{\pi}$

2. ✘  $\frac{3\sqrt{3}\cos\alpha}{\pi}$

3. ✔  $\frac{3\cos\alpha}{\pi}$

4. ✘  $\frac{\pi\cos\alpha}{3}$

Question Number : 100 Question Id : 9003001780 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The ripple factor of voltage for a step down chopper with duty cycle  $\alpha=0.9$  is

Options :

1. ✘  $1/9$

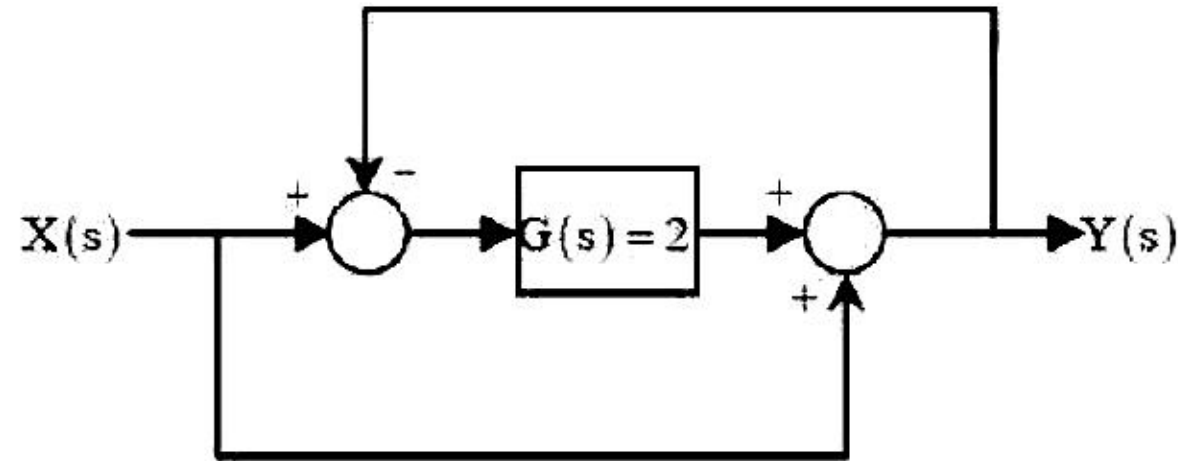
2. ✘  $9$

3. ✔  $1/3$

4. ✘  $3$

Question Number : 101 Question Id : 9003001781 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For the system shown in the figure,  $Y(s) / X(s) =$  \_\_\_\_\_.



Options :

1. ✘ 1
2. ✘ 2
3. ✘ 3
4. ✔ 4

Question Number : 102 Question Id : 9003001782 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Given the  $G(s)H(s) = K/s(s+1)(s+3)$ , the point of intersection of the asymptotes of the root

loci with the real axis is

Options :

1. ✘ -4

2. ✘ 1.33

3. ✔ -1.33

4. ✘ 4

**Question Number : 103 Question Id : 9003001783 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In the Bode-plot of a unity feedback control system, the value of phase of  $G(j\omega)$  at the gain cross over frequency is  $-125^\circ$ . The phase margin of the system is

**Options :**

1. ✘  $-125^\circ$

2. ✘  $-55^\circ$

3. ✔  $55^\circ$

4. ✘  $125^\circ$

**Question Number : 104 Question Id : 9003001784 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The open-loop transfer function of a plant is given as  $G(s)=1/s^2-1$ . If the plant is operated in a unity feedback configuration, then the lead compensator that can stabilize this control system is

**Options :**

1. ✘  $G(s)=10(s-1)/s+2$

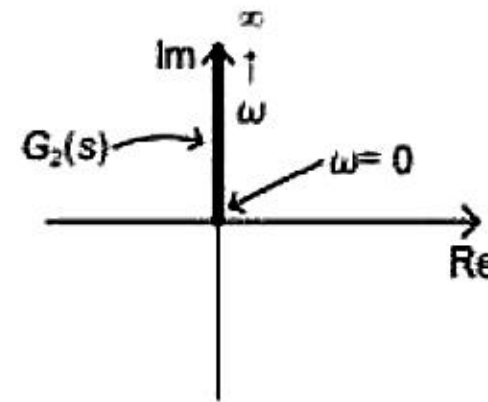
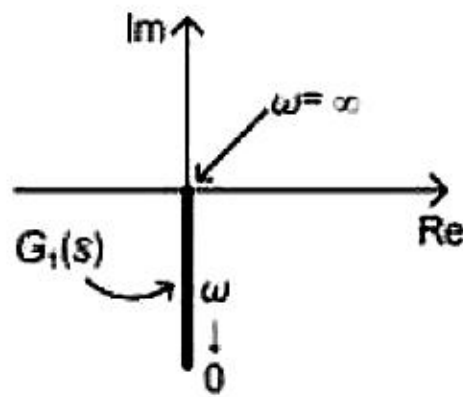
2. ✘  $G(s)=10(s+4)/s+2$

