

National Testing Agency

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Fundamental Concepts of Electricity

Group Number :	1
Group Id :	603489127
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Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	100
Is this Group for Examiner? :	No

Fundamental Concepts of Electricity-1

Section Id :	603489185
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory

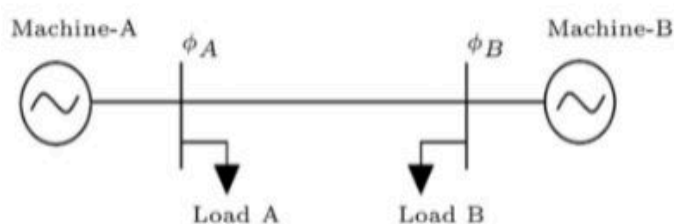
Number of Questions :	75
Number of Questions to be attempted :	75
Section Marks :	100
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	603489344
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 6034899519 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A lossless power system is shown in the figure, with bus voltage angles satisfying $\phi_A - \phi_B = 30^\circ$. In order to reduce this phase angle difference without changing the system frequency and the power outputs of machine-A and machine-B, the



1. Active power of load-A should be increased and that of load-B should be reduced
2. Active power of load-B should be increased and that of load-A should be reduced
3. Active power of load-B should be increased and no action should be taken by load-A
4. Active power of load-A and load-B should both be reduced.

Options :

60348936015. 1

60348936016. 2

60348936017. 3

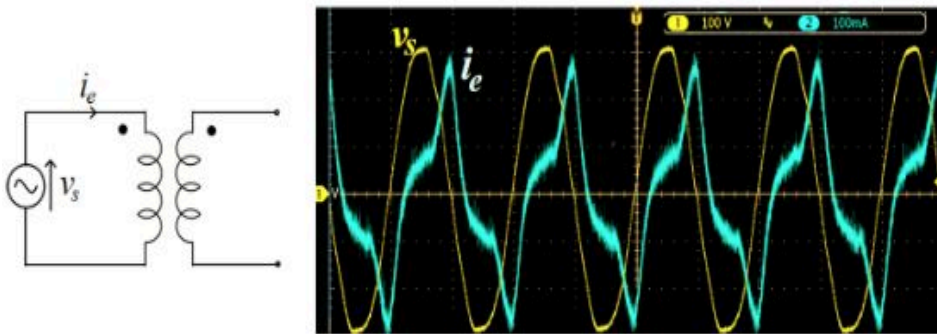
60348936018. 4

Question Number : 2 Question Id : 6034899520 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A practical transformer (having core and copper losses) when excited with a sinusoidal source of 50 Hz draws a no-load current as shown in the figure. What is the lag angle (ϕ) of the fundamental component of no-load current with respect to the source voltage?



1. $\phi < 90^\circ$
2. $\phi = 180^\circ$
3. $\phi = 90^\circ$
4. $\phi > 90^\circ$

Options :

60348936019. 1

60348936020. 2

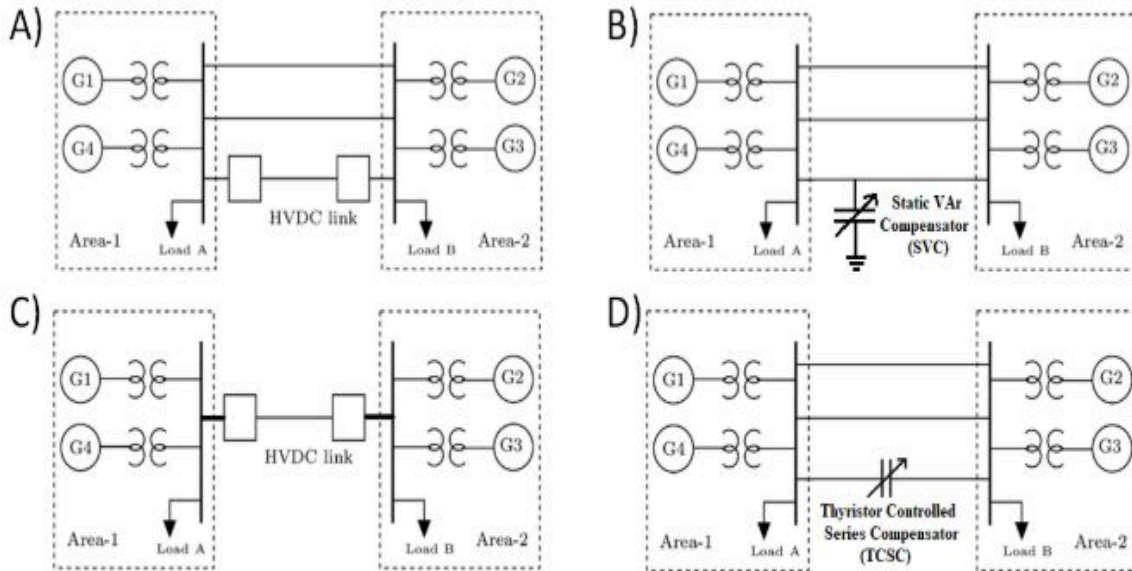
60348936021. 3

60348936022. 4

Question Number : 3 Question Id : 6034899521 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which one of the following configurations has an asynchronous link?



1. A)
2. B)
3. C)
4. D)

Options :

60348936023. 1
60348936024. 2
60348936025. 3
60348936026. 4

Question Number : 4 Question Id : 6034899522 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Series capacitors are connected to long EHV (extra high voltage) lines to:

1. Increase the power transfer capability of the line
2. Prevent over-voltages
3. Control the system frequency
4. Improve the power factor of loads

Options :

60348936027. 1
60348936028. 2

60348936029. 3

60348936030. 4

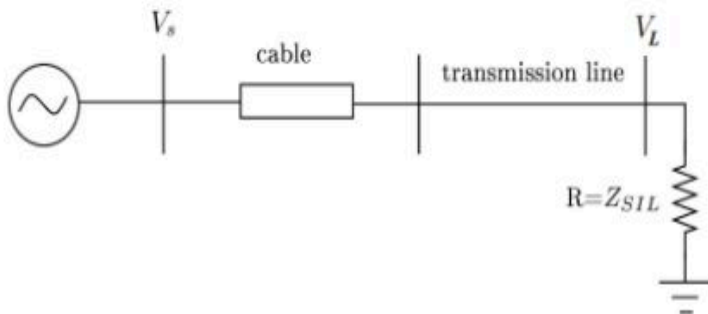
Question Number : 5 Question Id : 6034899523 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider a 100 km long, lossless overhead transmission line which is terminated on a 30 km cable as shown in the figure. The overhead transmission line and the cable are rated for the same nominal voltage. The parameters of the system are as follows:

Overhead transmission line: $x_L = 0.488 \Omega / \text{km}$, $b_c = 3.371 \mu\text{S} / \text{km}$

Cable: $x_L = 0.3388 \Omega / \text{km}$, $b_c = 245.6 \mu\text{S} / \text{km}$.



If the transmission line is terminated by a resistance equal to characteristic impedance of the transmission line (Z_{SIL}), then the voltage V_L at the junction of the cable and the resistance when $V_s = 230 \text{ kV}$ is

1. $V_L < 230 \text{ kV}$
2. $V_L > 230 \text{ kV}$
3. $V_L = 230 \text{ kV}$
4. $V_L = 0 \text{ kV}$

Options :

60348936031. 1

60348936032. 2

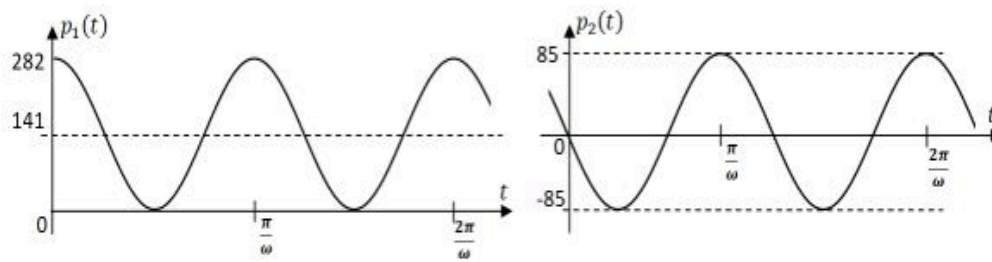
60348936033. 3

60348936034. 4

Question Number : 6 Question Id : 6034899524 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The instantaneous power p flowing into a single phase ac circuit in steady state is resolved into two components $p_1(t)$ and $p_2(t)$, i.e. $p(t) = p_1(t) + p_2(t)$. The plots of $p_1(t)$ and $p_2(t)$ (in W) versus t are shown below.



The apparent power drawn by the circuit in VA is:

1. 85
2. 141
3. 164.64
4. 294.53

Options :

60348936035. 1
60348936036. 2
60348936037. 3
60348936038. 4

Question Number : 7 Question Id : 6034899525 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

For a single phase linear circuit in sinusoidal steady state the active power in W is defined as $P = \text{real}\{\vec{V} \cdot \vec{I}^*\}$, where $\vec{V}$ is voltage phasor and $\vec{I}$ is current phasor. P is equal to:

1. The average power drawn over a cycle
2. The instantaneous value of power
3. Average power in a quarter of a cycle
4. The peak value of power over a cycle

Options :

60348936039. 1
60348936040. 2
60348936041. 3

Question Number : 8 Question Id : 6034899526 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A three phase balanced delta connected load is being supplied by a three-phase balanced 60 Hz supply. The total instantaneous three-phase power

1. Is constant
2. Includes a pulsating component of twice the supply frequency
3. Includes a pulsating component of half the supply frequency
4. Includes a pulsating component of thrice the supply frequency

Options :

60348936043. 1

60348936044. 2

60348936045. 3

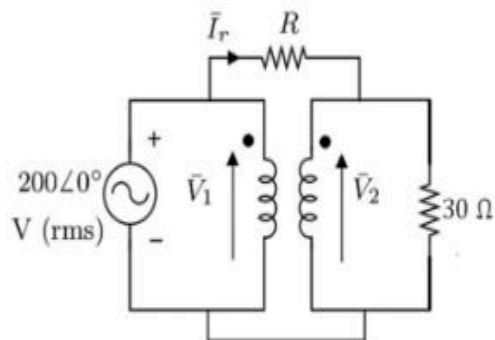
60348936046. 4

Question Number : 9 Question Id : 6034899527 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

What is the current $\bar{I}_r$ through the resistor R , whose value is $50\ \Omega$, in the circuit shown?

$$\bar{V}_1/\bar{V}_2 = 4/7.$$



1. $3\angle 0^\circ\text{ A}$
2. $11\angle 0^\circ\text{ A}$
3. $3\angle 180^\circ\text{ A}$
4. $11\angle 180^\circ\text{ A}$

Options :

60348936047. 1

60348936048. 2

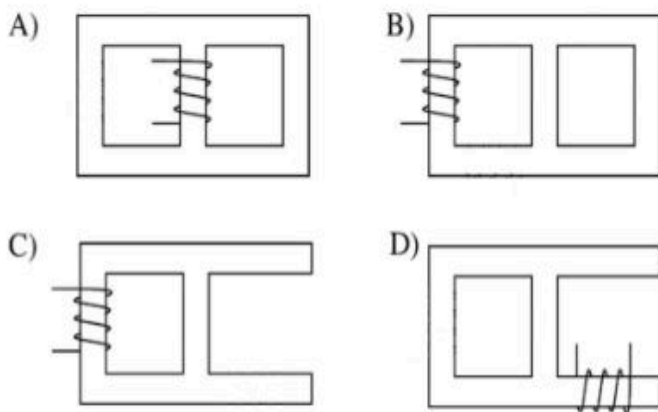
60348936049. 3

60348936050. 4

Question Number : 10 Question Id : 6034899528 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider the magnetic structures shown in the figures. The limbs are of ferromagnetic material, and the core is placed in air. In each case, the coil is excited with the same sinusoidal voltage source of 50 Hz.



