# Sample Paper

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## EE: Electrical Engineering

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**Q.No. 1** Consider a state-variable model of a system $\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix} = \begin{bmatrix}0 & 1\\ -\alpha & -2\beta\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix} + \begin{bmatrix}0\\ \alpha\end{bmatrix} r$ where y is the output, and r is $y = [1 \quad 0]\begin{bmatrix}x_1\\ x_2\end{bmatrix}$ the input. The damping ratio ξ and the undamped natural frequency $\omega_n$ (rad/sec) of the system are given by

(A) $\xi = (\beta/\sqrt{\alpha})$; $\omega_n = \sqrt{\alpha}$

(B) $\xi = \sqrt{\alpha}$; $\omega_n = (\beta/\sqrt{\alpha})$

(C) $\xi = (\sqrt{\alpha}/\beta)$; $\omega_n = \sqrt{\beta}$

(D) $\xi = \sqrt{\beta}$; $\omega_n = \sqrt{\alpha}$

Answer: (A)

**Q.No. 2** Consider a permanent magnet dc (PMDC) motor which is initially at rest. At t = 0, a dc voltage of 5 V is applied to the motor. Its speed monotonically increases from O rad/s to 6.32 rad/s in 0.5 s and finally settles to 10 rad/s. Assuming that the armature inductance of the motor is negligible, the transfer function for the motor is

(A) $\frac{10}{0.5s+1}$

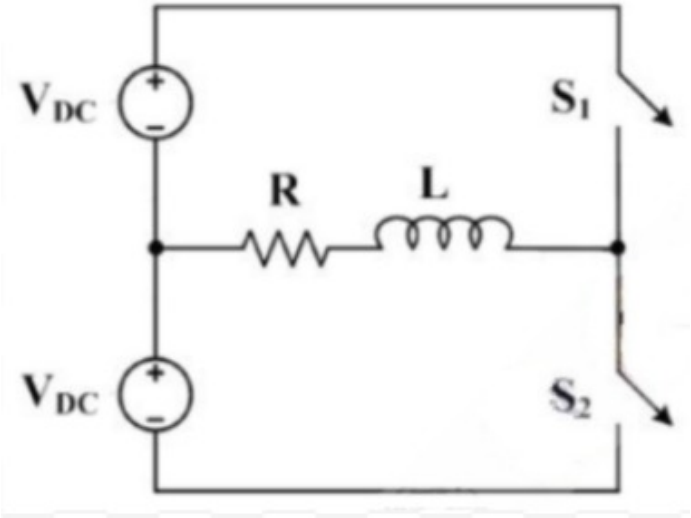
(B) $\frac{2}{0.5s+1}$

(C) $\frac{2}{s+0.5}$

(D) $\frac{10}{s+0.5}$

Answer: (B)

**Q.No. 3** The figure below shows a half-bridge voltage source inverter supplying an RL-load with $\mathrm{R} = 40\Omega$ and $\mathrm{L} = \left(\frac{0.3}{\pi}\right)$ H . The desired fundamental frequency of the load voltage is 50 Hz. The switch control signals of the converter are generated using sinusoidal pulse width modulation with modulation index, M = 0.6 . At 50 Hz- the RL-load draws an active power of I .44 kW. The value of DC source voltage in volts is




(A) $300\sqrt{2}$

(B) 500

(C) $500\sqrt{2}$

(D) $1000\sqrt{2}$

Answer: (C)

**Q.No. 4** The transfer function of the system Y(s)/U(s) whose state-space equations are given below is:

$$\begin{bmatrix}\dot{x}_1(t)\\ \dot{x}_2(t)\end{bmatrix} = \begin{bmatrix}1 & 2\\ 2 & 0\end{bmatrix}\begin{bmatrix}x_1(t)\\ x_2(t)\end{bmatrix} + \begin{bmatrix}1\\ 2\end{bmatrix}u(t)$$

$$y(t) = \begin{bmatrix}1 & 0\end{bmatrix}\begin{bmatrix}x_1(t)\\ x_2(t)\end{bmatrix}$$

(A) $\frac{(s+2)}{(s^2-2s-2)}$

(B) $\frac{(s-2)}{(s^2+s-4)}$

(C) $\frac{(s-4)}{(s^2+s-4)}$

(D) $\frac{(s+4)}{(s^2-s-4)}$

Answer: (D)

**Q.No. 5** Let $a_r$, $a_\varphi$ and $a_z$ be unit vectors along r, φ and z directions, respectively in the cylindrical coordinate system. For the electric flux density given by D = ($a_r$ 15 + aφ2r - $a_z$ 3rz) Coulomb/$m^2$, the total electric flux, in Coulomb, emanating from the volume enclosed by a solid cylinder of radius 3 m and height 5 m oriented along the z-axis with its base at the origin is:

(A) 54 π

(B) 90 π

(C) 108 π

(D) 180 π

Answer: (D)

**Q.No. 6** A non-ideal diode is biased with a voltage of —0.03 V, and a diode current of $I_1$ is measured. The thermal voltage is 26 mV and the ideality factor for the diode is 15/13. The voltage, in V, at which the measured current increases to $1.5I_1$ is closest to:

(A) -0.02

(B) -0.09

(C) -1.50

(D) -4.50

Answer: (B)

**Q.No. 7** Suppose for input x(t) a linear time-invariant system with impulse response h(t) produces output y(t), so that x(t) * h(t) = y(t). Further, if |x(t)| * |h(t)|, which of the following statements is true?

(A) For all t ∈ (-∞, ∞), z(t) ≤ y(t)

(B) For some but not all t ∈ (-∞, ∞), z(t) ≤ y(t)

(C) For all t ∈ (-∞, ∞), z(t) ≥ y(t)

(D) For some but not all t $\in (-\infty, \infty)$, $z(t) \geq y(t)$

Answer: (C)

**Q.No. 8** Which of the following statements is true about the two sided Laplace transform?

(A) It exists for every signal that may or may not have a Fourier transform.

(B) It has no poles for any bounded signal that is non-zero only inside a finite time interval.

(C) The number of finite poles and finite zeroes must be equal.

(D) If a signal can be expressed as a weighted sum of shifted one sided exponentials, then its Laplace Transform will have no poles.

Answer: (B)

**Q.No. 9** A common-source amplifier with a drain resistance, $R_D$ = 4.7 kΩ, is powered using a 10 V power supply. Assuming that the transconductance, $g_m$, is 520 μA/V, the voltage gain of the amplifier is closest to:

(A) -2.44

(B) -1.22

(C) 1.22

(D) 2.44

Answer: (A)

**Q.No. 10** The figure below shows the per-phase Open Circuit Characteristics (measured in V) and Short Circuit Characteristics (measured in A) of a 14 kVA, 400 V, 50 Hz, 4-pole, 3-phase, delta connected alternator, driven at 1500 rpm. The field current, $I_f$ is measured in A. Readings taken are marked as respective (x, y) coordinates in the figure. Ratio of the unsaturated and saturated synchronous impedances ($Z_{s(unsat)}$ /$Z_{s(sat)}$ of the alternator is closest to:

(A) 2.100

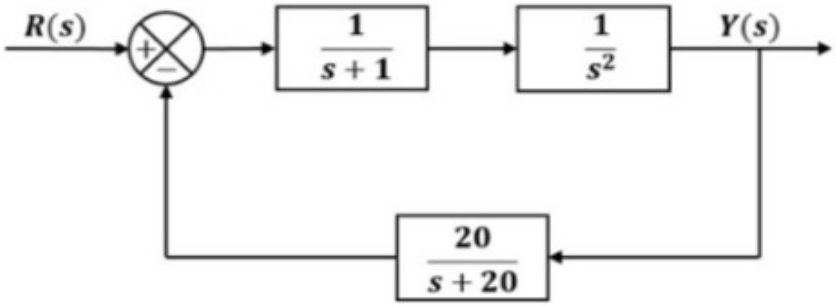
(B) 2.025

(C) 2.000

(D) 1.000

Answer: (B)

**Q.No. 11** Which of the following options is correct for the system shown below?




(A) $4_{th}$ order and stable

(B) $3_{rd}$ order and stable

(C) $4_{th}$ order and stable

(D) $3_{rd}$ order and stable

Answer: (C)

**Q.No. 12** The value of the following complex integral, with C representing the unit circle centered at origin in the counterclockwise sense, is: $\int_C \frac{z^2+1}{z^2-2z}\,dz$

(A) 8πi

(B) -8πi

(C) -πi

(D) πi

Answer: (C)

**Q.No. 13** A three-phase voltage source inverter with ideal devices operating in 180° conduction mode is feeding a balanced star-connected resistive load. The DC voltage input is $V_{dc}$. The peak of the fundamental component of the phase voltage is

(A) $\frac{V_{dc}}{\pi}$

(B) $\frac{2\,V_{dc}}{\pi}$

(C) $\frac{3\,V_{dc}}{\pi}$

(D) $\frac{4\,V_{dc}}{\pi}$

Answer: (B)

**Q.No. 14** A sequence detector is designed to detect precisely 3 digital inputs, with overlapping sequences detectable. For the sequence (1,0,1) and input data what is the output of this detector? (1,1,0,1,0,0,1,1,0,1,1,0), what is the output of this detector?