3. ✔  $G(s)=10(s+2)/s+10$

4. ✘  $G(s)=2(s+2)/s+10$

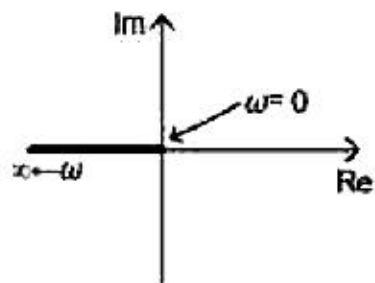
**Question Number : 105 Question Id : 9003001785 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Nyquist plot of two functions  $G_1(S)$  and  $G_2(S)$  are shown in figure.



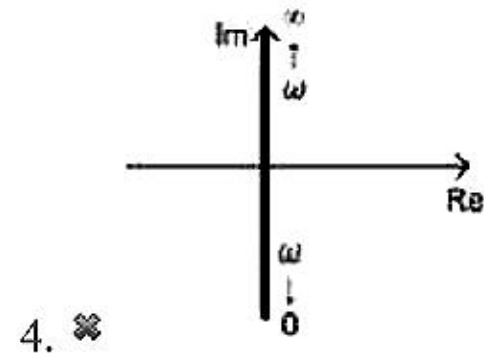
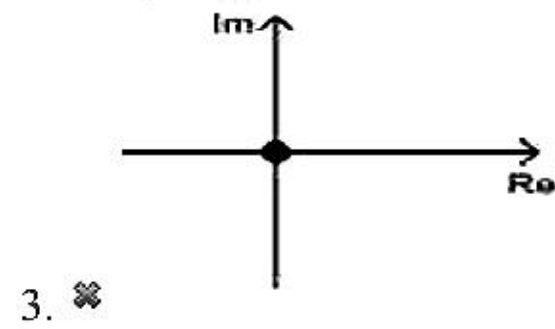
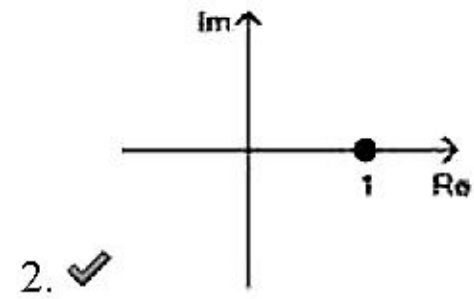
Nyquist plot of the product of  $G_1 (s)$  and  $G_2(s)$  is

Options :



1. ✘





Question Number : 106 Question Id : 9003001786 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Bundled conductors in EHV transmission systems provide

Options :

- 1. ✓ Increased line reactance
- 2. ✗ Reduced line capacitance
- 3. ✗ Reduced voltage gradient
- 4. ✗ Increased corona loss

**Question Number : 107 Question Id : 9003001787 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A list of relays and the power system components protected by the release are given in Group 1 and Group 2 respectively. Choose the correct match from the four choice given below

**Group 1**

P: Distance relay

Q: Under frequency relay

R: Differential relay

S: Buchholz relay

**Group 2**

1. Transformer

2. Turbine

3. Busbar

4. Shunt Capacitor

5. Alternator

6. Transmission lines

**Options :**

1. ✓ P-6, Q-5, R-3, S-1

2. ✗ P-4, Q-3, R-2, S-1

3. ✗ P-5, Q-2, R-1, S-6

4. ✗ P-6, Q-4, R-5, S-3

**Question Number : 108 Question Id : 9003001788 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The fuel cost characteristics of two generators are obtained as under

$$F_{c1}(P_{i1}) = 1000 + 50P_{i1} + 0.01P_{i1}^2 \text{ unit of cost per hour}$$

$$F_{c2}(P_{i2}) = 2500 + 45P_{i2} + 0.01P_{i2}^2 \text{ unit of cost per hour}$$

If the total load supplied is 1000MW. What are the approximate values of  $P_{i1}$  and  $P_{i2}$

Options :