Assuming that the limbs of core are not saturated, then in which case will the coil draw the largest current?

1. A
2. B
3. C
4. D

Options :

60348936051. 1

60348936052. 2

60348936053. 3

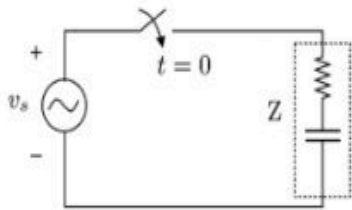
60348936054. 4

Question Number : 11 Question Id : 6034899529 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider the circuit shown in figure below.

The voltage source is $v_s = V_m \sin(\omega t + \phi)$ V, where $\omega = 2\pi \times 50$ rad/s, and the impedance Z of R-C load at 50 Hz is $(30 - j40) \Omega$. The initial capacitor voltage is zero. The value of ϕ , such that the closing of switch at $t = 0$ s does not result in any natural transient in the circuit is:



1. $\phi = -53.13^\circ$
2. $\phi = 53.13^\circ$
3. $\phi = -36.87^\circ$
4. $\phi = 36.87^\circ$

Options :

60348936055. 1

60348936056. 2

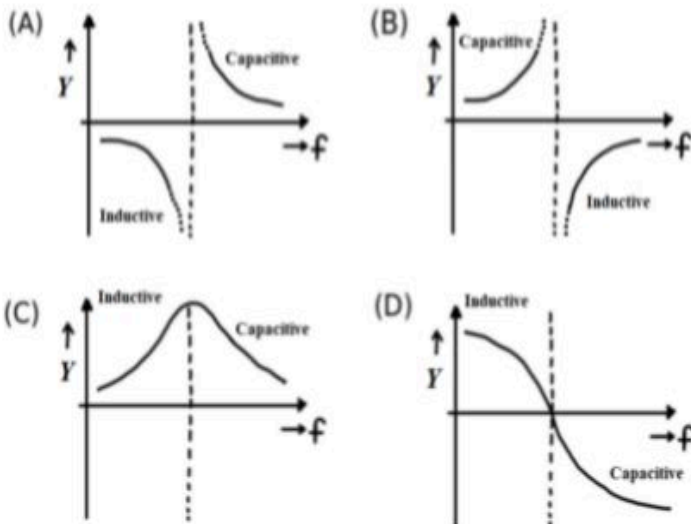
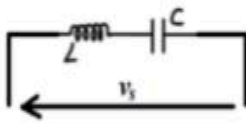
60348936057. 3

60348936058. 4

Question Number : 12 Question Id : 6034899530 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

An inductor is connected in series with a capacitor as shown in the figure. The variation of the imaginary part of the admittance Y as a function of the frequency (as seen from the terminals) is as given in:



1. A
2. B
3. C
4. D

Options :

60348936059. 1

60348936060. 2

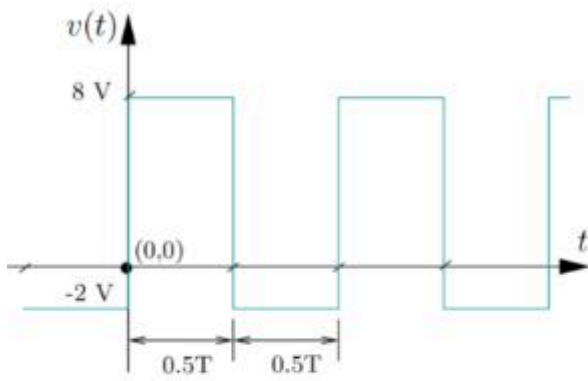
60348936061. 3

60348936062. 4

Question Number : 13 Question Id : 6034899531 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider a periodic waveform as shown in the figure, having a period of T .



The rms value of the sixth harmonic component of the waveform is

1. 0 V
2. 1.5 V
3. 2.12 V
4. 3 V

Options :

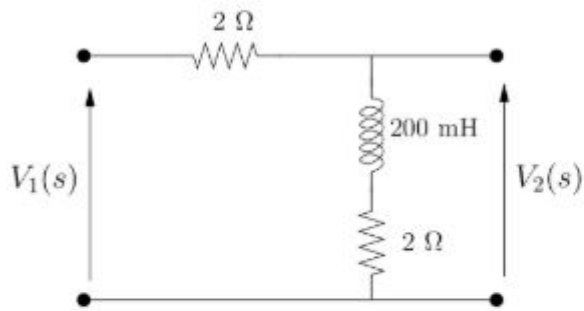
60348936063. 1
60348936064. 2
60348936065. 3
60348936066. 4

Question Number : 14 Question Id : 6034899532 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The transfer function $\frac{V_2(s)}{V_1(s)}$ of the circuit shown below is:



1. $\frac{0.5s+10}{s+2}$
2. $\frac{s+20}{s+10}$
3. $\frac{s+10}{s+20}$
4. $\frac{2s+10}{s+2}$

Options :

60348936067. 1

60348936068. 2

60348936069. 3

60348936070. 4

Question Number : 15 Question Id : 6034899533 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A 50 Hz synchronous generator is initially open-circuited. With the field voltage held constant, the generator is now connected to a 320 km lossless transmission line, which is open circuited at the receiving end, as shown in figure.



Which one of the following may be said about the steady-state voltage and the field current of the generator?

1. The magnitude of terminal voltage increases, and the field current does not change
2. The magnitude of terminal voltage decreases, and the field current does not change
3. The magnitude of terminal voltage decreases, and the field current increases
4. The magnitude of terminal voltage does not change, and the field current decreases

Options :

60348936071. 1

60348936072. 2

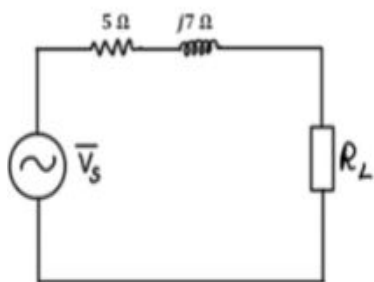
60348936073. 3

60348936074. 4

Question Number : 16 Question Id : 6034899534 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The load resistance R_L such that maximum real power is transferred to R_L from the source, is:



1. 7Ω
2. 5.5Ω
3. $5-j7 \Omega$
4. 8.6Ω

Options :

60348936075. 1

60348936076. 2

60348936077. 3

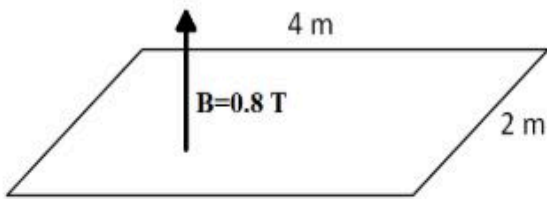
60348936078. 4

Question Number : 17 Question Id : 6034899535 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

In the figure below a uniform magnetic field B is perpendicular to the plane of the rectangle.



What is the magnetic flux through the rectangle?

- 1. 0.8 Wb
- 2. 0 Wb
- 3. 6.4 Wb
- 4. 8 Wb

Options :

60348936079. 1

60348936080. 2

60348936081. 3

60348936082. 4

Question Number : 18 Question Id : 6034899536 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A three phase induction machine (IM) is connected to a 400 V, 50 Hz three-phase supply. If the speed of the IM is 3060 rpm, then which of the following statements is correct?

1. IM is running as a generator and it has 4 poles
2. IM is running as a motor and it has 4 poles
3. IM is running as a generator and it has 2 poles
4. IM is running as a motor and it has 2 poles

Options :

60348936083. 1

60348936084. 2

60348936085. 3

60348936086. 4

Question Number : 19 Question Id : 6034899537 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A parallel R-L-C circuit is excited by a sinusoidal voltage source whose frequency is below the resonant frequency of the circuit. In steady-state, the circuit will

1. Draw reactive power from the source
2. Supply reactive power to the source
3. Operate at unity power factor
4. Not draw any real power from the source

Options :

60348936087. 1

60348936088. 2

60348936089. 3

60348936090. 4

Question Number : 20 Question Id : 6034899538 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The alternating current (ac) though the body which can lead to possible fatality (as per Dalziel electrocution formula, where t is time in s)

1. $I = \frac{0.165}{\sqrt{t}} A$

2. $I = 0.165 \times \sqrt{t} A$

3. $I = 16.5 \times \sqrt{t} A$

4. $I = \frac{16.5}{\sqrt{t}} A$

Options :

60348936091. 1

60348936092. 2

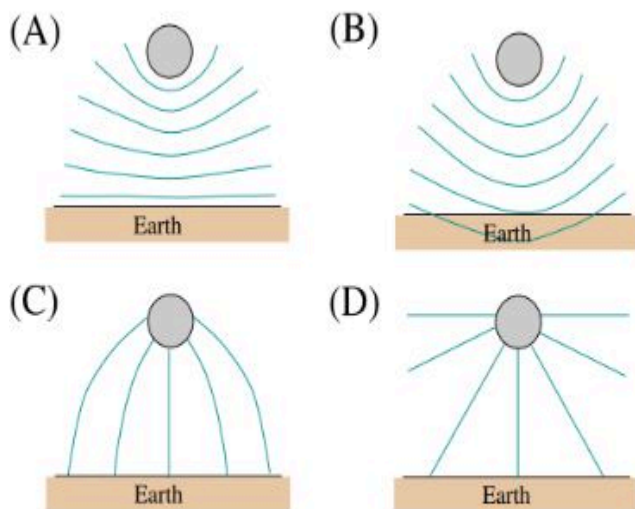
60348936093. 3

60348936094. 4

Question Number : 21 Question Id : 6034899539 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which of the following represents electric field lines for a cylindrical cross-section conductor excited by a dc voltage with respect to earth?



1. A

2. B

3. C

4. D

Options :

60348936095. 1

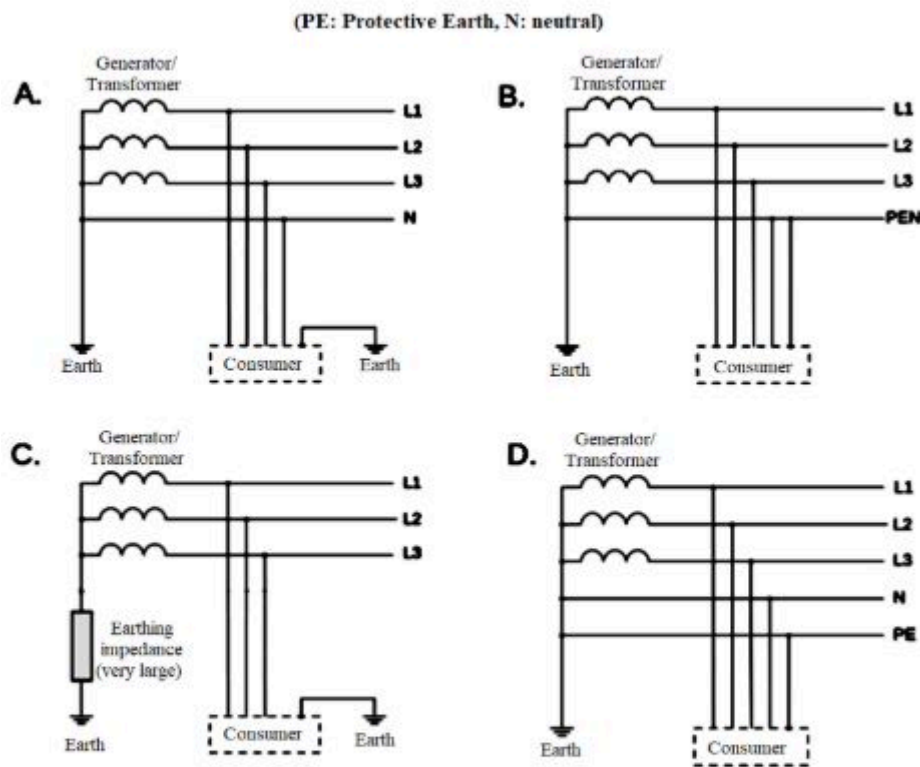
60348936096. 2

60348936097. 3

60348936098. 4

Question Number : 22 Question Id : 6034899540 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following is least safe for a broken neutral condition?