(A) 1,1,0,0,0,0,1,1,0,1,0,0

(B) 0,1,0,0,0,0,0,1,01,0,0

(C) 0,1,0,0,0,0,0,1,0,1,1,0

(D) 0,1,0,0,0,0,0,0,1,0,0,0

Answer: (B)

**Q.No. 15** For a complex number z, $\lim_{z\to i} \frac{z^2+1}{z^3+2z-i\left(z^2+2\right)}$ is

(A) -2i

(B) -i

(C) i

(D) 2i

Answer: (D)

**Q.No. 16** Consider a linear time-invariant system whose input r(t) and output y(t) are related by the following differential equation: $\frac{d^2y(t)}{dt^2} + 4y(t) = 6r(t)$ The poles of this system are at

(A) +2j, -2j

(B) +2, -2

(C) +4, -4

(D) +4j, -4j

Answer: (A)

**Q.No. 17** $X_R$ and $X_A$ are, respectively, the rms and average values of x(t) = x(t - T), and similarly, $Y_R$ and $Y_A$ are, respectively, the rms and average values of y(t) = kx(t) . k, T are independent of t. Which of the following is true?

(A) $Y_A = kX_A$; $Y_R = kX_R$

(B) $Y_A = kX_A$; $Y_R \neq kX_R$

(C) $Y_A \neq kX_A$; $Y_R = kX_R$

(D) $Y_A \neq kX_A$; $Y_R \neq kX_R$

Answer: (A)

**Q.No. 18** Let $g(x) = \begin{cases} -x, & x \leq 1 \\ x+1, & x \geq 1 \end{cases}$ and $f(x) = \begin{cases} 1-x, & x \leq 0 \\ x^2, & x > 0 \end{cases}$ Consider the composition of f and g, i.e., $(f \circ g)(x) = f(g(x))$ The number of discontinuities in $(f \circ g)(x)$ present in the interval $(-\infty, 0)$ is

(A) 0

(B) 1

(C) 2

(D) 4

Answer: (A)

**Q.No. 19** $ax^3 + b^{x2} + cx + d$ is a polynomial on real x over real coefficients a, b, c, d wherein a ≠ 0. Which of the following statements is true?

(A) d can be chosen to ensure that x = 0 is a root for any given set a, b, c.

(B) No choice of coefficients can make all roots identical.

(C) a, b, c, d can be chosen to ensure that all roots are complex.

(D) c alone cannot ensure that all roots are real

Answer: (C)

**Q.No. 20** The causal realization of a system transfer function H (s) having poles at (2, -1), (-2,1) and zeroes at (2,1), (-2, -1) will be

(A) stable, real, allpass

(B) unstable, complex, allpass

(C) unstable, real, highpass

(D) stable, complex, lowpass

Answer: (B)

**Q.No. 21** A phase-controlled, single-phase. full-bridge converter is supplying a highly inductive DC load. The converter is fed from a 230 V, 50 Hz, AC source. The ftndamental frequency in Hz of the voltage ripple on the DC side is

(A) 25

(B) 50

(C) 100

(D) 300

Answer: (C)

**Q.No. 22** A single-phase, full-bridge diode rectifier fed from a 230 V, 50 Hz sinusoidal source supplies a series combination of finite resistance, R, and a very large inductance, L. The two most dominant frequency components in the source current are:

(A) 50 Hz, 0 Hz

(B) 50 Hz, 100 Hz

(C) 50 Hz, 150 Hz

(D) 150 Hz, 250 Hz

Answer: (C)

**Q.No. 23** Which of the following options is true for a linear time-invariant discrete time system that obeys the difference equation: $y[n] - ay[n - 1] = b_0x[n] - b_1x[n - 1]$

(A) y[n] is unaffected by the values of x[n - k]; k > 2.

(B) The system is necessarily causal.

(C) The system impulse response is non-zero at infinitely many instants.

(D) When x[n] = 0, n < 0, the function y[n];n > 0 is solely determined by the function x [n].

Answer: (C)

**Q.No. 24** The partial differential equation $\frac{\partial^2 u}{\partial t^2} - c^2\left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}\right) = 0$ where $c \neq 0$ is known as

(A) heat equation

(B) wave equation

(C) Poisson's equation

(D) Laplace equation

Answer: (B)

**Q.No. 25** Consider a solid sphere of radius 5 cm made of a perfect electric conductor. If one million electrons are added to this sphere, these electrons will be distributed

(A) uniformly over the entire volume of the sphere

(B) uniformly over the outer surface of the sphere

(C) concentrated around the centre of the sphere

(D) along a straight line passing through the centre of the sphere

Answer: (B)

**Q.No. 26** The matrix $\mathbf{A} = \begin{bmatrix} \frac{3}{2} & 0 & \frac{1}{2} \\ 0 & -1 & 0 \\ \frac{1}{2} & 0 & \frac{3}{2} \end{bmatrix}$ has three distinct eigenvalues and one of its eigenvectors is $\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$ Which one of the following can be another eigenvector of A ?

