

International Advanced Research Centre for Powder Metallurgy and New Materials ARCI

Notations :

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

SRF JRF Electrical Engineering

PART A

Question Number : 1 Question Id : 8616631401 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Let $f(x)$ and $g(x)$ be differentiable functions such that $f'(x) = g(x)$ and $g'(x) = f(x)$.
If $f(3) = 10$ and $f'(3) = 9$, then the value of $[f(2025)]^2 - [g(2025)]^2$ is _____

Options :

1. ✓ $f(3) + f'(3)$

2. ✗ $f(3) - f'(3)$

3. ✗ $f'(3) - f(3)$

4. ✗ 0

Question Number : 2 Question Id : 8616631402 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Let A be a 3×3 matrix. If $\begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}$ are eigenvectors of A corresponding to the eigenvalues $-2, -2, 4$, respectively, then the matrix A^2 is _____

Options :

1. ✗ $\begin{pmatrix} 10 & -6 & 6 \\ 6 & 2 & -6 \\ 12 & -12 & 16 \end{pmatrix}$

2. ✗ $\begin{pmatrix} 10 & -6 & 6 \\ 6 & -2 & 6 \\ -12 & 12 & 16 \end{pmatrix}$

3. ✗ $\begin{pmatrix} 10 & 6 & 6 \\ -6 & -2 & -6 \\ 12 & -12 & 16 \end{pmatrix}$

4. ✓ $\begin{pmatrix} 10 & -6 & 6 \\ 6 & -2 & 6 \\ 12 & -12 & 16 \end{pmatrix}$

Question Number : 3 Question Id : 8616631403 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

The solution of the ordinary differential equation $x^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + y = \log x$ satisfying $y(1) = 1, y'(1) = 2$, is _____

Options :

1. ✖ $y(x) = 2 + x + (2x + 1) \log x$
2. ✖ $y(x) = 2 - x + (2x - 1) \log x$
3. ✔ $y(x) = 2 - x + (2x + 1) \log x$
4. ✖ $y(x) = 2 + x + (2x - 1) \log x$

Question Number : 4 Question Id : 8616631404 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical
Correct Marks : 3 Wrong Marks : 1

Let $y(x)$ be the solution of the second order differential equation $4 \frac{d^2 y}{dx^2} + 24 \frac{dy}{dx} + 61y = 0$ with initial conditions $y(0) = 1, y'(0) = \frac{-1}{2}$. Then, $\lim_{x \rightarrow \frac{\pi}{30}} \sqrt{2} e^{3x} y(x) = \underline{\hspace{2cm}}$

Options :

1. ✖ 0
2. ✖ $\sqrt{2}$
3. ✔ $\sqrt{3}$
4. ✖ $\sqrt{6}$

Question Number : 5 Question Id : 8616631405 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical
Correct Marks : 3 Wrong Marks : 1

Let z be a complex variable and $C: |z| = 2.5$ be a circle in the complex plane. If $\oint_C \frac{z^2 - 1}{4} \frac{e^z}{z^2 + 1} dz = k\pi$, then the value of k is $\underline{\hspace{2cm}}$

Options :

1. ✖ $i \cos 1$

2. ✖ $-i \cos 1$

3. ✔ $-i \sin 1$

4. ✖ 0

Question Number : 6 Question Id : 8616631406 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Let n be an integer. If a^n is the coefficient of z^n in the Laurent series expansion of the complex function $f(z) = \frac{z+1}{z^3(z^2+1)}$ in the annulus $0 < |z| < 1$ centered at $z = 0$, then

$$a^{-2} + a^{-1} + a^0 + a^1 + a^3 = \underline{\hspace{2cm}}$$

Options :

1. ✔ -1

2. ✖ 0

3. ✖ 1

4. ✖ 3

Question Number : 7 Question Id : 8616631407 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Let R be the region bounded by the curves $y^2 = x$ and $x^2 + y^2 = 2x$ that lies in the first quadrant. Let I be the value of the double integral $\iint_R 12 \, dx dy$ over the region R and J be the value of the improper integral $\int_1^\infty \frac{\ln x}{x^2} \, dx$. Then, $I+8J = \underline{\hspace{2cm}}$

Options :

1. ✖ 0

2. ✖ π

3. ✖ 2π

4. ✓ 3π

Question Number : 8 Question Id : 8616631408 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Let X be a continuous random variable with the probability density function

$$f(x) = \begin{cases} kx^5, & \text{if } 0 \leq x \leq 2 \\ 0, & \text{otherwise} \end{cases}$$

Then, $2^9 \cdot P\left(\frac{1}{2} < X < \frac{3}{2}\right) = \underline{\hspace{2cm}}$

Options :

1. ✓ 91

2. ✗ 182

3. ✗ 364

4. ✗ 728

Question Number : 9 Question Id : 8616631409 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Let E and F be two events of a sample space such that $P(E) = \frac{1}{3}, P(F|E) = \frac{2}{3}, P(E|F) = \frac{1}{2}$. If $\bar{F}$ is the complement of F , then $P(E|\bar{F})$ is _____

Options :

1. ✗ 0.5

2. ✓ 0.2

3. ✗ 0.25

4. ✗ 0.6

Question Number : 10 Question Id : 8616631410 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A charge of 5×10^{-6} C experiences a force of 0.2 N in an electric field. What is the electric field intensity at that point?