- 1. A
- 2. B
- 3. C
- 4. D

Options :

60348936099. 1

60348936100. 2

60348936101. 3

60348936102. 4

Question Number : 23 Question Id : 6034899541 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

In a practical situation, a synchronous generator can be made to supply more reactive power by

1. Increasing the speed of the machine
2. Increasing the field current
3. Decreasing the speed of the machine
4. Decreasing the field current

Options :

60348936103. 1

60348936104. 2

60348936105. 3

60348936106. 4

Question Number : 24 Question Id : 6034899542 Question Type : MCQ Option Shuffling : No Is

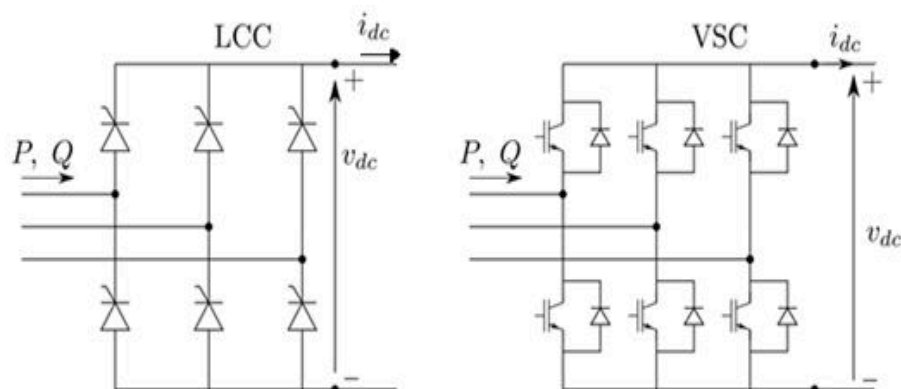
Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider an LCC (line commutated converter) and a VSC (voltage source converter) based device as shown in the figure below.

Statement 1: For an LCC, the average value of i_{dc} can only be non-negative.

Statement 2: For a VSC, the average value of i_{dc} can only be non-negative.



1. Both Statement 1 and Statement 2 are false
2. Statement 1 is true and Statement 2 is false
3. Statement 1 is false and Statement 2 is true
4. Both Statement 1 and Statement 2 are true

Options :

60348936107. 1

60348936108. 2

60348936109. 3

60348936110. 4

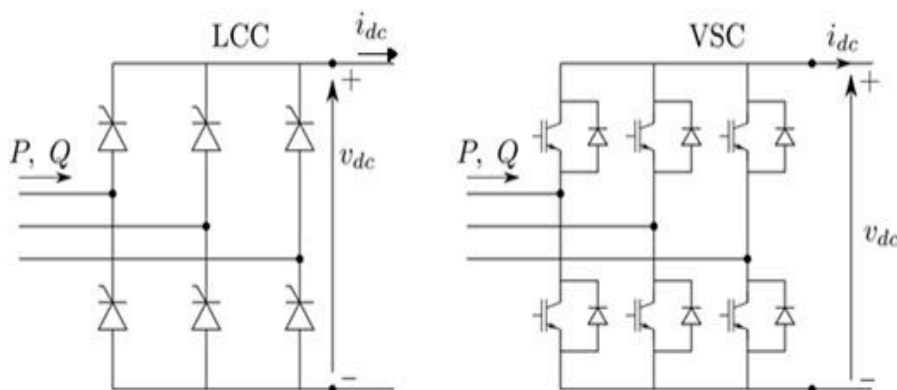
Question Number : 25 Question Id : 6034899543 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider an LCC (line commutated converter) and a VSC (voltage source converter) based device as shown in the figure below.

Statement 1: An LCC is capable of both injecting and absorbing reactive power on the AC side

Statement 2: A VSC is capable of both injecting and absorbing reactive power on the AC side



1. Both Statement 1 and Statement 2 are false
2. Statement 1 is true and Statement 2 is false
3. Statement 1 is false and Statement 2 is true
4. Both Statement 1 and Statement 2 are true

Options :

60348936111. 1

60348936112. 2

60348936113. 3

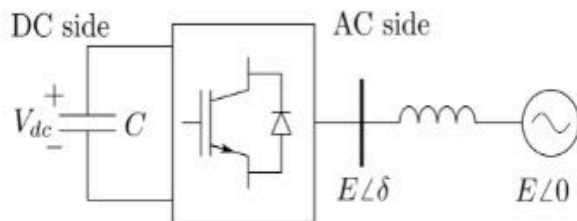
60348936114. 4

Question Number : 26 Question Id : 6034899544 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A three phase voltage source converter is connected to a power system as shown in the figure. The converter's dc side capacitor is marked as C . The system is initially operating in steady-state with $\delta = 0$ and the dc capacitor initial voltage is V_{dc} .



Which of the following actions should be taken to increase the capacitor voltage to a new steady state value? Note: Neglect all losses and the effects of harmonics.

1. Make δ positive and maintain at the positive value
2. Make δ positive and return to its original value
3. Make δ negative and maintain at the negative value
4. Make δ negative and return to its original value

Options :

60348936115. 1

60348936116. 2

60348936117. 3

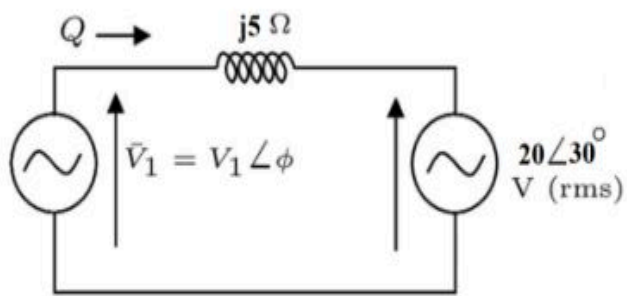
60348936118. 4

Question Number : 27 Question Id : 6034899545 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider two sinusoidal sources of frequency 50 Hz connected as shown in the figure. There is no real power exchange between the two sources. If the first source $\bar{V}_1$ has a reactive power output of 100 VAR, then V_1 is approximately :



1. 14.5 V
2. 24.5 V
3. 34.5 V
4. 44.5 V

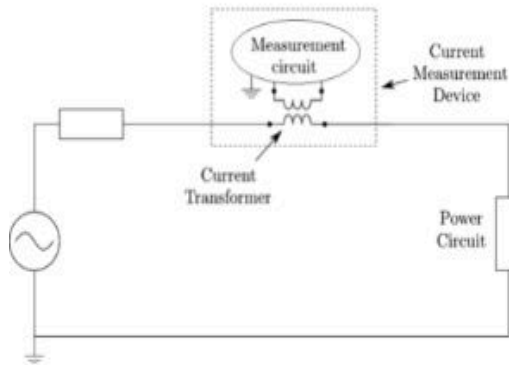
Options :

60348936119. 1
60348936120. 2
60348936121. 3
60348936122. 4

Question Number : 28 Question Id : 6034899546 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A current transformer is used as a part of a current measurement device. It is connected in series with an ac power circuit as shown in the figure. It can step down the currents to measurable levels, besides providing isolation to the measurement circuits. Which of the following is TRUE?



1. The load impedance offered by the measurement circuit when referred to the power circuit side of the current transformer is very small.
2. The current transformer is practically open circuited on the measurement circuit side
3. Short circuiting the winding on the measurement side will damage the power circuit and the current transformer
4. The current transformer is designed to be in saturated state under normal operating conditions.

Options :

60348936123. 1

60348936124. 2

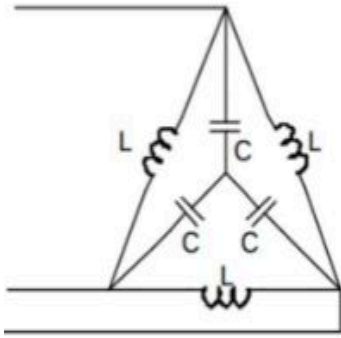
60348936125. 3

60348936126. 4

Question Number : 29 Question Id : 6034899547 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

In the balanced three-phase 60 Hz circuit shown below, the value of the inductance (L) is 10 mH. What is the value of the capacitance (C) for which all the line currents are zero in steady-state?



1. 0.70 mF
2. 2.11 mF
3. 6.33 mF
4. Line currents cannot be made zero.

Options :

60348936127. 1
60348936128. 2
60348936129. 3
60348936130. 4

Question Number : 30 Question Id : 6034899548 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider a linear time-invariant system with transfer function $H(s) = \frac{1}{s + \sqrt{3}}$.

If the input is $\cos(t + \beta)$ and the steady state output is $A \cos(t + \phi)$ then the value of A and ϕ respectively are

1. $\frac{1}{2}, \beta + 30^\circ$
2. $\frac{1}{2}, \beta - 30^\circ$
3. $\frac{1}{\sqrt{3}}, 30^\circ$
4. $\frac{1}{\sqrt{3}}, -30^\circ$

Options :

60348936131. 1

60348936132. 2

60348936133. 3

60348936134. 4

Question Number : 31 Question Id : 6034899549 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

If the voltage applied to an inductor (initially connected to a 415 V ac source) drops by 5%, its VAR (reactive power) consumed drops by

1. 5.25%
2. 9.75%
3. 12.25%
4. 20.25%

Options :

60348936135. 1

60348936136. 2

60348936137. 3

60348936138. 4

Question Number : 32 Question Id : 6034899550 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A power system has two synchronous generators. The governor-turbine characteristics corresponding to the generators are $P_1 = 60(50 - f)$ and $P_2 = 120(51 - f)$ where f denotes the system frequency in Hz, and P_1 and P_2 are, respectively, the power output (in MW) of turbines 1 and 2.

Assuming the generators and transmission network to be lossless, the system frequency for a total load of 360 MW is

1. 47.33 Hz
2. 48.67 Hz
3. 49.82 Hz
4. 50.33 Hz

Options :

60348936139. 1
60348936140. 2
60348936141. 3
60348936142. 4

Question Number : 33 Question Id : 6034899551 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The static electric field intensity at a point in charge-free space is given by $\mathbf{E} = 10y \mathbf{a}_x + 2kx \mathbf{a}_y + 5 \mathbf{a}_z$ V/m.

