NETWORK AND TRANSMISSION LINES 100 IMPORTANT MCQ

Q.1 To calculate Thevenin's equivalent value in a circuit

(A) all independent voltage sources are opened and all independent current sources are short circuited.
(B) both voltage and current sources are open circuited
(C) all voltage and current sources are shorted.
(D) all voltage sources are shorted while current sources are opened.

Ans: **D**
To calculate Thevenin's equivalent impedance value in a circuit, all independent voltage sources are shorted while all independent current sources are opened.

Q.2 A 26 dBm output in watts equals to

(A) 2.4W. **(B)** 0.26W.
(C) 0.156W. **(D)** 0.4W.

Ans: **A**
A 26dBm output in watts equals to 0.4 W because

$$10\times\log_{10}\left[\frac{400\text{mW}}{1\text{mW}}\right] = 10\times 2.6 = 26\text{ dB}$$

Q.3 The Characteristic Impedance of a low pass filter in attenuation Band is

(A) Purely imaginary. **(B)** Zero.
(C) Complex quantity. **(D)** Real value.

Ans: **A**
The characteristic impedance of a low pass filter in attenuation band is purely imaginary.

Q.4 The real part of the propagation constant shows:

(A) Variation of voltage and current on basic unit.
(B) Variation of phase shift/position of voltage.
(C) Reduction in voltage, current values of signal amplitude.
(D) Reduction of only voltage amplitude.

Ans: **C**
The real part of the propagation constant shows reduction in voltage, current values of signal amplitude.

Q.5 The purpose of an Attenuator is to:

(A) increase signal strength. **(B)** provide impedance matching.

(C) decrease reflections. **(D)** decrease value of signal strength.

Ans: **D**

The purpose of an Attenuator is to decrease value of signal strength.

Q.6 In Parallel Resonance of:

R – L – C circuit having a R – L as series branch and 'C' forming parallel branch. Tick the correct answer only.

(A) Max Impedance and current is at the frequency that of resonance.

(B) Value of max Impedance = L / (CR).

(C) ranch currents are 180 Degree phase shifted with each other.

(D) $f_r = \frac{1}{2\pi}\left[\frac{1}{LC} - \frac{R^2}{L^2}\right]$.

Ans: **D**

In parallel resonance of R-L-C circuit having a R-L branch and 'C' forming parallel branch,

$$fr = \frac{1}{2\pi}\sqrt{\frac{1}{LC} - \frac{R^2}{L^2}}$$

Q.7 In a transmission line terminated by characteristic impedance, Z_o

(A) There is no reflection of the incident wave.

(B) The reflection is maximum due to termination.

(C) There are a large number of maximum and minimum on the line.

(D) The incident current is zero for any applied signal.

Ans: **A**

In a transmission line terminated by characteristic impedance, Z_o, there is no reflection of the incident wave.

Q.8 For a coil with inductance L and resistance R in series with a capacitor C has

(A) Resonance impedance as zero.

(B) Resonance impedance R.

(C) Resonance impedance L/CR.

(D) Resonance impedance as infinity.

Ans: **B**

For a coil with inductance L and resistance R in series with a capacitor C has a resonance impedance R.

Q.9 Laplace transform of a unit Impulse function is

(A) s. **(B)** 0.

(C) e^{-s}. **(D)** 1.

Ans: **D**

Laplace transform of a unit Impulse function is **1**

Q.10 Millman's theorem is applicable during determination of

(A) Load current in a network of generators and impedances with two output terminals.
(B) Load conditions for maximum power transfer.
(C) Dual of a network.
(D) Load current in a network with more than one voltage source.

Ans: D
Millman's theorem is applicable during determination of **Load current in a network with more than one voltage source.**

Q.11 Asymmetrical two port networks have

(A) $Z_{sc_1} = Z_{oc_2}$ **(B)** $Z_{sc_1} = Z_{sc_2}$
(C) $Z_{oc_1} \neq Z_{oc_2}$ **(D)** $Z_{oc_1} \neq Z_{oc_2}$ and $Z_{sc_1} \neq Z_{sc_2}$

Ans: D
Asymmetrical two port networks have $\mathbf{Z_{OC1} \neq Z_{OC2}}$ **and** $\mathbf{Z_{SC1} \neq Z_{SC2}}$

Q.12 An attenuator is a

(A) R's network. **(B)** RL network.
(C) RC network. **(D)** LC network.

Ans: A
An attenuator is a **R's network**.

Q.13 A pure resistance, R_L when connected at the load end of a loss-less 100 Ω line produces a VSWR of 2. Then R_L is

(A) 50 Ω only. **(B)** 200 Ω only.
(C) 50 Ω or 200 Ω. **(D)** 400 Ω.