Options :

1. ✓ 4×10^4 N/C
2. ✗ 2.5×10^4 N/C
3. ✗ 10×10^4 N/C
4. ✗ 3×10^4 N/C

Question Number : 11 Question Id : 8616631411 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A uniformly charged spherical shell of radius $R = 0.5$ m carries a total charge of $Q = 2 \times 10^{-6}$ C. What is the electric field intensity at a point located $r = 0.3$ m from the center of the shell?

Options :

1. ✓ 0 N/C
2. ✗ 10×10^{-6} N/C
3. ✗ 2×10^{-6} N/C
4. ✗ None of the options are right

Question Number : 12 Question Id : 8616631412 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A point charge of $Q = 3 \times 10^{-6}$ C is located in vacuum. What is the electric potential at a point 0.2 m away from the charge?

(Take $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2/\text{C}^2$)

Options :

1. ✖ $1.35 \times 10^5 \text{ V}$
2. ✖ $2.7 \times 10^5 \text{ V}$
3. ✔ $5.4 \times 10^5 \text{ V}$
4. ✖ $6.75 \times 10^5 \text{ V}$

Question Number : 13 Question Id : 8616631413 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Divergence of a Curl of a magnetic field is

Options :

1. ✔ Zero
2. ✖ Negative
3. ✖ Positive
4. ✖ Constant

Question Number : 14 Question Id : 8616631414 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Divergence of the three dimensional radial vector field $\mathbf{F}$ is

Options :

1. ✔ 3
2. ✖ $1/r$

3. ✖ $i + j + k$

4. ✖ $3(i + j + k)$

Question Number : 15 Question Id : 8616631415 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A coaxial cable of inner radius 1mm and outer radius 5 mm has a capacitance per unit length of 172 pF/m. If the ratio of outer radius to inner radius is doubled, the capacitance per unit length in pF/m is

Options :

1. ✖ 172

2. ✔ 120.22

3. ✖ 344

4. ✖ 86

Question Number : 16 Question Id : 8616631416 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Two electric charges Q and $-2Q$ are placed at $(0,0)$ and $(6,0)$ on the x - y plane. The equation of zero equipotential curve in the x - y plane is

Options :

1. ✖ $x = -2$

2. ✖ $y = 2$

3. ✖ $x^2 + y^2 = 2$

4. ✔ $(x+2)^2 + y^2 = 6$

Question Number : 17 Question Id : 8616631417 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option

Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Consider an electron, a neutron and a proton initially at rest and placed along a straight line such that the neutron is exactly at the center of the line joining the electron and proton. At $t=0$, the particles are released but are constrained to move along the same straight line. Which of these collide first.

Options :

The particles will never collide

1. ✖

All will collide together at the same instant

2. ✖

Proton and neutron

3. ✖

Electron and neutron

4. ✔

Question Number : 18 Question Id : 8616631418 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option

Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

The field $\mathbf{B} = -2a_x + 3a_y + 4a_z$ present in free space. Given $A(1,1,1)$ and $B(3,5,6)$, the vector force exerted on a straight line carrying 12 A of current in the direction $\mathbf{a}_{AB}$ is

Options :

1. ✖ $12a_x + 216a_y + 168a_z$ mN

2. ✔ $12a_x - 216a_y + 168a_z$ mN

3. ✖ $12a_x + 216a_y - 168a_z$ mN

4. ✖ $12a_x - 216a_y - 168a_z$ mN

Question Number : 19 Question Id : 8616631419 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option

Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Shunt resistor is connected across the contacts of a circuit-breaker in order to

Options :

1. ✓ damp out the re-striking transient
2. ✗ bypass the arc current
3. ✗ limit the short-circuit current
4. ✗ reduce the damage to the contacts due to arcing

Question Number : 20 Question Id : 8616631420 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Bundled conductors are mainly used in high voltage overhead transmission lines to

Options :

1. ✗ Reduce transmission line losses
2. ✗ Increase mechanical strength of the line
3. ✓ Reduce corona
4. ✗ Reduce the sag

Question Number : 21 Question Id : 8616631421 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A single load is supplied by a single voltage source. If the current flowing from the load to the source is $10\angle -150^\circ$ and if the voltage at the load terminal is $100\angle 60^\circ$, then the

Options :

1. ✗ Load absorbs real power and delivers reactive power
2. ✓ Load absorbs real power and absorbs reactive power

3. ✖ Load delivers real power and absorbs reactive power

4. ✖ Load delivers real power and delivers reactive power

Question Number : 22 Question Id : 8616631422 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Buses for load flow studies are classified as (i) the load bus, (ii) the generator bus and
(iii) the slack bus

The correct combination of the pair of quantities specified having their usual meaning

At Load bus, Generator Bus and Slack bus respectively are

Options :

1. ✖ $P, |V|$, P, Q P, δ

2. ✔ P, Q $P, |V|$ V, δ

3. ✖ $|V|, Q$ P, δ P, Q

4. ✖ P, δ $Q, |V|$ Q, δ

Question Number : 23 Question Id : 8616631423 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Incremental fuel costs in Rs/MWh for a plant consisting of two units are given by

$$dF1/dP1 = 0.4P1 + 400 \text{ and } dF2/dP2 = 0.48P2 + 320.$$

The allocation of loads $P1$ and $P2$ between the units 1 and 2, respectively, for minimum
cost of generation for a total load of 900 MW is

Options :

1. ✖ 200 MW and 700 MW

- 2. ✖ 300 MW and 600 MW
- 3. ✔ 400 MW and 500 MW
- 4. ✖ 500 MW and 400 MW

Question Number : 24 Question Id : 8616631424 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A surge of 15 kV magnitude travels along a cable towards its junction with an overhead line. The inductance and capacitance of the cable and overhead line are respectively 0.3 mH, 0.4 μ F and 1.5 mH, 0.012 μ F per km. Find the voltage rise at the junction due to the surge.