1. ✘ 136.33 MW, 863.66 MW
2. ✔ 166.33 MW, 833.66 MW
3. ✘ 256.33 MW, 743.66 MW
4. ✘ 456.33 MW, 543.66 MW

Question Number : 109 Question Id : 9003001789 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The ratio error of a current transformer is due to

Options :

1. ✘ Lagging power factor
2. ✔ Exciting current
3. ✘ Stray magnetism
4. ✘ Corona effects

**Question Number : 110 Question Id : 9003001790 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

..... is the ability of power system to maintain synchronism between machines with the system and external tie- line, for small and slow normal load fluctuations

**Options :**

1.  Dynamic stability
2.  Steady state stability
3.  Transient stability
4.  Voltage stability

**Question Number : 111 Question Id : 9003001791 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 a and b the equations  $x+2y+3z = 6$ ,  $x+3y+5z = 9$ ,  $2x+5y+az = b$  has a unique solution

**Options :**

1.   $a \neq 8, b \neq 15$
2.   $a = 8, b \neq 15$
3.   $a = 8, b = 15$
4.   $a \neq 8, b = 15$

Question Number : 112 Question Id : 9003001792 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Eigen values of the matrix  $\begin{bmatrix} 0 & -2 & -2 \\ -1 & 1 & 2 \\ -1 & -1 & 2 \end{bmatrix}$  are

Options :

1. ✖ 0, 1, 2

2. ✖ 1, 2, -3

3. ✔ -1, 2, 2

4. ✖ 3, 0, 0

Question Number : 113 Question Id : 9003001793 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $f(x, y) = x^3 + y^3 - 3axy$ , then the stationary points are

Options :

1. ✔ (0, 0), (a, a)

2. ✖ (0, a), (a, a)

3. ✖ (0, 0), (-a, -a)

4. ✖ (0, 0)

Question Number : 114 Question Id : 9003001794 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Value of normal vector to the surface  $\Phi = xy^2 + yz^3$  at the point (2, -1, 1)

Options :

1. ✘  $i - 3j - 2k$
2. ✔  $i - 3j - 3k$
3. ✘  $i + 3j - 3k$
4. ✘  $8i - j - 10k$

Question Number : 115 Question Id : 9003001795 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

General Solution of  $\frac{d^2y}{dx^2} - 81y = 0$

Options :

1. ✘  $y = C_1 \cos 9x + C_2 \sin 9x$
2. ✘  $y = C_1 \cos 9x - C_2 \sin 9x$
3. ✔  $y = C_1 e^{9x} + C_2 e^{-9x}$
4. ✘  $y = C_1 e^{9x} - C_2 e^{-9x}$

Question Number : 116 Question Id : 9003001796 Display Question Number : Yes Is Question Mandatory : No Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

General Solution of  $4xyz = pq + 2px^2y + 2qxy^2$

Options :

1. ✖  $z = ax^2 + by^2$
2. ✖  $z = ax^2 - by^2$
3. ✔  $z = ax^2 + by^2 + a b$
4. ✖  $z = ax^2 + by^2 - ab$

Question Number : 117 Question Id : 9003001797 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Let  $f(z) = \frac{e^{3z}}{(z-1)(z-2)}$ , and  $C: |z|=3$ . The value of  $\int_C f(z)dz$  is

Options :

1. ✔  $2\pi i (e^6 - e^3)$
2. ✖  $-2\pi i (e^6 + e^3)$
3. ✖  $\pi i (e^6 - e^3)$
4. ✖  $-2\pi i (e^6 - e^3)$

Question Number : 118 Question Id : 9003001798 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $f(z) = \frac{-e^{2z}}{(z-1)^3}$ , then the Residue at  $z = 1$  is

Options :

1. ✘  $-\pi e^4$
2. ✔  $-2e^2$
3. ✘  $-2\pi i e^4$
4. ✘  $-e^2$

Question Number : 119 Question Id : 9003001799 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A box I contains eleven cards numbered 1 to 11, box II contains seven cards numbered 1 to 7.

A box is selected at random and a card is drawn. If the number is even, find the probability that the card is from box I

Options :

1. ✔  $35/68$
2. ✘  $-35/68$
3. ✘  $1/11$
4. ✘  $1/7$



Question Number : 120 Question Id : 9003001800 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Regula false formula for  $a < b$  is

Options :

1. ✓  $\frac{af(b)-bf(a)}{f(b)-f(a)}$

2. ✗  $\frac{f(b)-f(a)}{af(b)-bf(a)}$

3. ✗  $\frac{bf(b)-af(a)}{f(b)-f(a)}$

4. ✗  $\frac{af(b)+bf(a)}{f(b)-f(a)}$