The value of constant k must be equal to:

1. -3
2. -2.5
3. 4
4. 5

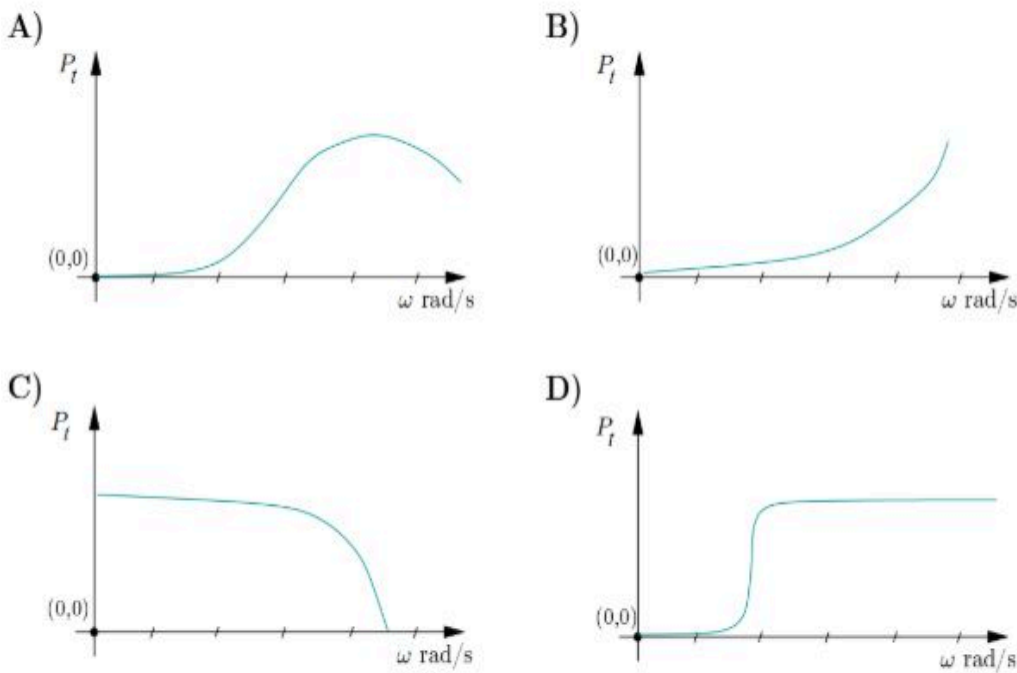
Options :

60348936143. 1
60348936144. 2
60348936145. 3
60348936146. 4

Question Number : 34 Question Id : 6034899552 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Wind turbine system coupled with an electric generator is used to convert wind energy to electrical energy. Which of the following is the CORRECT (typical) characteristic for turbine power (P_t) and turbine angular speed (ω) for a particular wind speed?



- 1. A)
- 2. B)
- 3. C)
- 4. D)

Options :

- 60348936147. 1
- 60348936148. 2
- 60348936149. 3
- 60348936150. 4

Question Number : 35 Question Id : 6034899553 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The signal $y(t) = 10 \sin(2\pi \times 90t + 45^\circ) + 7 \cos(2\pi \times 45t - 60^\circ) + 2.1 \sin(2\pi \times 105t)$

is periodic. The fundamental frequency of $y(t)$ is:

1. 25 Hz
2. 630 Hz
3. 105 Hz
4. 15 Hz

Options :

60348936151. 1

60348936152. 2

60348936153. 3

60348936154. 4

Question Number : 36 Question Id : 6034899554 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

A three-phase delta connected capacitor bank is connected in parallel to a lagging power factor load to make the overall power factor unity. If the same capacitors are now connected in star, the overall power factor will be

1. Lagging
2. Leading
3. One
4. $\sqrt{3}$

Options :

60348936155. 1

60348936156. 2

60348936157. 3

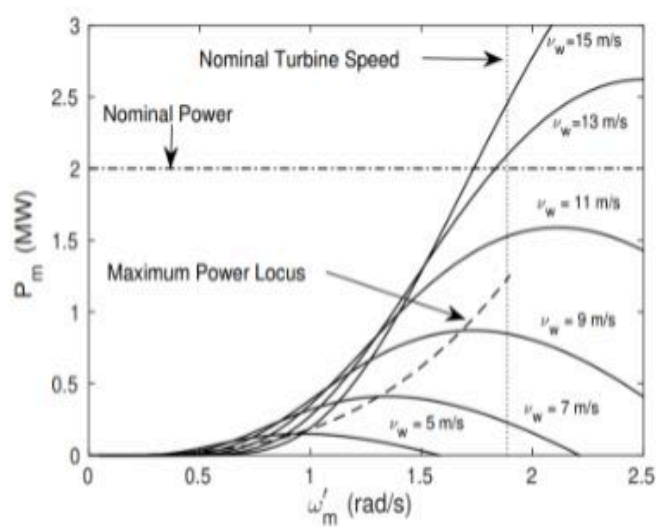
60348936158. 4

Question Number : 37 Question Id : 6034899555 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The characteristics of a wind turbine are shown in the figure below (y axis is the turbine speed) at the minimum blade pitch angle. The wind turbine power and speed ratings are also indicated on the figure.



The turbine has blade-pitch control to avoid over-speed, while the generator torque-speed characteristic is power electronically controlled. If the wind speed is 7 m/s, then it is most appropriate that the wind-turbine should be made to operate at the

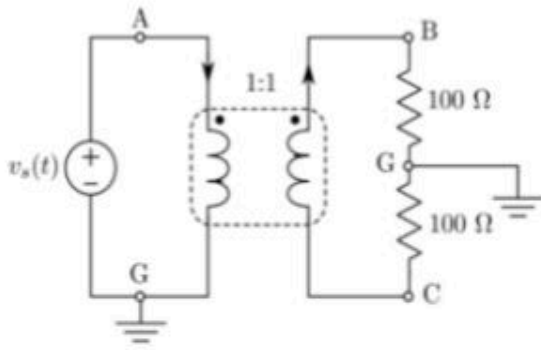
1. Rated Speed
2. Rated Power
3. Maximum Power Point at that speed
4. Angular speed of 1.8 rad/s

Options :

- 60348936159. 1
- 60348936160. 2
- 60348936161. 3
- 60348936162. 4

Question Number : 38 Question Id : 6034899556 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Consider an ideal transformer as shown in the figure.



If $v_s(t) = 200 \sin(2\pi \times 50t)$ V, then the peak value of the potential difference $v_{AB}(t)$ is

1. 0 V
2. 50 V
3. 100 V
4. 300 V

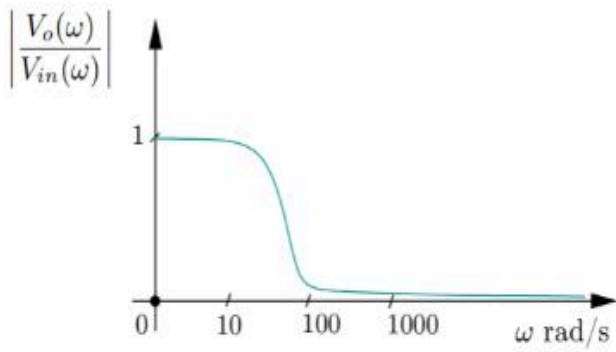
Options :

60348936163. 1
60348936164. 2
60348936165. 3
60348936166. 4

Question Number : 39 Question Id : 6034899557 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider a filter whose magnitude frequency response is shown in figure.



If the applied input voltage is $v_{in}(t) = 10 \sin^2(10t)$, then what is the average value of the output voltage $v_o(t)$ in steady state?

- 1. 5 V
- 2. 15 V
- 3. 25 V
- 4. 30 V

Options :

60348936167. 1

60348936168. 2

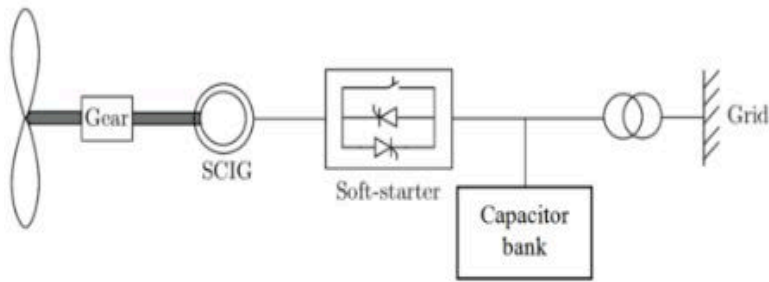
60348936169. 3

60348936170. 4

Question Number : 40 Question Id : 6034899558 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider a type-I wind energy conversion system as shown in the figure. SCIG is a squirrel cage induction generator. The role of the capacitor bank is



1. To assist the functioning of soft starter circuit
2. To compensate for the reactive power required by the induction generator
3. To perform maximum power extraction from the induction generator
4. To filter the effects of wind variability on the active power injected to the grid

Options :

60348936171. 1

60348936172. 2

60348936173. 3

60348936174. 4

Question Number : 41 Question Id : 6034899559 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider a series L-C branch with resonant frequency f_o . The resonant frequency of the circuit consisting of five such branches in parallel will be

1. f_o
2. $5f_o$
3. $f_o/5$
4. Resonance does not occur.

Options :

60348936175. 1

60348936176. 2

60348936177. 3

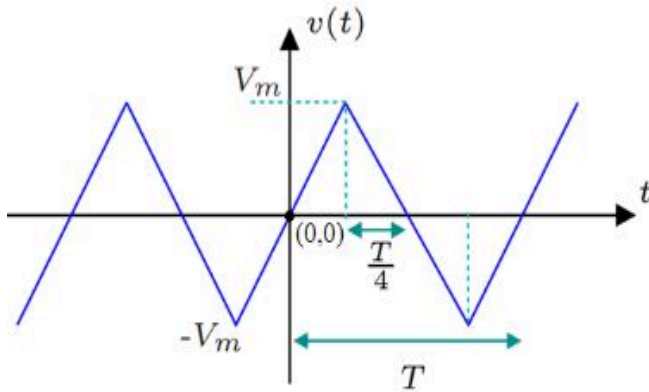
60348936178. 4

Question Number : 42 Question Id : 6034899560 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

For a periodic and symmetric triangular signal as shown, choose the appropriate attributes pertaining to frequency spectra



1. Only sine components and only odd harmonics are present
2. Only sine components and all harmonics are present
3. Only cosine components and only odd harmonics are present
4. Only cosine components and all harmonics are present

Options :

60348936179. 1

60348936180. 2

60348936181. 3

60348936182. 4

Question Number : 43 Question Id : 6034899561 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider a magnetic field under static conditions:

$$\vec{B} = B_x \vec{a}_x + B_y \vec{a}_y + B_z \vec{a}_z \text{ Wb/m}^2,$$

where the coefficients B_x, B_y and B_z are functions in x, y and z respectively.

Which of the following expression is TRUE?

1. $\frac{\partial}{\partial x} B_x + \frac{\partial}{\partial y} B_z + \frac{\partial}{\partial z} B_y = 0$
2. $\frac{\partial}{\partial z} B_y + \frac{\partial}{\partial y} B_x + \frac{\partial}{\partial x} B_z = 0$
3. $\frac{\partial}{\partial x} B_x + \frac{\partial}{\partial y} B_y + \frac{\partial}{\partial z} B_z = 0$
4. $\frac{\partial}{\partial z} B_x + \frac{\partial}{\partial x} B_y + \frac{\partial}{\partial y} B_z = 0$

Options :

60348936183. 1

60348936184. 2

60348936185. 3

60348936186. 4

Question Number : 44 Question Id : 6034899562 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Consider a balanced three-phase synchronous generator. It is connected to a balanced three-phase passive load as shown in the Fig. (i). The direction of speed (ω), net electro-magnetic torque (T_e) and mechanical torque (T_m) applied on the shaft are as shown in Fig. (ii). In steady state, T_e will be

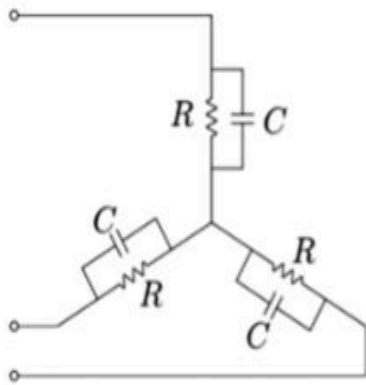


Fig. (i)

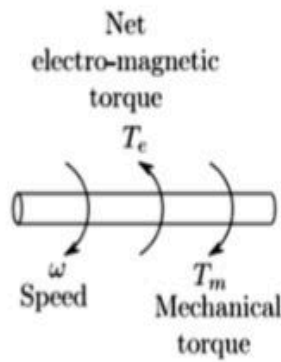


Fig. (ii)

1. a zero average component + a component pulsating at twice the supply frequency
2. constant at zero
3. a constant positive value
4. a positive average component + a component pulsating at twice the supply frequency

Options :

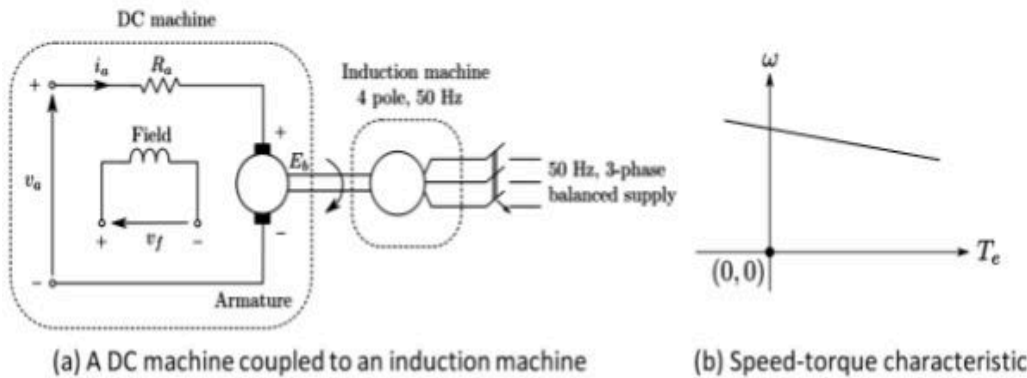
60348936187. 1
60348936188. 2
60348936189. 3
60348936190. 4

Question Number : 45 Question Id : 6034899563 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The rotor of the separately excited DC machine is mechanically coupled to the rotor of a 50 Hz, three-phase, 4-pole induction machine, as shown in figure (a). The steady state speed-torque characteristic of the DC machine (motor convention) for a fixed v_a and v_f is also given in figure (b).