Options :

- 1. ✔ 27.87 kV
- 2. ✖ 278.7kV
- 3. ✖ 55.74 kV
- 4. ✖ 557.4 kV

Question Number : 25 Question Id : 8616631425 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A power system is subjected to a fault which makes the zero sequence component of current equal to zero. The nature of fault is

Options :

- 1. ✖ double line to ground fault
- 2. ✔ double line fault
- 3. ✖ line to ground fault
- 4. ✖ three-phase to ground fault

Question Number : 26 Question Id : 8616631426 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

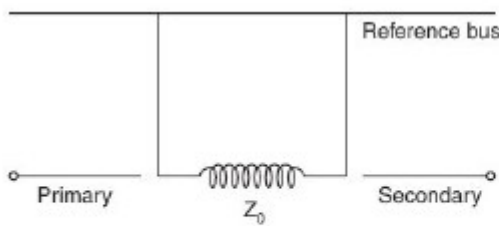
Correct Marks : 3 Wrong Marks : 1

Two generators rated at 200 MW and 400 MW are operating in parallel. Both the Governors have a droop of 4%, when the total load is 300 MW. They share the load as (suffix '1' is used for generator 200 MW and suffix '2' is used for generator 400 MW)

Options :

1.  $P_1 = 100 \text{ MW}$ and $P_2 = 200 \text{ MW}$
2.  $P_1 = 150 \text{ MW}$ and $P_2 = 150 \text{ MW}$
3.  $P_1 = 200 \text{ MW}$ and $P_2 = 100 \text{ MW}$
4.  $P_1 = 200 \text{ MW}$ and $P_2 = 400 \text{ MW}$

Question Number : 27 Question Id : 8616631427 Question Type : MCQ Option Shuffling : Yes
 Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
 Orientation : Vertical
 Correct Marks : 3 Wrong Marks : 1



A three-phase transformer having zero-sequence impedance of Z_0 has the zero-sequence network as shown in the above figure. The connections of its windings are

Options :

1. ✖ star-star
2. ✖ star-delta
3. ✔ delta-delta
4. ✖ delta-star with neutral grounded

Question Number : 28 Question Id : 8616631428 Question Type : MCQ Option Shuffling : Yes
 Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
 Orientation : Vertical
 Correct Marks : 3 Wrong Marks : 1

An alternator rated for 13.2 kV, 80 MVA has d-axis reactances during a short circuit study are $x_d''=20\%$, $X_d'=40\%$, $X_d=100\%$. The alternator is connected to a 3-ph transformer of 13.2 kV/132 kV, 80 MVA, $X=10\%$ through a transformer. A three phase short circuit occurs in between the CB and transformer during no load operation. The rms value of subtransient fault current is

Options :

1. ✔ 17.5 kA
2. ✖ 3.5 kA
3. ✖ 5.0 kA
4. ✖ 1.75 kA

Question Number : 29 Question Id : 8616631429 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical
Correct Marks : 3 Wrong Marks : 1

Find the fundamental period of the discrete time sequence

$$x(n) = \cos\left(\frac{2\pi n}{10}\right) + \sin\left(\frac{2\pi n}{15}\right) + e^{\frac{j2\pi n}{10}}$$

Options :

1. ✖ 50
2. ✖ 30
3. ✖ 20
4. ✔ 60

Question Number : 30 Question Id : 8616631430 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical
Correct Marks : 3 Wrong Marks : 1

A discrete time (DT) sequence $x(n) = \{-2, -3, -1, 1, 1, 2, 3\}$ for $-3 \leq n \leq 3$. First fold $x(n)$ and then delay the resulting signal by 3 samples. Report the resulting sequence

Options :

1. ✖ $\{-2, -3, -1, 1, 1, 2, 3\}$, for $0 \leq n \leq 6$.
2. ✖ $\{-2, -3, -1, 1, 1, 2, 3\}$, for $-6 \leq n \leq 0$.
3. ✔ $\{1, 2, 3, 1, -1, -3, -2\}$; $0 \leq n \leq 6$
4. ✖ $\{1, 2, 3, 1, -1, -3, -2\}$; $-3 \leq n \leq 3$

Question Number : 31 Question Id : 8616631431 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical
Correct Marks : 3 Wrong Marks : 1

Which sequence is causal one among the following options

Options :

1. ✓ $y(n) = x(n) - x(n-2)$
2. ✗ $y(n) = x(n) - x(n+2)$
3. ✗ $y(n) = x(n) - 3x(n-2) + 4x(n+5)$
4. ✗ $y(n) = x(n) + 2x(n-2) + 3x(n+6)$

Question Number : 32 Question Id : 8616631432 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

Consider the triangle signal $x(t)$ exists between $-1 \leq t \leq 1$ and symmetric about $t=0$ at which the value of 1. The scaling operation of $y(t) = x(2t)$ results in

Options :

1. ✗ Expansion
2. ✓ Compression
3. ✗ Unchanged
4. ✗ Flipped

Question Number : 33 Question Id : 8616631433 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

Consider the analog signal $x(t) = 3\sin 4\pi t + 5\sin 12\pi t + 10\sin 30\pi t$. What is the sampling frequency required to avoid aliasing?