(A) $\begin{bmatrix} 0 \\ 0 \\ -1 \end{bmatrix}$

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(B) $\begin{bmatrix} = \\ 0 \\ 0 \end{bmatrix}$

(C) $\begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$

(D) $\begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}$

Answer: (C)

**Q.No. 27** The inverse Laplace transform of $H(s) = \frac{s+3}{s^2+2s+1}$ for $t \geq 0$ is

(A) $3te^{-t} + e^{-t}$

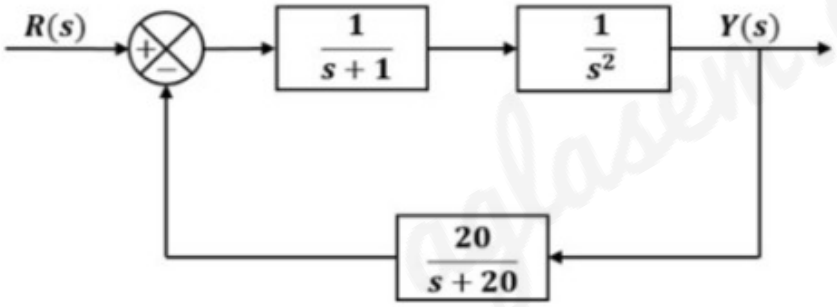
(B) $3e^{-t}$

(C) $2te^{-t} + e^{-t}$

(D) $4te^{-t} + e^{-t}$

Answer: (C)

**Q.No. 28** Which of the following options is correct for the system shown below?




(A) $4_{th}$ order and stable

(B) $3_{rd}$ order and stable

(C) $4_{th}$ order and stable

(D) $3_{rd}$ order and stable

Answer: (C)

**Q.No. 29** The slope and level detector circuit in a CRO has a delay of 100 ns. The start-stop sweep generator has a response time of 50 ns. In order to display correctly, a delay line of

(A) 150 ns has to be inserted into the y-channel

(B) 150 ns has to be inserted into the x-channel

(C) 150 ns has to be inseltecl into both x and y channels

(D) 100 ns has to be inserted into both x and y channels

Answer: (A)

**Q.No. 30** Out of the following options, the most relevant information needed to specify the real power (P) at the PV buses in a load flow analysis is

(A) solution of economic load dispatch

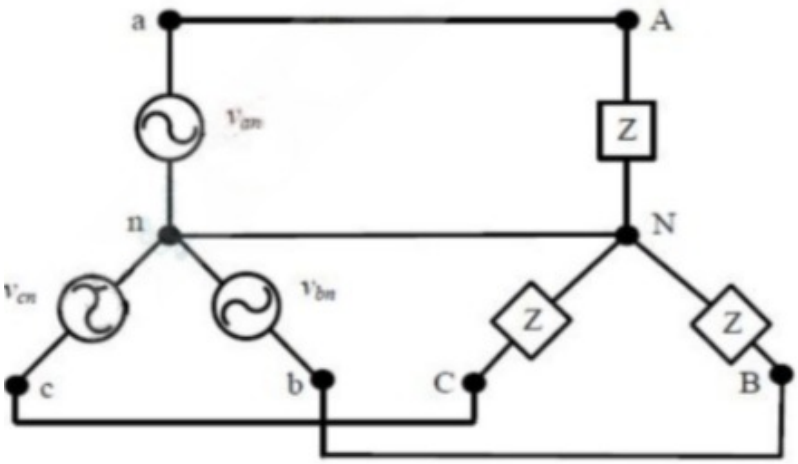
(B) rated power output of the generator

(C) rated voltage of the generator

(D) base power of the generator

Answer: (A)

**Q.No. 31** For the balanced Y-Y connected 3-phase circuit shown in the figure below, the line-line voltage is 208 V rms and the total power absorbed by the load is 432 W at a power factor of 0.6 leading.




The approximate value of the impedance Z is

(A) $33\angle -53.1^{\circ}\Omega$

(B) $60\angle 53.1^{\circ}\Omega$

(C) $60\angle -53.1^{\circ}\Omega$

(D) $180\angle -53.1^{\circ}\Omega$

Answer: (C)

**Q.No. 32** A 5 kVA, 50 V/100 V, single-phase transformer has a secondary terminal voltage of 95 V when loaded. The regulation of the transformer is

(A) 4.5%

(B) 9%

(C) 5%

(D) 1%

Answer: (C)

**Q.No. 33** The symbols, $a$ and $T$, represent positive quantities, and $u(t)$ is the unit step function. Which one of the following impulse responses is NOT the output of a causal linear time-invariant system?