The DC machine is energized first, and the machines are found to rotate at 1600 rpm. Subsequently, the induction machine is connected to a 50 Hz, three-phase balanced AC source with the phase sequence being consistent with the direction of rotation.

Note: v_a and v_f are not changed.

At steady-state, the DC machine and the induction machine will operate in

1. generating mode and motoring mode respectively
2. motoring mode and generating mode respectively
3. generating mode and generating mode respectively
4. motoring mode and motoring mode respectively

Options :

60348936191. 1

60348936192. 2

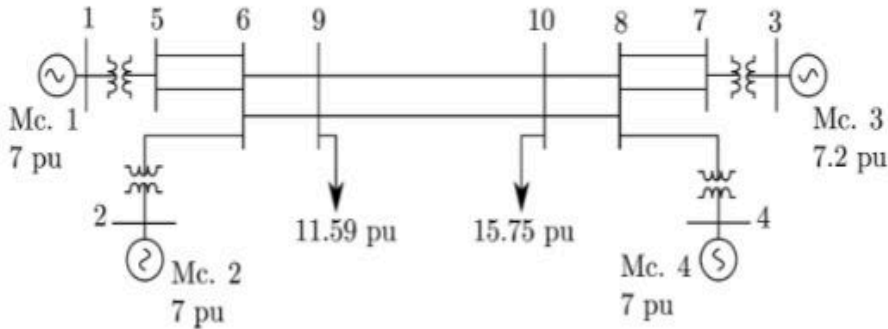
60348936193. 3

60348936194. 4

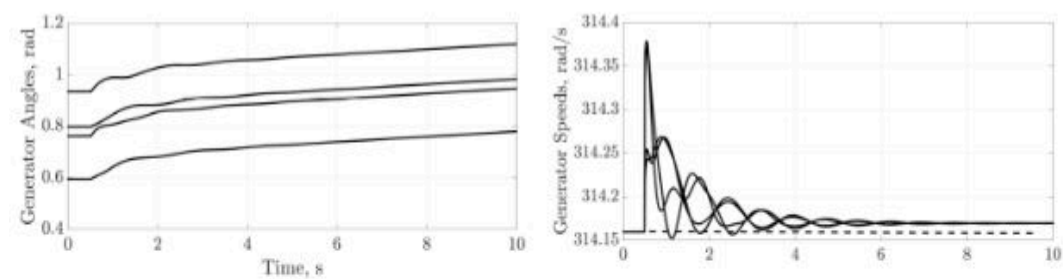
Question Number : 46 Question Id : 6034899564 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The single-line diagram of a two-area four-machine power system has been shown in the figure. The generator active power injections and the load active powers are also indicated in the figure



A disturbance occurs in the system. The plots of the generator speeds and rotor angles (in a 50 Hz frame) are shown in the figures below.



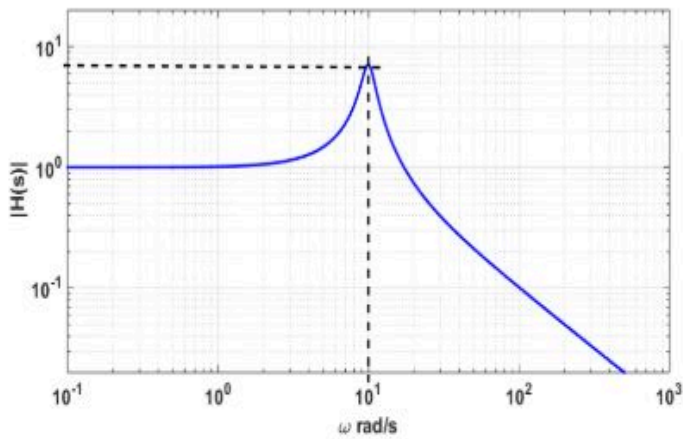
Which of the following statements is correct?

1. The generators have lost synchronism
2. The generators remain in synchronism
3. The oscillations (power swings) are unstable
4. Balance between load and generation is not eventually attained

Options :

- 60348936195. 1
- 60348936196. 2
- 60348936197. 3
- 60348936198. 4

Which of the following transfer functions represent the magnitude Bode plot shown in the figure?



1. $\frac{50(s+2)}{s(s^2+5s+100)}$
2. $\frac{(s+10)}{s(s^2+2s+100)}$
3. $\frac{10(s+10)}{(s^2+2s+100)}$
4. $\frac{100}{(s^2+5s+100)}$

Options :

60348936199. 1

60348936200. 2

60348936201. 3

60348936202. 4

Question Number : 48 Question Id : 6034899566 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The rms value of the line currents of a balanced three-phase delta connected load is 10 A. The rms values of the delta branch currents is

1. 5.77 A
2. 10 A
3. 17.32 A
4. 7.07 A

Options :

60348936203. 1

60348936204. 2

60348936205. 3

60348936206. 4

Question Number : 49 Question Id : 6034899567 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The rating of a $\Delta - Y$ connected three-phase transformer is given as 100 MVA, 15 kV/110 kV, 50 Hz. Here 100 MVA refers to

1. Total three phase active power
2. Total three phase apparent power
3. Per phase active power
4. Per phase apparent power

Options :

60348936207. 1

60348936208. 2

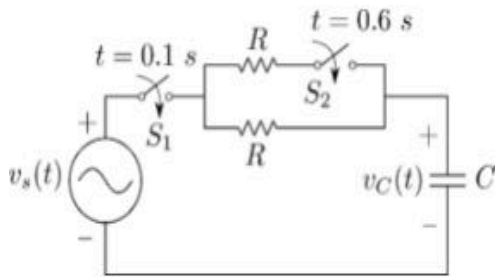
60348936209. 3

60348936210. 4

Question Number : 50 Question Id : 6034899568 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

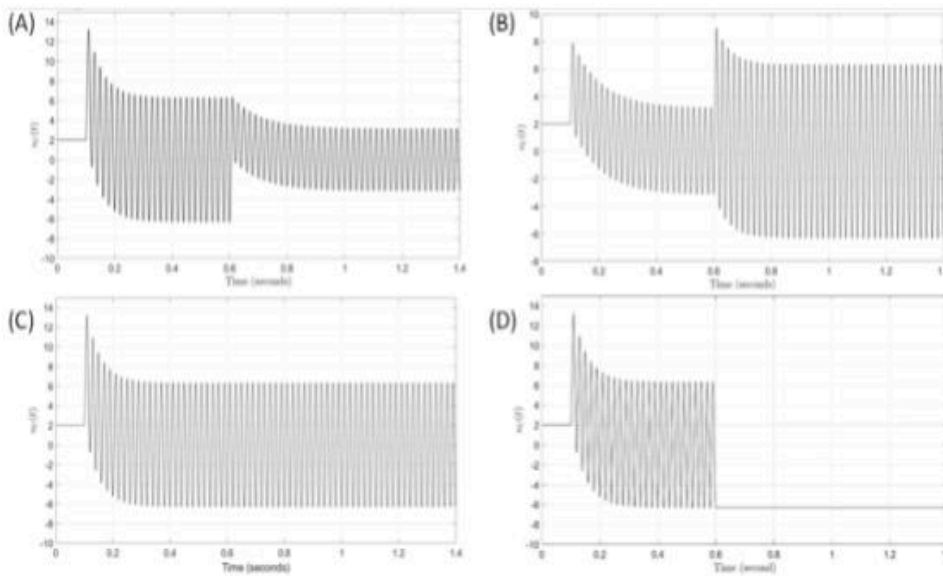
Consider the circuit given in the figure. S_1 is switched ON at $t = 0.1$ s, while S_2 is switched ON at $t = 0.6$ s.



The circuit parameters are as follows:

$v_s(t) = 100 \sin(2\pi \times 50t)$ V, $R = 500 \, \Omega$, $C = 200 \, \mu\text{F}$, Initial capacitor voltage = 2 V.

Which one of the following waveforms correctly captures the response of the capacitor voltage?



1. A
2. B
3. C
4. D

Options :

- 60348936211. 1
- 60348936212. 2
- 60348936213. 3
- 60348936214. 4

Sub-Section Number :

2

Sub-Section Id :

603489345

Question Shuffling Allowed :

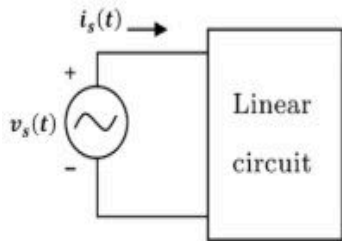
Yes

Question Number : 51 Question Id : 6034899569 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider a voltage source $v_s(t)$ connected to a linear circuit as shown in the figure. It is observed that if $v_s(t) = 100 \sin(2\pi \times 50t + 30^\circ) + 50 \cos(2\pi \times 100t + 45^\circ) \text{ V}$, then the current is $i_s(t) = 20 \cos(2\pi \times 50t) + 2 \sin(2\pi \times 100t + 45^\circ) \text{ A}$ in steady-state.