Options :

1. ✗ 4Hz
2. ✗ 12 Hz
3. ✗ 30 Hz

4. ✓ 32 Hz

Question Number : 34 Question Id : 8616631434 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A continuous time system that is initially at rest is described by $\ddot{y} + 5y(t) = 2x(t)$, where $x(t)$ is the input voltage and $y(t)$ is the output voltage. The impulse response of the system is

Options :

1. ✗ $3e^{-2t}$

2. ✗ $0.33e^{-2t}u(t)$

3. ✓ $2e^{-5t}u(t)$

4. ✗ $5e^{-2t}u(t)$

Question Number : 35 Question Id : 8616631435 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Consider the sequence $x(n) = 4(-0.5)^n u(n) + 2(0.2)^n u(n)$ with unit step function $u(n)$. Find the Z- transform

Options :

1. ✗ $\frac{4}{1+0.1z^{-1}} + \frac{2}{1-0.2z^{-1}} ; \text{ROC: } |z| < 0.2$

2. ✓ $\frac{4}{1+0.15} + \frac{2}{1-0.1z^{-1}} ; \text{ROC: } |z| > 0.5$

3. ✗ $\frac{4}{1+0.15} + \frac{2}{1-0.1z^{-1}} ; \text{ROC: } |z| < 0.5$

4. ✗ $\frac{4}{1+0.15} + \frac{3}{1-0.1z^{-1}} ; \text{ROC: } |z| > 0.5$

Question Number : 36 Question Id : 8616631436 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Let an input $x(t) = 2 \sin(10\pi t) + 5 \cos(15\pi t) + 7 \sin(42\pi t) + 4 \cos(45\pi t)$ is passed through an LTI system having an impulse response

$$h(t) = \frac{\sin(50\pi t) - \sin(30\pi t)}{\pi t}$$

The output of the system is

Options :

1. ✖ $2 \sin(10\pi t) + 5 \cos(15\pi t)$
2. ✖ $2 \sin(10\pi t) + 4 \cos(45\pi t)$
3. ✔ $7 \sin(42\pi t) + 4 \cos(45\pi t)$
4. ✖ $7 \sin(42\pi t) + 5 \cos(15\pi t)$

Question Number : 37 Question Id : 8616631437 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Determine the impulse response of the below difference equation

$$y(n) - 0.5 y(n-1) = x(n) - 0.25x(n-1)$$

Options :

1. ✔ $(0.5)^n u(n) - (0.4)(0.5)^{n-1} u(n-1)$
2. ✖ $(0.25)^n u(n) - (0.4)(0.25)^{n-1} u(n-1)$
3. ✖ $(0.2)^n u(n) - (0.25)(0.5)^{n-1} u(n-1)$

4. ✖ $(0.25)^n u(n) - (0.5)(0.25)^{n-1} u(n-1)$

Question Number : 38 Question Id : 8616631438 Question Type : MCQ Option Shuffling : Yes
 Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
 Orientation : Vertical
 Correct Marks : 3 Wrong Marks : 1

Determine the Z-transform of the sequence $x(n) = r^n \cos(\omega_0) u(n)$

Options :

1. ✔ $\frac{1 - r \cos(\omega_0) z^{-1}}{1 - 2r \cos(\omega_0) z^{-1} + r^2 z^{-2}} ; |Z| > r$

2. ✖ $\frac{1 - r z^{-1}}{1 - 2r \cos(\omega_0) z^{-1}} ; |Z| < r$

3. ✖ $\frac{r \cos(\omega_0) z^{-1}}{1 - 2r \cos(\omega_0) z^{-1} + r^2 z^{-2}} ; |Z| = r$

4. ✖ $\frac{1 - r \cos(\omega_0)}{1 - 2r \cos(\omega_0) z^{-1} + r^2 z^{-2}} ; |Z| > r$

Question Number : 39 Question Id : 8616631439 Question Type : MCQ Option Shuffling : Yes
 Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
 Orientation : Vertical
 Correct Marks : 3 Wrong Marks : 1

The number of 2x4 deciders required to implement 8x256 decoder is

Options :

1. ✖ 42

2. ✖ 40

3. ✔ 85

4. ✖ 84

Question Number : 40 Question Id : 8616631440 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical
Correct Marks : 3 Wrong Marks : 1

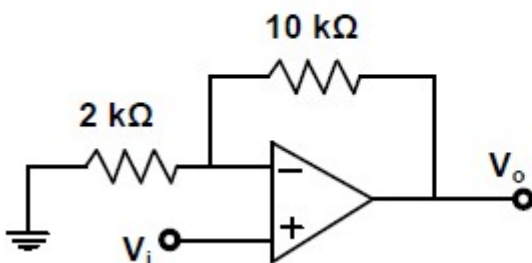
A 4-bit mod-16 ripple counter used JK flip-flops. The propagation delay of each flip-flop is 5 nS, the maximum clock frequency that can be used is equal to

Options :

1. ✖ 200 MHz
2. ✔ 50 MHz
3. ✖ 5 MHz
4. ✖ 20 MHz

Question Number : 41 Question Id : 8616631441 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical
Correct Marks : 3 Wrong Marks : 1

The op-amp shown in the figure has a low open-loop gain of 24 but is otherwise ideal. Determine the closed-loop gain of the amplifier.