(A) $e^{+at}u(t)$

(B) $e^{-a(t+T)}u(t)$

(C) $1 + e^{-at}u(t)$

(D) $e^{-a(t-T)}u(t)$

Answer: (C)

**Q.No. 34** Consider a linear time-invariant system whose input r(t) and output y(t) are related by the following differential equation: $\frac{d^2y(t)}{dt^2} + 4y(t) = 6r(t)$ The poles of this system are at

(A) +2j, -2j

(B) +2, -2

(C) +4, -4

(D) +4j, -4j

Answer: (A)

**Q.No. 35** Which one of the following functions is analytic in the region $|z| \leq 1$?

(A) $(z^2-1)/z$

(B) $(z^2-1)/z+2$

(C) $(z^2-1)/z-0.5$

(D) $(z^2-1)/z+j0.5$

Answer: (B)

**Q.No. 36** A benchtop dc power supply acts as an ideal 4 A current source as long as its terminal voltage is below 10 V. Beyond this point, it begins to behave as an ideal 10 V voltage source for all load currents going down to 0 A. When connected to an ideal rheostat, find the load resistance value at which maximum power is transferred, and the corresponding load voltage and current.

(A) Short, ∞ A, 10 V

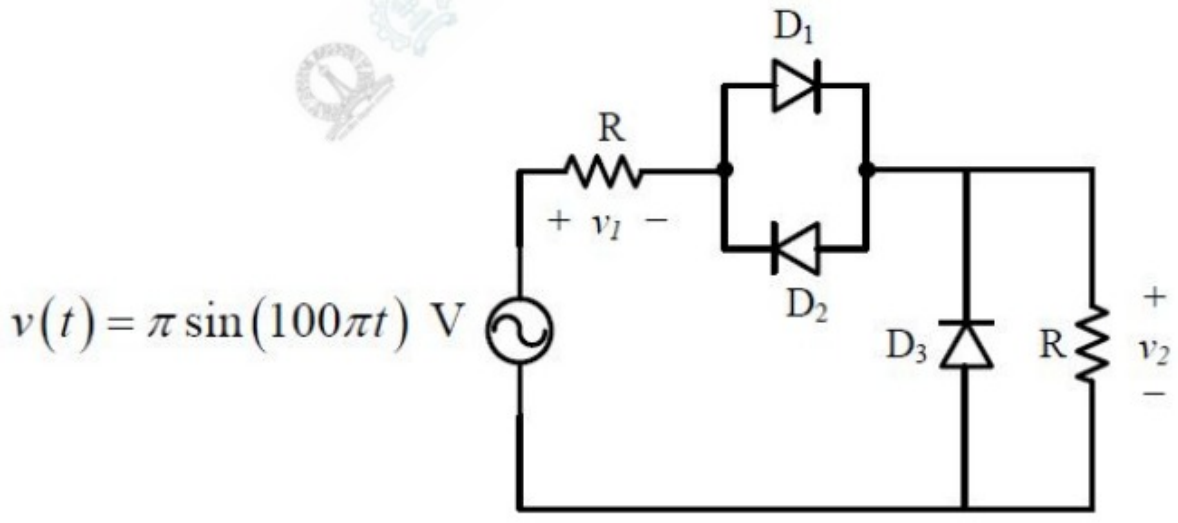
(B) open, 4 A, 0 V

(C) 2.5 Ω, 4 A, 10 V

(D) 2.5 Ω, 4 A, 5 V

Answer: (C)

**Q.No. 37** For the circuit shown in the figure below, assume that diodes D1, D2 and D3 are ideal.




The DC components of voltages V1 and V2 are respectively

(A) 0 V and 1V

(B) -0.5 v 0.5 v

(C) 1 V and 0.5 V

(D) 1 V and 1V

Answer: (B)

**Q.No. 38** A lossless transmission line with 0.2 pu reactance per phase uniformly distributed along the length of the line, connecting a generator bus to a load bus, is protected up to 80 % of its length by a distance relay placed at the generator bus. The generator terminal voltage is 1 pu. There is no generation at the load bus. The threshold pu current for operation of the distance relay for a solid three phase-to-ground fault on the transmission line is closest to:

(A) 1.00

(B) 3.61

(C) 5.00

(D) 6.25

Answer: (D)