If in another situation, the steady-state current is

$i_s(t) = 15 \sin(2\pi \times 50t + 25^\circ) + \sin(2\pi \times 100t - 30^\circ) \text{ A}$, then the input voltage $v_s(t)$ is

1. $v_s(t) = 25 \sin(2\pi \times 50t - 35^\circ) + 25 \sin(2\pi \times 100t - 60^\circ) \text{ V}$
2. $v_s(t) = 75 \sin(2\pi \times 50t - 55^\circ) + 25 \sin(2\pi \times 100t - 30^\circ) \text{ V}$
3. $v_s(t) = 75 \sin(2\pi \times 50t + 55^\circ) + 75 \sin(2\pi \times 100t + 60^\circ) \text{ V}$
4. $v_s(t) = 75 \sin(2\pi \times 50t - 35^\circ) + 25 \sin(2\pi \times 100t + 60^\circ) \text{ V}$

Options :

60348936215. 1

60348936216. 2

60348936217. 3

60348936218. 4

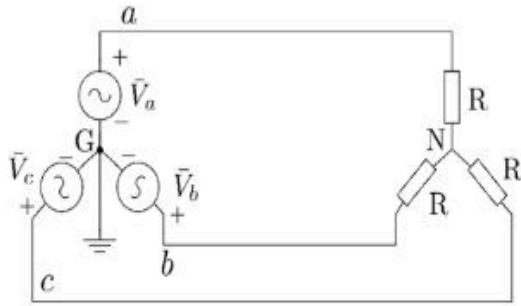
Question Number : 52 Question Id : 6034899570 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider a three-phase circuit as shown below. The load is balanced whereas the source is unbalanced with the phase voltages given by

$$\bar{V}_a = 100\angle 0^\circ \text{ V}, \bar{V}_b = 99\angle -115^\circ \text{ V} \text{ and } \bar{V}_c = 91\angle 110^\circ \text{ V}$$



If $R=10 \Omega$, then the magnitude of the rms voltage of the load neutral point N with respect to the ground point G is

1. 0 V
2. 3.041 V
3. 9.121 V
4. 27.363 V

Options :

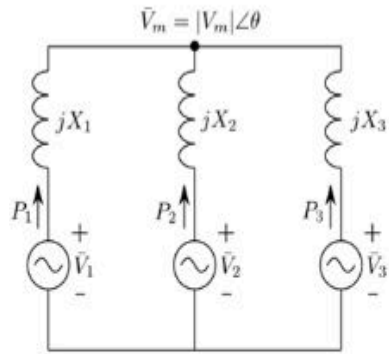
60348936219. 1
60348936220. 2
60348936221. 3
60348936222. 4

Question Number : 53 Question Id : 6034899571 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

For the circuit shown in the figure below, the voltage sources are given by:

$\vec{V}_1 = 300\angle 0^\circ \text{ V}$, $\vec{V}_2 = 300\angle 60^\circ \text{ V}$ and $\vec{V}_3 = 300\angle -60^\circ \text{ V}$.



If the real power outputs P_1 , P_2 and P_3 satisfy $P_1 < 0$, $P_2 > 0$, $P_3 < 0$, then which of the following is TRUE regarding the phase angle (θ) of $\vec{V}_m$?

1. $0^\circ < \theta < 60^\circ$
2. $-60^\circ < \theta < 0^\circ$
3. $\theta > 60^\circ$
4. $\theta < -60^\circ$

Options :

60348936223. 1

60348936224. 2

60348936225. 3

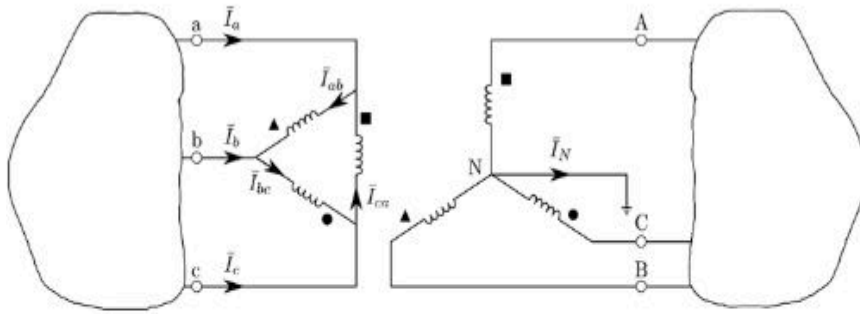
60348936226. 4

Question Number : 54 Question Id : 6034899572 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

A three-phase transformer is made by connecting three single-phase ideal transformers as shown in the figure. The single-phase transformers have turns ratio of 1:1 i.e. identical number of turns in both primary and secondary windings.



The expression of $\vec{V}_{cb}$ and $\vec{I}_{bc}$ will respectively be

1. $\vec{V}_{CN}$ and $\frac{\vec{I}_a - \vec{I}_b + \vec{I}_N}{3}$
2. $\vec{V}_{BN}$ and $\frac{\vec{I}_a - 2\vec{I}_b + \vec{I}_N}{3}$
3. $\vec{V}_{CN}$ and $\frac{\vec{I}_a + 2\vec{I}_b + \vec{I}_N}{3}$
4. $\vec{V}_{CB}$ and $\frac{\vec{I}_a + \vec{I}_b + \vec{I}_N}{3}$

Options :

60348936227. 1

60348936228. 2

60348936229. 3

60348936230. 4

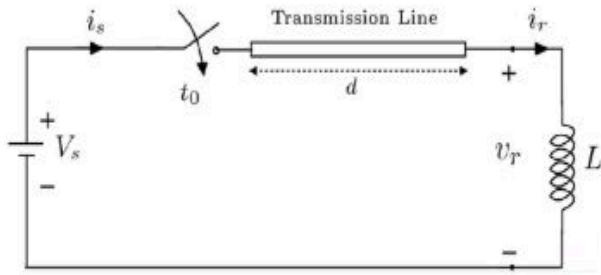
Question Number : 55 Question Id : 6034899573 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

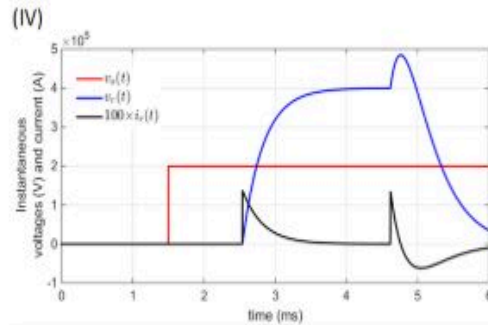
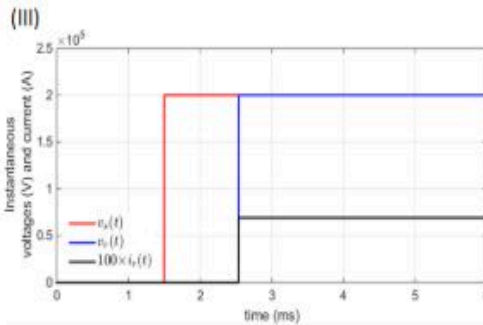
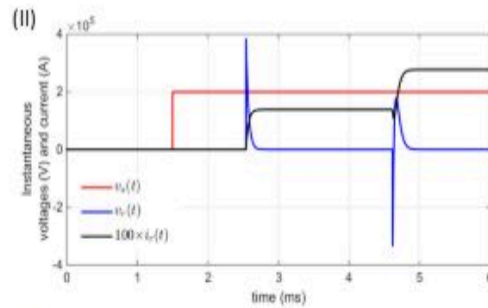
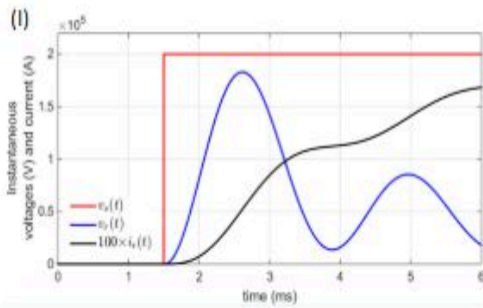
Correct Marks : 2 Wrong Marks : 0

A 300 km long, lossless overhead transmission line is connected to a capacitor as shown in the figure. The circuit parameters are $V_s = 200 \text{ kV}$, $C = 1 \mu\text{F}$.

The transmission line parameters are $L' = 1 \text{ mH/km}$, $C' = 12 \text{ nF/km}$.



The switch is closed at $t_o = 1.5 \text{ ms}$. The transmission line was de-energized prior to the switching. The capacitor voltage prior to the switching is zero. Which of the following waveforms captures v_r and i_r ?



1. (I)
2. (II)
3. (III)
4. (IV)

Options :

60348936231. 1

60348936232. 2

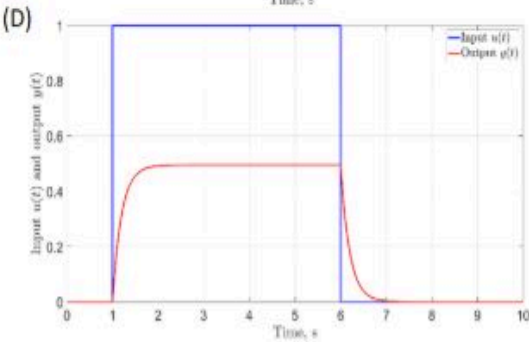
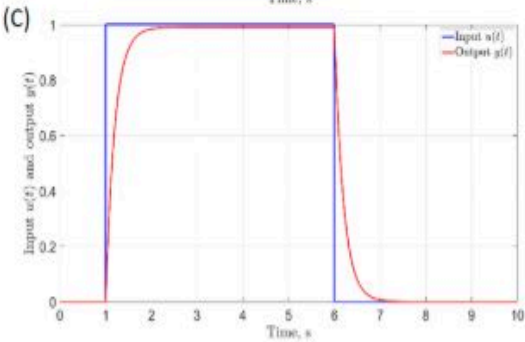
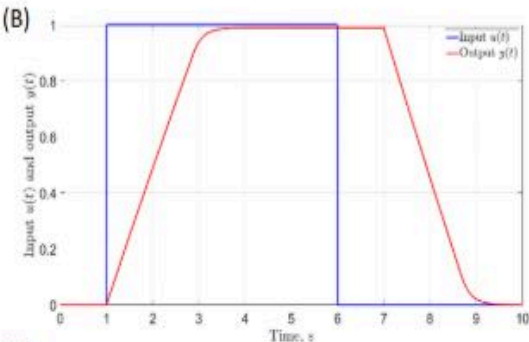
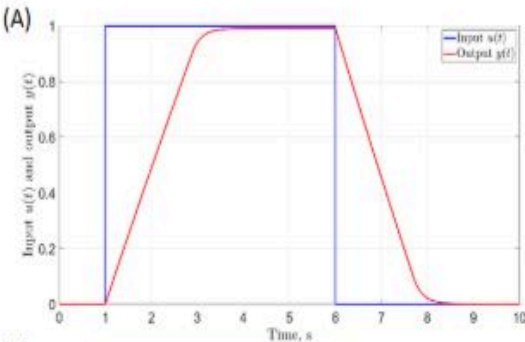
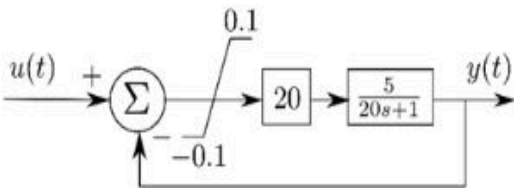
60348936233. 3

60348936234. 4

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Which of the following plots correctly denotes the output $y(t)$ for a unit magnitude pulse input $u(t)$ (as shown in the figure)? The initial value of output $y(t = 0)$ is 0.