Options :

1. ✖ 12
2. ✖ 6
3. ✖ 5
4. ✔ 4.8

Question Number : 42 Question Id : 8616631442 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Silicon is doped with boron to a concentration of 1.5×10^{15} atoms/cm³. The fermi-potential of a doped Silicon is

Options :

1. ✘ 0.13 eV
2. ✘ 0.46 eV
3. ✔ 0.3 eV
4. ✘ 0.2 eV

Question Number : 43 Question Id : 8616631443 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

How many comparators are required to design a 6-bit flash type ADC?

Options :

1. ✘ 33
2. ✘ 65
3. ✘ 31
4. ✔ 63

Question Number : 44 Question Id : 8616631444 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A clipper circuit includes a 1 k Ω resistor in series with the input and a silicon diode (with a forward voltage drop 0.7 V) connected in shunt to ground. When a triangular wave of ± 5 V is applied, which portion of the waveform is clipped?

Options :

1. ✘ Entire waveform passes unchanged

- 2. ✖ Positive peaks above 0.7 V are clipped
- 3. ✔ Negative peaks below -0.7 V are clipped
- 4. ✖ Both positive and negative peaks are clipped

Question Number : 45 Question Id : 8616631445 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

When a digital input of a 4-bit DAC is 1010, analog output voltage of DAC is 6V. What will be the output voltage for digital input 1110?

Options :

- 1. ✔ 8.4V
- 2. ✖ 7V
- 3. ✖ 10V
- 4. ✖ 14V

Question Number : 46 Question Id : 8616631446 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

In a Colpitts oscillator, the frequency of oscillation depends primarily on

Options :

- 1. ✖ The ratio of capacitors only
- 2. ✔ The inductance and the series combination of the capacitors
- 3. ✖ The inductance and the parallel combination of the capacitors
- 4. ✖ The transistor gain and supply voltage

Question Number : 47 Question Id : 8616631447 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

For a fixed bias BJT with $V_{CC} = 12\text{ V}$, $V_{BE} = 0.7\text{ V}$, $\beta = 100$, and desired $I_C = 2\text{ mA}$, what should be the base resistor R_B ?

Options :

1. ✓ 565 k Ω
2. ✗ 500 k Ω
3. ✗ 600 k Ω
4. ✗ 525 k Ω

Question Number : 48 Question Id : 8616631448 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Which of the following feature is suitable for parallel operation of the MOSFETs.

Options :

1. ✓ Resistive nature of the channel
2. ✗ Parasitic body diode
3. ✗ Voltage controlled gate
4. ✗ High switching speed

Question Number : 49 Question Id : 8616631449 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A single-phase thyristor full-bridge rectifier is fed from a 230 V, 50 Hz, single-phase AC mains. If it is delivering a constant DC current of 10 A, at firing angle of 30° , then value of the power factor at AC mains is

Options :

1. ✖ 0.87

2. ✖ 0.9

3. ✔ 0.78

4. ✖ 0.45

Question Number : 50 Question Id : 8616631450 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

If the current in a capacitor leads the voltage by 80° , the loss angle of the capacitor is

Options :

1. ✔ 10°

2. ✖ 80°

3. ✖ 120°

4. ✖ 170°

Question Number : 51 Question Id : 8616631451 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

For Asynchronous sine PWM value of frequency modulation index should be _____.

Options :

1. ✖ >11

2. ✔ >21

3. ✖ >15

4. ✖ >29

Question Number : 52 Question Id : 8616631452 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Latching behavior of IGBT is related to

Options :

1. ✖ Gate current of IGBT
2. ✔ dv/dt across IGBT at the time turn-off
3. ✖ di/dt through IGBT at the time of turn-off
4. ✖ Gate resistance of IGBT

Question Number : 53 Question Id : 8616631453 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A step-down (buck) converter has

$$V_{in} = 200 \text{ V,}$$

$$\text{Duty ratio } D = 0.4$$

$$\text{Load is } R = 20 \, \Omega$$

$$\text{Switching frequency } f_s = 50 \text{ kHz}$$

The converter operates in continuous conduction mode.

Choose the inductance L so that the inductor peak-to-peak ripple ΔI_L is 20% the average inductor current.

Options :

1. ✖ 4.8 mH

2. ✖ 3.6 mH

3. ✖ 2.4 mH

4. ✔ 1.2 mH

Question Number : 54 Question Id : 8616631454 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A single-phase half-controlled rectifier is driving a separately excited dc motor. The dc motor has a back emf constant of 0.5 V/rpm. The current armature is 5 A without any ripple. The armature resistance is 2 Ω . The converter is working from a 230 V, single-phase ac source with a firing angle of 30°. Under this operating condition, the speed of the motor will be

Options :

1. ✖ 339 rpm

2. ✖ 359 rpm

3. ✔ 366 rpm

4. ✖ 386 rpm

Question Number : 55 Question Id : 8616631455 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

Dead-time in PWM inverters causes:

Options :

1. ✔ Voltage distortion
2. ✖ Complete elimination of harmonics
3. ✖ Polarity inversion
4. ✖ Overvoltage

Question Number : 56 Question Id : 8616631456 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

A 1 kW resistive heater is supplied through integral cycle (ICC) control from 230 V AC. If ICC delivers 4 ON cycles and 6 OFF cycles in 10-cycle interval, calculate the average power delivered.

Options :

1. ✖ 333 W
2. ✖ 200 W
3. ✖ 667 W
4. ✔ 400 W

Question Number : 57 Question Id : 8616631457 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

A MOSFET switches at 100 kHz, gate charge $Q_g = 80\text{nC}$, gate driver voltage $V_g = 12\text{V}$. Estimate average gate power dissipation.