**Q.No. 39** If a synchronous motor is running at a leading power factor, its excitation induced voltage (Ef) is

(A) equal to tenninal voltage Vt

(B) higher than the tenninal voltage Vt

(C) less than terminal voltage Vt

(D) dependent upon supply yoltage Vt

Answer: (B)

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

**Q.No. 40** The output expression for the Karnaugh map shown below is

(A) $B\bar{D} + BCD$

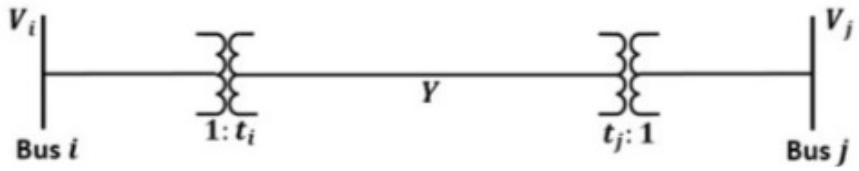
(B) $B\bar{D} + AB$

(C) $\bar{B}D + ABC$

(D) $B\bar{D} + ABC$

Answer: (D)

**Q.No. 41** Two buses, i and j, are connected with a transmission line of admittance Y, at the two ends of which there are ideal transformers with turns ratios as shown. Bus admittance matrix for the system is:




(A) $\begin{bmatrix} -t_i t_j Y & t_j^2 Y \\ t_i^2 Y & -t_i t_j Y \end{bmatrix}$

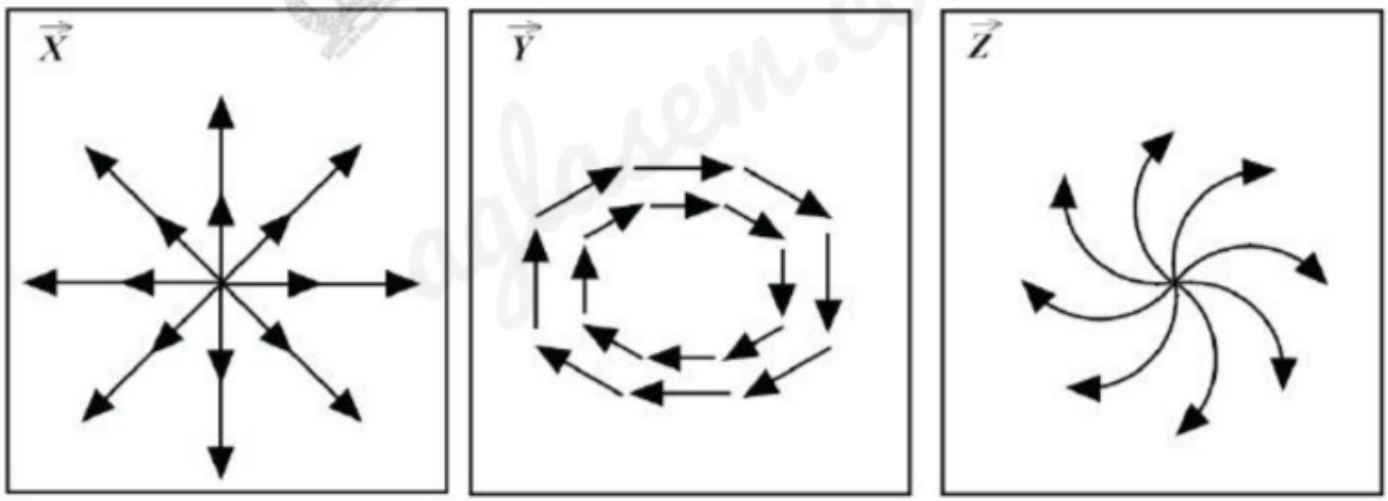
(B) $\begin{bmatrix} t_i t_j Y & -t_j^2 Y \\ -t_i^2 Y & t_i t_j Y \end{bmatrix}$

(C) $\begin{bmatrix} t_i^2 Y & -t_i t_j Y \\ -t_i t_j Y & t_j^2 Y \end{bmatrix}$

(D) $\begin{bmatrix} t_i t_j Y & -(t_i - t_j)^2 Y \\ -(t_i - t_j)^2 Y & t_i t_j Y \end{bmatrix}$

Answer: (C)

**Q.No. 42** The figures show diagramatic representations of vector fields $\vec{X}$, $\vec{Y}$, and $\vec{Z}$ respectively. which one of the following choices is true?