1. (A)
2. (B)
3. (C)
4. (D)

Options :

60348936235. 1
60348936236. 2
60348936237. 3
60348936238. 4

Question Number : 57 Question Id : 6034899575 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider a non-linear algebraic equation $x = 2x^2 - 5e^{-x}$. If this equation is solved using Newton-Raphson method with an initial guess value of $x_0 = 0$, then the value of x after one iteration (x_1) will be

1. 2.5
2. -1.25
3. 1.25
4. -2.5

Options :

60348936239. 1

60348936240. 2

60348936241. 3

60348936242. 4

Question Number : 58 Question Id : 6034899576 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

A state space realization of the transfer function $G(s) = \frac{(2s-1)}{(s+2)}$ between input u and output y is

1. $\dot{x} = -2x + 2u, y = -5x + u$
2. $\dot{x} = -2x + u, y = 5x + 2u$
3. $\dot{x} = -2x + 5u, y = -x + 2u$
4. $\dot{x} = -2x - u, y = -x$

Options :

60348936243. 1

60348936244. 2

60348936245. 3

60348936246. 4

Question Number : 59 Question Id : 6034899577 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider the dynamical system given below.

$$\frac{d}{dt} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -9 & 16 \\ 5 & -9 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0.5 \end{bmatrix} u$$

If a unit step input is applied at time $t = 0$, then the steady state value of $y = x_1 - 2x_2$ will be

1. 0
2. 1
3. -1
4. -2

Options :

60348936247. 1

60348936248. 2

60348936249. 3

60348936250. 4

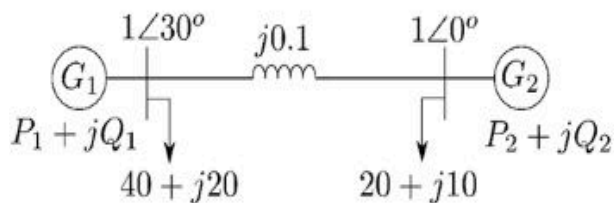
Question Number : 60 Question Id : 6034899578 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider the two bus power system network with given loads as shown in the figure. All the values shown in the figure are in per unit. The reactive power supplied by generators

G_1 and G_2 are Q_1 and Q_2 respectively. The real power supplied by generators G_1 and G_2 are P_1 and P_2 respectively. The values of P_1, Q_1, P_2, Q_2 (all in per unit) are respectively:



1. 40, 18.66, 20, 8.66
2. 40, 21.34, 20, 11.34
3. 45, 21.34, 15, 11.34
4. 45, 18.66, 15, 11.34

Options :

60348936251. 1

60348936252. 2

60348936253. 3

60348936254. 4

Question Number : 61 Question Id : 6034899579 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The line data of a 230 kV, 50 Hz lossless overhead transmission line is: total reactance $x_l = 66 \Omega$ and total shunt susceptance $b_c = 730 \mu S$. The characteristic impedance and length of the line respectively are approximately

1. 180Ω and 210 km
2. 180Ω and 150 km
3. 300Ω and 210 km
4. 300Ω and 150 km

Options :

60348936255. 1

60348936256. 2

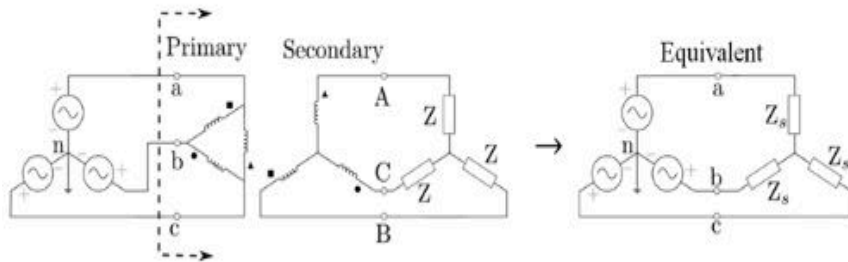
60348936257. 3

60348936258. 4

Question Number : 62 Question Id : 6034899580 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider a delta-star connected three-phase transformer as shown in the figure. The transformer is made of three identical ideal single-phase transformer of turns ratio $\sqrt{3} : 1$ (i.e. number of turns on the delta connected windings is $\sqrt{3}$ times the number of turns on the star connected windings). If the effective load impedance (Z_s) as seen by the source is $(6 + j8) \Omega$, then the load impedance connected per phase (Z) is _____ .



1. $(18 + j24) \Omega$
2. $(6 + j8) \Omega$
3. $(10.38 + j13.84) \Omega$
4. $(2 + j2.66) \Omega$

Options :

60348936259. 1

60348936260. 2

60348936261. 3

60348936262. 4

Question Number : 63 Question Id : 6034899581 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

A 50 MVA, 20 kV synchronous generator is supplying a load. The field voltage is regulated using the following control strategy

$$E_{fd}(s) = \frac{0.2}{1 + 0.01s} (V_{ref}(s) - V_t(s))$$

It is found that when the reference voltage V_{ref} has been set to 20 kV, the field voltage E_{fd} required (in steady state) is 100 V. The terminal voltage V_t in steady state will be

1. 20 kV
2. 20.5 kV
3. 19.5 kV
4. 19.8 kV

Options :

60348936263. 1

60348936264. 2

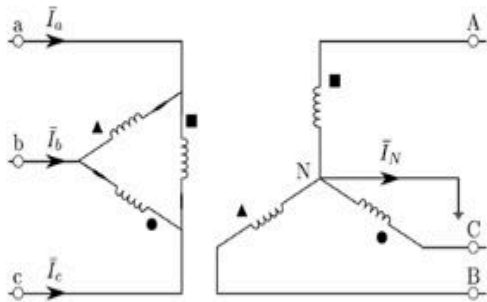
60348936265. 3

60348936266. 4

Question Number : 64 Question Id : 6034899582 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider a delta-star connected three-phase transformer as shown in the figure. The balanced, three phase voltages (applied to the delta winding) have the phase sequence a-b-c. The three-phase line-to-line voltages on the star side lead the corresponding voltages on the delta side by



1. -30°
2. $+90^\circ$
3. -90°
4. $+30^\circ$

Options :

60348936267. 1

60348936268. 2

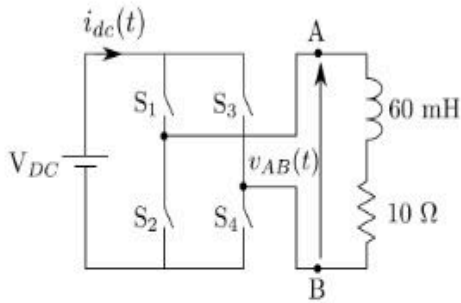
60348936269. 3

60348936270. 4

Question Number : 65 Question Id : 6034899583 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

A lossless voltage source converter (VSC) based device is connected to an R-L component as shown in the figure below. The converter switching strategy and inductance are chosen such that the harmonics in the load current are negligible. The fundamental frequency of the inverter output voltage $v_{AB}(t)$ is 50 Hz.



If the average value of $i_{dc}(t)$ is 3 A and the dc voltage V_{DC} is 500 V, then the rms value of the fundamental component of $v_{AB}(t)$ and the active power consumed by the R-L component are respectively

1. 261.33 V and 1500 W
2. 392.45 V and 500 W
3. 261.33 V and 5000 W
4. 392.45 V and 1500 W

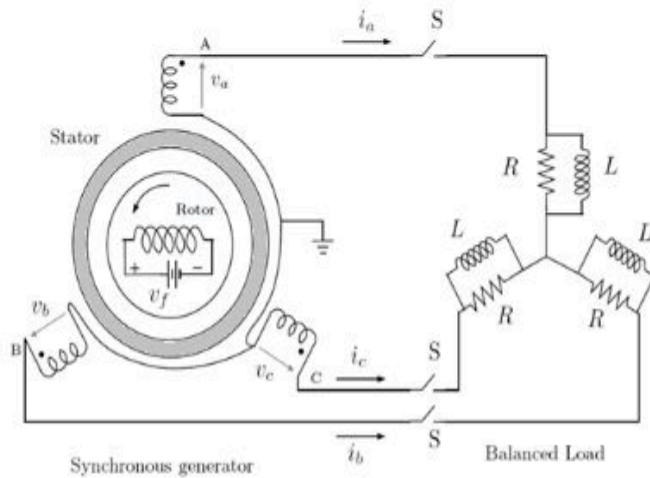
Options :

60348936271. 1
60348936272. 2
60348936273. 3
60348936274. 4

Question Number : 66 Question Id : 6034899584 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

A 2-pole, 50 Hz star-connected synchronous generator is initially kept in the open-circuit condition. The field voltage v_f is applied such that the rated three-phase balanced voltages appear at the stator terminals. The speed and the field voltage v_f of the synchronous machine are maintained constant.



If the stator terminals are now connected to a balanced three-phase star connected R-L load by closing the switch S, then in steady state

1. the flux due to the stator currents rotates at 50 Hz in the opposite direction as that of the field flux,
2. the resultant rotating flux due to the stator and rotor currents is changed due to the connection of the load,
3. the relative angle between the rotating stator and rotor fluxes is varying and is determined by the nature of load (values of R and L),
4. the flux due to stator currents does not rotate at 50 Hz

Options :

60348936275. 1

60348936276. 2

60348936277. 3

60348936278. 4

Question Number : 67 Question Id : 6034899585 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider the transfer function $G(s) = \frac{(1+0.02s)}{(1+0.1s)}$. The frequency ω at which maximum phase lag is provided by $G(s)$ is

1. $\omega=0$ rad/s
2. $0<\omega<10$ rad/s
3. $10<\omega<50$ rad/s
4. $\omega>50$ rad/s

Options :

60348936279. 1

60348936280. 2

60348936281. 3

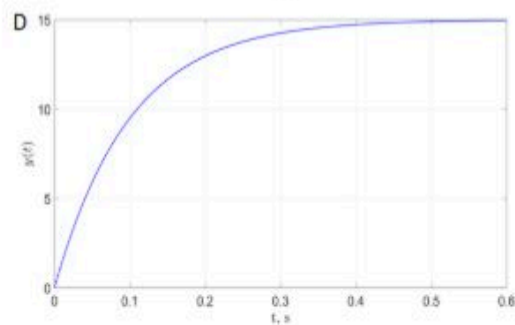
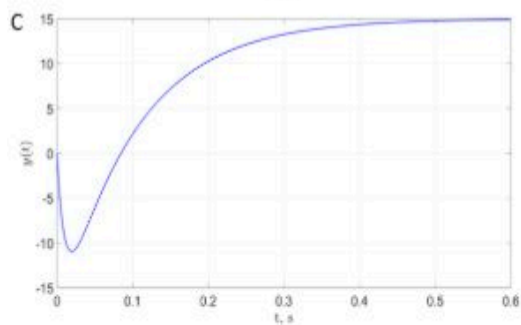
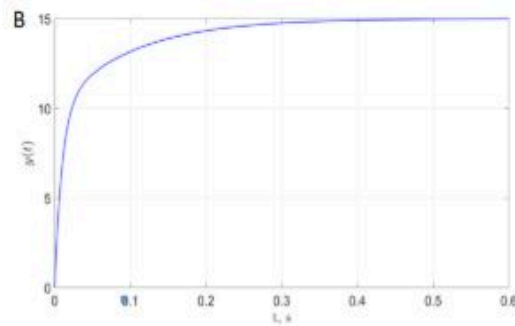
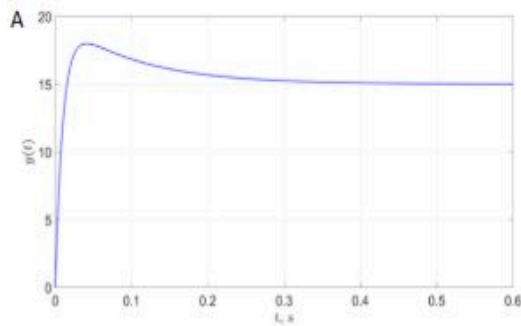
60348936282. 4

Question Number : 68 Question Id : 6034899586 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Which of the following plots capture the unit step response of $G(s) = 15 \frac{(1-0.08s)}{(1+0.1s)(1+0.01s)}$?

Hint: Write $G(s)$ as $\frac{A}{(1+0.1s)} + \frac{B}{(1+0.01s)}$.



1. A
2. B
3. C
4. D

Options :

60348936283. 1

60348936284. 2

60348936285. 3

60348936286. 4

Question Number : 69 Question Id : 6034899587 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider an interconnected power system consisting of Area-1 and Area-2. A total generation of 2 MW and a total load of 3 MW is present in Area-1 and it imports 1 MW from Area-2.

Due to the presence of governors, the total generation in Area-1 has a frequency dependence given by $P_g = 2 \left(1 - 24 \frac{(f - f_o)}{f_o} \right)$ MW. The total load in Area-1 has a frequency dependence given by $P_l = 3 \left(1 + \alpha \frac{(f - f_o)}{f_o} \right)$ MW.