Options :

1. ✖ 48 mW
2. ✔ 96 mW
3. ✖ 24 mW
4. ✖ 12 mW

Question Number : 58 Question Id : 8616631458 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Thevenin's Theorem is particularly useful for analyzing:

Options :

1. ✖ Circuits with only dependent sources
2. ✖ Circuits with purely resistive networks
3. ✔ Circuits with a single load resistance connected to a complex network
4. ✖ Circuits with only reactive components

Question Number : 59 Question Id : 8616631459 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Which of the following is an active network element?

Options :

1. ✖ Resistor
2. ✖ Inductor

3. ✓ Voltage source

4. ✗ Capacitor

Question Number : 60 Question Id : 8616631460 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

In a DC circuit, the impedance of a resistor is:

Options :

1. ✓ Equal to its resistance

2. ✗ Zero

3. ✗ Infinite

4. ✗ Frequency-dependent

Question Number : 61 Question Id : 8616631461 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

In a balanced three-phase system, the phase difference between any two line voltages is:

Options :

1. ✗ 90°

2. ✓ 120°

3. ✗ 180°

4. ✗ 60°

Question Number : 62 Question Id : 8616631462 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

Norton's Theorem represents any linear two-terminal network as:

Options :

1. ✖ A current source in series with resistance
2. ✔ A current source in parallel with resistance
3. ✖ A voltage source in series with resistance
4. ✖ A voltage source in parallel with resistance

Question Number : 63 Question Id : 8616631463 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

For a series RC circuit with $R = 5 \Omega$, $C = 0.1 \text{ F}$, and a 10 V step input, the voltage across the capacitor at $t = 2 \text{ s}$ is:

Options :

1. ✖ 2.5 V
2. ✖ 6.3 V
3. ✔ 9.82 V
4. ✖ 15 V

Question Number : 64 Question Id : 8616631464 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A balanced 3-phase system supplies a load with $V_l = 400 \text{ V}$, $I_l = 10 \text{ A}$, and $\text{pf} = 0.8$. The total active power is:

Options :

1. ✖ 3200 W

2. ✖ 4000 W
3. ✖ 6928 W
4. ✔ 5542 W

Question Number : 65 Question Id : 8616631465 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A two-port network has Z-parameters: $Z_{11} = 4 \Omega$, $Z_{12} = 2 \Omega$, $Z_{21} = 2 \Omega$, $Z_{22} = 5 \Omega$. If the output port is open-circuited, the input voltage is 10 V, the input current is approximately:

Options :

1. ✖ 1 A
2. ✖ 2 A
3. ✖ 3 A
4. ✔ 2.5 A

Question Number : 66 Question Id : 8616631466 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A load absorbs 30 kW at 0.6 lag pf. The line voltage is 400 V (3-phase). To improve pf to 0.9, the required capacitive reactive power is approximately:

Options :

1. ✖ 10 kVAR
2. ✖ 15 kVAR
3. ✖ 18 kVAR
4. ✔ 25.45 kVAR

Question Number : 67 Question Id : 8616631467 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Two coils have mutual inductance $M = 2\text{ H}$, and carry currents, $i_1 = 3\text{ A}$, $i_2 = 4\text{ A}$. The mutual energy stored is:

Options :

1. ✖ 12 J
2. ✖ 6 J
3. ✔ 24 J
4. ✖ 48 J

Question Number : 68 Question Id : 8616631468 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

The Routh-Hurwitz criterion helps determine:

Options :

1. ✔ Stability of a system without solving the characteristic equation
2. ✖ Gain margin of a system
3. ✖ phase margin of a system
4. ✖ Transient response

Question Number : 69 Question Id : 8616631469 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A lead compensator primarily improves:

Options :

1. ✖ Steady-state accuracy

Transient response and phase margin

2. ✓

System gain

3. ✗

System bandwidth

4. ✗

Question Number : 70 Question Id : 8616631470 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

In a Bode plot, the phase of a pure integrator is:

Options :

1. ✗ 0°

2. ✗ 90°

3. ✗ 45°

4. ✓ -90°

Question Number : 71 Question Id : 8616631471 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Which of the following inputs is **not** valid for testing BIBO stability?

Options :

1. ✗ Step input

2. ✗ Sinusoidal input

3. ✓ Ramp input

4. ✗ Bounded pulse input

Question Number : 72 Question Id : 8616631472 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

For a second-order underdamped system, increasing damping ratio ζ :

Options :

1. ☒ Reduces overshoot
2. ☐ Increases peak time
3. ☐ Reduces settling time
4. ☐ Increases natural frequency

Question Number : 73 Question Id : 8616631473 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

The controllability of a system is determined by:

Options :

1. ☐ Rank of the output matrix
2. ☒ Rank of the controllability matrix
3. ☐ Eigenvalues of the system matrix
4. ☐ Trace of the state matrix

Question Number : 74 Question Id : 8616631474 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A unity feedback system has $G(s) = \frac{K}{s(s^2 + 6s + 25)}$. The asymptotes of the root locus ($K > 0$) will intersect at

Options :

1. ✓ -2

2. ✗ -3

3. ✗ -6

4. ✗ $-\frac{25}{3}$

Question Number : 75 Question Id : 8616631475 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

A Nyquist plot encircles the point $(-1, 0)$ twice in the clockwise direction. The open-loop system has two poles in the right half-plane. The number of unstable closed-loop poles is:

Options :