(A) $(\mathrm{A})\ \nabla \cdot \vec{x} = 0, \nabla \times \vec{Y} \neq 0, \nabla \times \vec{Z} = 0$

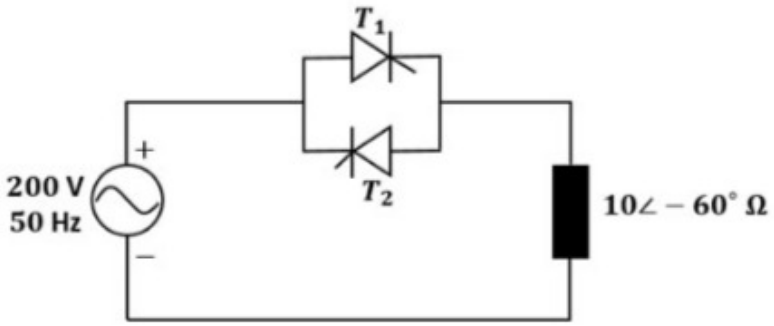
(B) $\nabla . \vec{X} \neq 0, \nabla \times \vec{Y} = 0, \nabla \times \vec{Z} \neq 0$

(C) $\nabla \cdot \vec{X} \neq 0, \nabla \times \vec{Y} \neq 0, \nabla \times \vec{Z} \neq 0$

(D) $\nabla . \vec{x} = 0, \nabla \times \vec{Y} = 0, \nabla \times \vec{z} = 0$

Answer: (C)

**Q.No. 43** Thyristor $T_1$ is triggered at an angle (in degree), and $T_2$ at angle 180° + α, in each cycle of the sinusoidal input voltage. Assume both thyristors to be ideal. To control the load power over the range 0 to 2 kW, the minimum range of




variation in α is:

(A) 0° to 60°

(B) 0° to 120°

(C) 60° to 120°

(D) 0° to 180°

Answer: (D)

**Q.No. 44** A 250 V dc shunt motor has an armature resistance of 0.2 Ω and a field resistance of 100 Q. When the motor is operated on no-load at rated voltage, it draws an armature current of 5 A and runs at 1200 rpm. When a load is coupled to the motor, it draws total line current of 50 A at rated voltage, with a 5 % reduction in the air-gap flux due to armature reaction. Voltage drop across the brushes can be taken as 1 V per brush under all operating conditions. The speed of the motor, in rpm, under this loaded condition, is closest to:

(A) 1200

(B) 1000

(C) 1220

(D) 900

Answer: (C)

**Q.No. 45** A DC-DC buck converter operates in continuous conduction mode. It has 48 V input voltage, and it feeds a resistive load of 24Ω. The switching frequency of the converter is 250 Hz. If switch-on duration is 1 ms, the load power is

(A) 6 W

(B) 12 W

(C) 24 W

(D) 48 W

Answer: (A)

**Q.No. 46** Which of the following options is true for a linear time-invariant discrete time system that obeys the difference equation: $y[n] - ay[n - 1] = b_0x[n] - b_1x[n - 1]$

(A) y[n] is unaffected by the values of x[n - k]; k > 2.

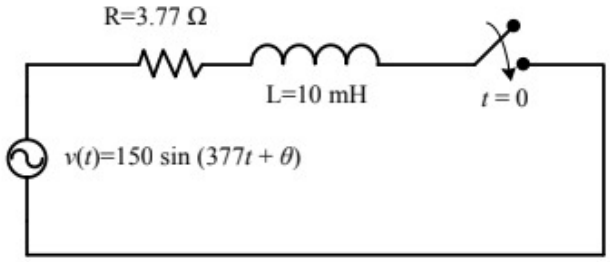
(B) The system is necessarily causal.

(C) The system impulse response is non-zero at infinitely many instants.

(D) When x[n] = 0, n < 0, the function y[n];n > 0 is solely determined by the function x [n].

Answer: (C)

**Q.No. 47** In the circuit shown below, the switch is closed at t = 0. The value of θ in degrees which will give the maximum value of DC offset of the current at the time of switching is




(A) 60

(B) −45

(C) 90

(D) −30

Answer: (B)

**Q.No. 48** A stable real linear time-invariant system with single pole at p, has a transfer function $H(s) = \frac{s^2+100}{s-p}$ with a dc gain of 5. The smallest positive frequency, in rad/s, at unity gain is closest to:

(A) 8.84

(B) 11.08

(C) 78.13

(D) 122.87

Answer: (A)

**Q.No. 49** 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. Att — O, the particles are released but ale constrained to move along the same straight line. Which of these will collide first?