The system is initially operating at a nominal frequency $f_o = 60$ Hz. Due to some disturbance, Area-2 gets disconnected from Area-1. If the frequency of Area-1 settles to 59 Hz, then the value of α is

- 1. 2
- 2. 4
- 3. 8
- 4. 10

Options :

60348936287. 1

60348936288. 2

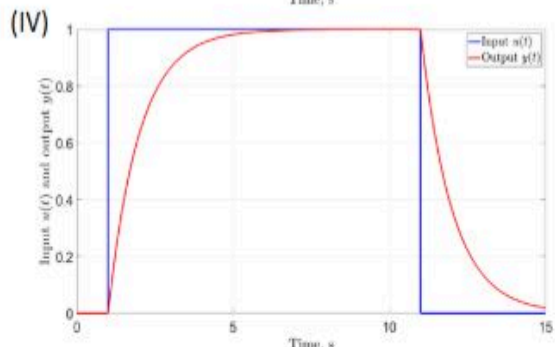
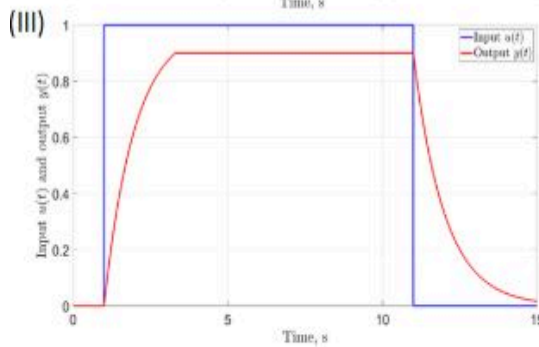
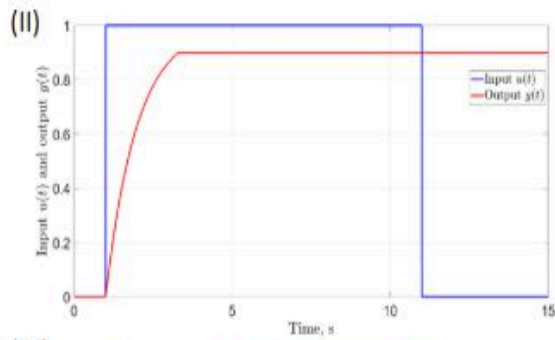
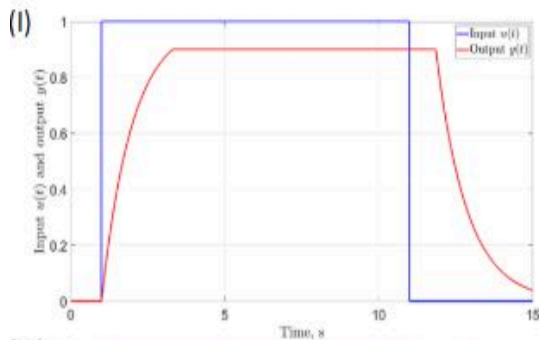
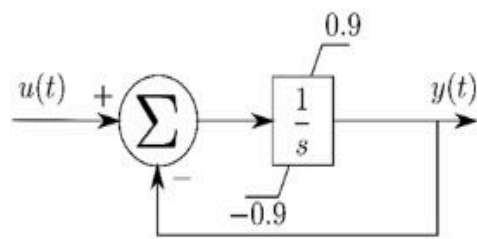
60348936289. 3

60348936290. 4

Question Number : 70 Question Id : 6034899588 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

A system is shown in the figure. The initial value of the output is $y(t = 0) = 0$. If the integrator is equipped with a hard-limiter (windup type), then the output $y(t)$ for a unit pulse input is



1. (I)
2. (II)
3. (III)
4. (IV)

Options :

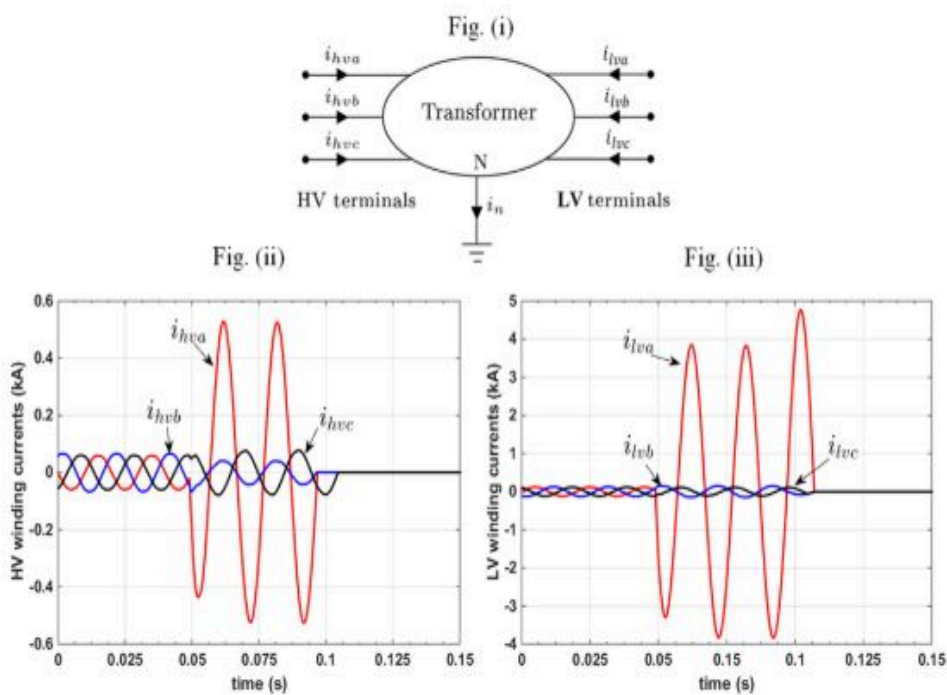
60348936291. 1
60348936292. 2
60348936293. 3
60348936294. 4

Question Number : 71 Question Id : 6034899589 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider a three-phase 400 kV/220 kV transformer which is connected to a transmission network. The measured currents during a disturbance are shown in Fig. (ii) and (iii). The corresponding current directions are shown in Fig. (i). The observed fault currents indicate



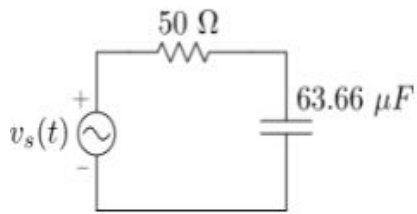
- 1. Phase-a to ground fault inside the transformer
- 2. Phase-a to ground fault outside the transformer
- 3. A fault in phase-b or phase-c inside the transformer
- 4. A fault in phase-b or phase-c outside the transformer

Options :

- 60348936295. 1
- 60348936296. 2
- 60348936297. 3
- 60348936298. 4

Question Number : 72 Question Id : 6034899590 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 2 Wrong Marks : 0

For the circuit shown in the figure, the voltage source $v_s(t)$ is given by $v_s(t) = 50 + 50 \cos(2\pi \times 50t + 15^\circ)$ V. The rms value of the current $i(t)$ in steady state is



1. 0.5 A
2. 0.707 A
3. 0.814 A
4. 1 A

Options :

60348936299. 1

60348936300. 2

60348936301. 3

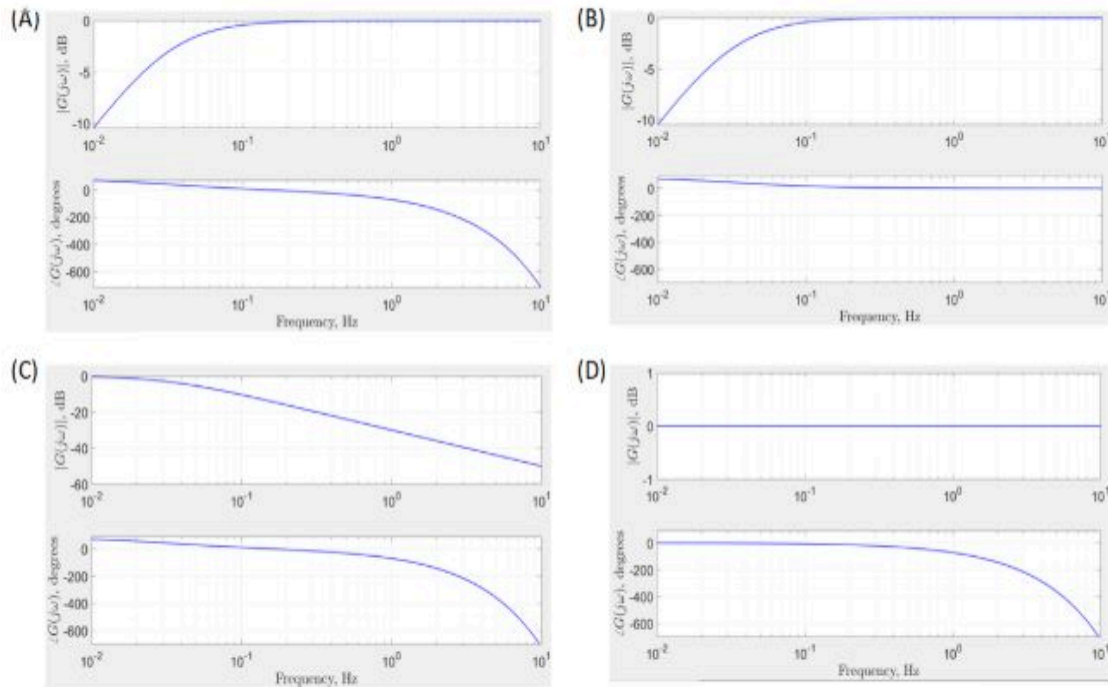
60348936302. 4

Question Number : 73 Question Id : 6034899591 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Which of the following plots represents the Bode magnitude and phase plots of

$$G(s) = \frac{5s}{(1+5s)} e^{-0.2s}?$$



1. (A)
2. (B)
3. (C)
4. (D)

Options :

60348936303. 1

60348936304. 2

60348936305. 3

60348936306. 4

Question Number : 74 Question Id : 6034899592 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Match the columns appropriately.

Which of the following options correctly match the typical per unit length parameters of the given conductors?

Column-1		Column-2			
Sl. No.	Conductor	Sl. No.	Resistance (Ω/km)	Reactance (Ω/km)	Susceptance ($\mu\text{S}/\text{km}$)
P	230 kV overhead line	(i)	0.012	0.329	4.978
Q	765 kV overhead line	(ii)	0.027	0.339	245.6
R	230 kV PIPE cable	(iii)	0.05	0.488	3.371

1. P-(ii), Q-(iii), R-(i)
2. P-(iii), Q-(ii), R-(i)
3. P-(iii), Q-(i), R-(ii)
4. P-(i), Q-(iii), R-(ii)

Options :

60348936307. 1

60348936308. 2

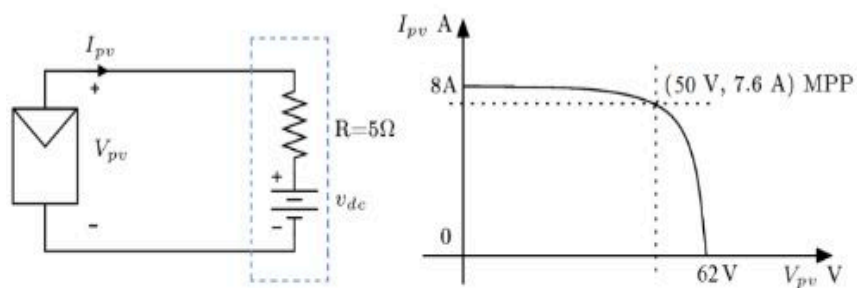
60348936309. 3

60348936310. 4

Question Number : 75 Question Id : 6034899593 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Consider a solar module with the $v - I$ characteristic as shown below. The solar module is connected to an external circuit as shown.



The value of v_{dc} which extracts maximum power from the solar module is

1. 5 V
2. 10 V
3. 12 V
4. 18.5 V

Options :

60348936311. 1

60348936312. 2

60348936313. 3

60348936314. 4