1. ✓ 0

2. ✗ 1

3. ✗ 2

4. ✗ 4

Question Number : 76 Question Id : 8616631476 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

A system has a gain crossover frequency at 10 rad/s and phase of -190° . The gain margin is:

Options :

1. ✗ 10 db

2. ✗ 0 db

3. ✓ Negative

4. ✖ infinite

Question Number : 77 Question Id : 8616631477 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A PI controller increases system type by:

Options :

1. ✖ 0

2. ✔ 1

3. ✖ 2

4. ✖ Depends on gain

Question Number : 78 Question Id : 8616631478 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A synchronous generator is feeding a zero power factor (lagging) load at rated current. The armature reaction is

Options :

1. ✖ Magnetizing

2. ✔ Demagnetizing

3. ✖ Cross-Magnetizing

4. ✖ Ineffective

Question Number : 79 Question Id : 8616631479 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

In a single phase induction motor driving a fan load, the reason for having a high resistance rotor is to achieve

Options :

1. ✖ low starting torque
2. ✖ high efficiency
3. ✔ quick acceleration
4. ✖ reduced size

Question Number : 80 Question Id : 8616631480 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A three-phase synchronous motor connected to ac mains is running at full load and unity power factor. If its shaft load is reduced by half, with field current held constant, its new power factor will be

Options :

1. ✖ Unity
2. ✔ Leading
3. ✖ Lagging
4. ✖ Dependent on machine parameters

Question Number : 81 Question Id : 8616631481 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A 4-pole induction motor, supplied by a slightly unbalanced three-phase 50 Hz source, is rotating at 1440 rpm. The electrical frequency in Hz of the induced negative sequence current in the rotor is

Options :

1. ✖ 100

2. ✓ 98

3. ✗ 52

4. ✗ 48

Question Number : 82 Question Id : 8616631482 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A 220 V, 10 kW, 900 rpm separately excited DC motor has an armature resistance $R_a = 0.02\Omega$ when the motor operates at rated speed and with rated terminal voltage, the electromagnetic torque developed by the motor is 70 Nm. Neglecting the rotational losses of the machine, the current drawn by the motor from the 220 V supply is

Options :

1. ✗ 34.2 A

2. ✗ 4.84 A

3. ✗ 22 A

4. ✓ 30 A

Question Number : 83 Question Id : 8616631483 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

The maximum efficiency of a 500 KVA, 3300/500 V 50 Hz single phase transformer is 97% and occurs at 3/4 full load unity power factor. If the impedance is 10%. Then the voltage regulation of transformer at full load 0.8 PF lag is _____.

Options :

1. ✗ 6.2 %

2. ✗ 5.5 %

3. ✓ 7.5%

4. ✖ 9.5%

Question Number : 84 Question Id : 8616631484 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

A 500 kVA, 3-phase transformer has iron losses of 300 W and full load copper losses of 600W. The percentage load at which the transformer is expected to have maximum efficiency is

Options :

- 1. ✖ 50.0 %
- 2. ✔ 70.7 %
- 3. ✖ 141.4 %
- 4. ✖ 200.0 %

Question Number : 85 Question Id : 8616631485 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

Determine the pitch factor for winding: 36 slots, 4 poles, coil span 1-8

Options :

- 1. ✔ $\cos 20^\circ$
- 2. ✖ $\cos 30^\circ$
- 3. ✖ $\cos 80^\circ$
- 4. ✖ $\cos 40^\circ$

Question Number : 86 Question Id : 8616631486 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A three phase, salient pole synchronous motor is connected to an infinite bus. It is operated at no load a normal excitation. The field excitation of the motor is first reduced to zero and then increased in reverse direction gradually. Then the armature current.

Options :

1. ✖ Increases continuously
2. ✔ First increases and then decreases steeply
3. ✖ First decreases and then increases steeply
4. ✖ Remains constant

Question Number : 87 Question Id : 8616631487 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A 400 V, 50 Hz, 30hp, three-phase induction motor is drawing 50 A current at 0.8 power factor lagging. The stator and rotor copper losses are 1.5 kW and 900 W respectively. The friction and windage losses are 1050 W and the core losses are 1200 W. The air-gap power of the motor will be

Options :

1. ✖ 23.06 kW
2. ✖ 24.11 kW
3. ✔ 25.01 kW
4. ✖ 26.21 kW

Question Number : 88 Question Id : 8616631488 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

An ammeter has a current range of 0-5A, and its internal resistance is 0.2Ω . In order to change the range to 0-25 A, we need to add a resistance of

Options :

1. ✖ 0.8Ω in series with the meter
2. ✖ 1.0Ω in series with the meter
3. ✖ 0.04Ω in parallel with the meter
4. ✔ 0.05Ω in parallel with the meter

Question Number : 89 Question Id : 8616631489 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A galvanometer with a full scale current of 10mA has a resistance of 1000Ω . The multiplying power (the ratio of measured current to galvanometer current) of 100Ω shunt with this galvanometer is

Options :

1. ✖ 110
2. ✖ 100
3. ✔ 11
4. ✖ 10

Question Number : 90 Question Id : 8616631490 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

A moving coil of a meter has 100 turns, and a length and depth of 10mm and 20mm respectively. It is positioned in uniform radial flux density of 200mT. The coil carries a current of 50 mA. The torque on the coil is

Options :

1. ✔ $200\mu\text{Nm}$

2. ✖ 100 μNm

3. ✖ 2 μNm

4. ✖ 1 μNm

PART B

Question Number : 91 Question Id : 8616631491 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical
Correct Marks : 3 Wrong Marks : 1

In the question below given four statements followed by three Conclusions number I, II and III. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusions and then decide which of the given conclusions logically follows from the given statements despite gardening commonly known facts.