(A) the particles will never collide

(B) all will collide together

(C) proton and neutron

(D) electron and neutron

Answer: (D)

**Q.No. 50** A common-source amplifier with a drain resistance, $R_D$ = 4.7 kΩ, is powered using a 10 V power supply. Assuming that the transconductance, $g_m$, is 520 μA/V, the voltage gain of the amplifier is closest to:

(A) -2.44

(B) -1.22

(C) 1.22

(D) 2.44

Answer: (A)

**Q.No. 51** Consider a 2 × 2 matrix $\boldsymbol{M}$ = [$\boldsymbol{v_1}$ $\boldsymbol{v}_2$], where, $\boldsymbol{v_1}$ and $\boldsymbol{v}_2$ are the column vectors. Suppose $\boldsymbol{M}^{-1} = \begin{bmatrix} \boldsymbol{u}_1^T \\ \boldsymbol{u}_2^T \end{bmatrix}$, where $\boldsymbol{u}_1{}^T$and $\boldsymbol{u}_2{}^T T$ are the row vectors. Consider the following statements: Statement 1: $\boldsymbol{u}_1{}^T \boldsymbol{v}_1$=1 and $\boldsymbol{u}_2{}^T \boldsymbol{v}_2$=1 Statement 2:

$\boldsymbol{u}_1{}^T\boldsymbol{v}_2=0$ and $\boldsymbol{u}_2{}^T\boldsymbol{v}_1=0$ Which of the following options is correct?

(A) Statement 1 is true and statement 2 is false

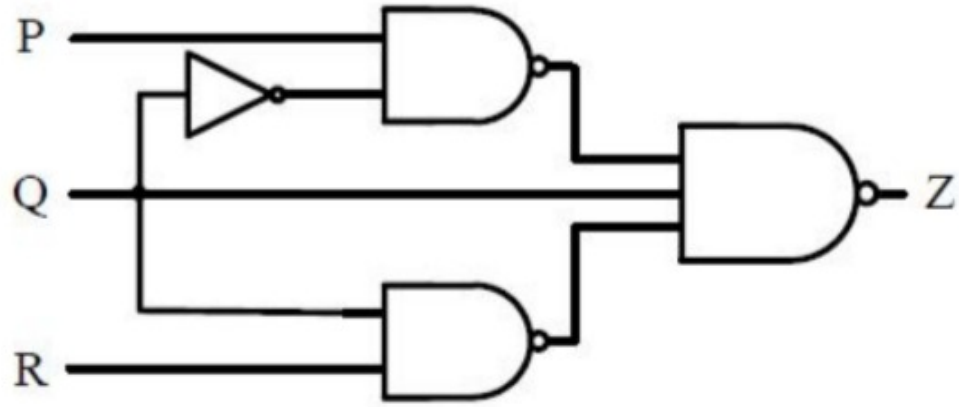
(B) Statement 2 is true and statement 1 is false

(C) Both the statements are true

(D) Both the statements are false

Answer: (C)

**Q.No. 52** For a 3-input logic circuit shown below, the output Z can be expressed as




(A) $Q + \bar{R}$

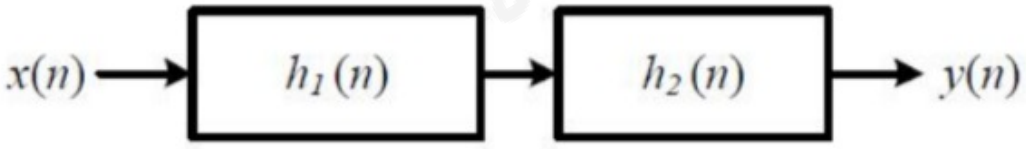
(B) $P\bar{Q} + R$

(C) $\bar{Q} + R$

(D) $P + \bar{Q} + R$

Answer: (C)

**Q.No. 53** A cascade system having the impulse responses $h_1(n) = \{1, -1\}$ and $h_2(n) = \{1, 1\}$ is shown in the figure below. where symbol ↑ denotes the time origin.




The input sequence x(n) for which the cascade system produces an output sequence y(n) = { 1, 2, 1, -1, -2, -1} is

(A) x( n) = {1,2,1,1}

(B) x( n) = {1,1,2,2}

(C) x( n) = {1,1,1,1}

(D) x( n) = {1,2,2,1}

Answer: (D)

**Q.No. 54** A 3-phase, 4-pole, 400 V, 50 Hz squirrel-cage induction motor is operating at a slip of 0.02. The speed of the rotor flux in mechanical rad/sec, sensed by a stationary observer, is closest to

(A) 1500

(B) 1470

(C) 157

(D) 154

Answer: (C)

**Q.No. 55** Consider a signal x[n] = (½)$^n$ 1[n], where 1[n] = 0 if n < 0, and 1[n] = 1 if n ≥ 0. The z-transform of x[n— k], k > 0 is $\frac{z^{-k}}{1-\frac{1}{2}z^{-1}}$ with region of convergence being

(A) |z| < 2

(B) |z| > 2

(C) |z| < ½

(D) |z| > ½

Answer: (D)

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