Statements: Some plates are spoons.
 All spoons are forks.
 All forks are bowls.
 Some bowls are utensils.

Conclusions: I. Some plates are bowls.
 II. All spoons are bowls.
 III. Some forks are utensils.

Options :

1. ✖ Only I follows
2. ✖ Only II follows
3. ✖ Only I and III follow
4. ✔ Only I and II follow

Question Number : 92 Question Id : 8616631492 Question Type : MCQ Option Shuffling : Yes
 Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
 Orientation : Vertical
 Correct Marks : 3 Wrong Marks : 1

From the given answer figures, select the one in which the question figure is hidden/embedded.

Question Figure:



Options :



1. ✔

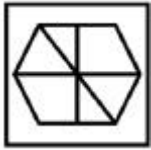


2. ✖

3. ✖

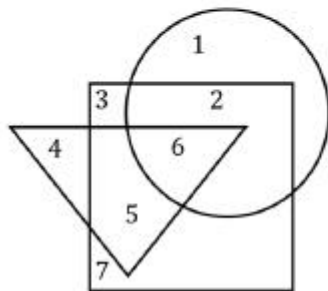


4. ✖



Question Number : 93 Question Id : 8616631493 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

When a survey was made regarding the preferences in the watching of TV channel, a few said that they watch only ZEE TV channel, the others liked only Sun TV channel, while others Asianet TV channel. A small percentage said that they watch all the three TV channels. In the figure given below the circle indicates the Asianet TV channel, the square Z TV and the triangle the Sun TV channel. Which number in the figure indicates the fact that some people watch all the three TV channels?



Options :

1. ✖ 2

2. ✖ 5

3. ✔ 6

4. ✖ 3

Question Number : 94 Question Id : 8616631494 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical Correct Marks : 3 Wrong Marks : 1

If 27 March, 1995 was a Mon day, then what days of the week was 1 November, 1995?

Options :

1. ✖ Monday
2. ✖ Sunday
3. ✖ Tuesday
4. ✔ Wednesday

Question Number : 95 Question Id : 8616631495 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Ashok started walking towards South. After walking 50 metres he took a right turn and walked 30 metres. He then took a right turn and walked 100 metres. He again took a right turn and walked 30 metres and stopped. How far and in which direction was he from the starting point?

Options :

1. ✖ 50 metres South
2. ✖ 150 metres North
3. ✖ 180 metres East
4. ✔ 50 metres North

Question Number : 96 Question Id : 8616631496 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

In a certain code language 'ROUTINE' is written as 'VMRGFLI'. How will be 'CRUELTY' written in that code language?

Options :

1. ✖ VPVCZRL
2. ✖ VPCVZRL
3. ✖ WPCVZRL

4. ✓ BGOVFIX

Question Number : 97 Question Id : 8616631497 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Thirty-six vehicles are parked in a parking lot in a single row. After the first car, there is one scooter. After the second car, there are two scooters. After the third car, there are three scooters and so on. Work out the number of scooters in the second half of the row.

Options :

1. ✗ 10

2. ✗ 12

3. ✓ 15

4. ✗ 17

Question Number : 98 Question Id : 8616631498 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

In the following number series, a wrong number is given. Find out that wrong number.
10, 11, 24, 75, 303, 1525, 9156

Options :

1. ✗ 24

2. ✗ 1525

3. ✗ 75

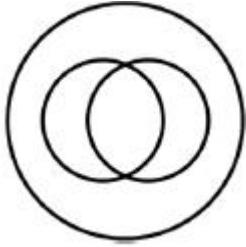
4. ✓ 303

Question Number : 99 Question Id : 8616631499 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

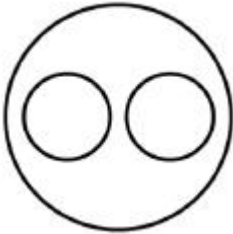
Correct Marks : 3 Wrong Marks : 1

Which of the following figures represents the relation between 'Sparrows', 'Birds' and 'Crows'?

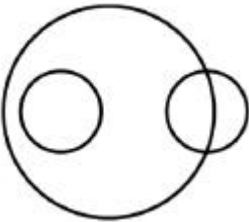
Options :



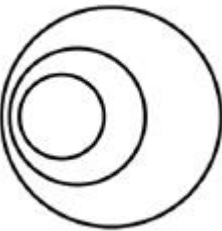
1. ✖



2. ✔



3. ✖

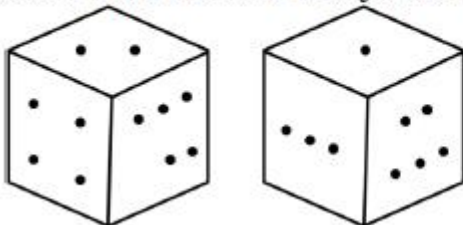


4. ✖

Question Number : 100 Question Id : 8616631500 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes Is Question Mandatory : No Calculator : Normal Option
Orientation : Vertical

Correct Marks : 3 Wrong Marks : 1

Study the two different positions of a cube given below with dots from 1 to 6 marked on its faces. Find out how many dots are there on the face opposite to that containing 4 dots.



Options :

1. ✖ 1

2. ✖ 2

3. ✔ 3

4. ✖ 5