Ans: C
A pure resistance, R_L when connected at the load end of a loss-less 100 Ω line produces a VSWR of 2. Then R_L is **50** .fi **or 200 fi,** as follows:

$$VSWR = \frac{R_O}{R_L} = \frac{100}{R_L} = 2 \qquad \therefore R_L = 50 \text{ fi}$$

$$VSWR = \frac{R_L}{R_O} = \frac{R_L}{100} = 2 \qquad \therefore R_L = 200 \text{ fi}$$

Q.14 The reflection coefficient of a transmission line with a short-circuited load is

(A) 0. **(B)** ∞.
(C) $1.0\angle 0°$. **(D)** $1.0\angle 180°$.

Ans: A
The reflection coefficient of a transmission line with a short-circuited load is **0**.

Q.15 All pass filter

(A) passes whole of the audio band.
(B) passes whole of the radio band.
(C) passes all frequencies with very low attenuation.
(D) passes all frequencies without attenuation but phase is changed.

Ans: D
All pass filters, **passes all frequencies without attenuation but phase change.**

Q.16 A series resonant circuit is inductive at f = 1000 Hz. The circuit will be capacitive some where at

(A) f > 1000 Hz.
(B) f < 1000 Hz.
(C) f equal to 1000 Hz and by adding a resistance in series.
(D) f = 1000+ f_o (resonance frequency)

Ans: B
A series resonant circuit is inductive at f = 1000 Hz. The circuit will be capacitive some where at **f < 1000 Hz.**

Q.17 Compensation theorem is applicable to

(A) non-linear networks. **(B)** linear networks.
(C) linear and non-linear networks. **(D)** None of the above.

Ans: C
Compensation theorem is applicable to **linear and non-linear networks.**

Q.18 Laplace transform of a damped sine wave $e^{-\alpha t}\sin(\theta t).u(t)$ is

(A) $\frac{1}{(s+\alpha)^2+\theta^2}$. **(B)** $\frac{s}{(s+\alpha)^2+\theta^2}$.

(C) $\frac{\theta}{(s+\alpha)^2+\theta^2}$. **(D)** $\frac{(^2}{(s+\alpha)^2+\theta^2}$.

Ans: C
Laplace transform of a damped sine wave $e^{-\alpha t}\sin(\theta t)\ u\ (t)$ is

$$\frac{\theta}{(s+\alpha)^2+\theta^2}$$

Q.19 A network function is said to have simple pole or simple zero if

(A) the poles and zeroes are on the real axis.
(B) the poles and zeroes are repetitive.
(C) the poles and zeroes are complex conjugate to each other.
(D) the poles and zeroes are not repeated.

Ans: D

A network function is said to have simple pole or simple zero if **the poles and zeroes are not repeated.**

Q.20 Symmetrical attenuators have attenuation ' α' given by

(A) $20\log_{10}\left(\frac{R}{I_S}\right)$ **(B)** $20\log_{10}\left(\frac{R}{I_S}\frac{R}{R_S}\right)$.

(C) $10\log_{10}\left(\frac{R}{I_S}\right)$. **(D)** $20\log_{10}\left(\frac{I_S}{I_R}\right)$.

Ans: D

Symmetrical attenuators have attenuation 'α' given by

$$\alpha = 20\log_{10}\left[\frac{I_S}{I_R}\right]$$

Q.21 The velocity factor of a transmission line

(A) is governed by the relative permittivity of the dielectric.

(B) is governed by the skin effect.

(C) is governed by the temperature.

(D) All of the above.

Ans: A

The velocity factor of a transmission line **is governed by the relative permittivity of the dielectric.**

Q.22 If ' α' is attenuation in nepers then

(A) attenuation in dB = α / 0.8686. **(B)** attenuation in dB = 8.686 α .

(C) attenuation in dB = 0.1 α . **(D)** attenuation in dB = 0.01 α .

Ans: B

If 'a' is attenuation in nepers then **attenuation in dB = 8.686 α.**

Q.23 For a constant K high pass π -filter, characteristic impedance Z_0 for $f < f_c$ is

(A) resistive. **(B)** inductive.

(C) capacitive. **(D)** inductive or capacitive.

Ans: D

For a constant K high pass π-filter, characteristic impedance Z_o for $f < f_c$ is **inductive or capacitive.**

Q.24 A delta connection contains three impedances of 60 Ω each. The impedances of equivalent star connection will be

(A) 15 Ω each. **(B)** 20 Ω each.

(C) 30 Ω each. **(D)** 40 Ω each.

Ans: B
A delta connection contains three impedances of 60Ω each. The impedances of equivalent star connection will be **20Ω each.**

Q.25 Which one of the following is a passive element?
(A) A BJT. **(B)** An Inductor.
(C) A FET. **(D)** An Op-amp.

Ans: B
Which one of the following is a passive element? **An Inductor**

Q.26 Millman theorem yields
(A) equivalent resistance of the circuit.
(B) equivalent voltage source.
(C) equivalent voltage OR current source.
(D) value of current in milli amperes input to a circuit from a voltage source.

Ans: C
Millman's theorem yields equivalent **voltage or current source.**

Q.27 The z-parameters of the shown T-network at Fig.1 are given by
(A) 5, 8, 12, 0
(B) 13, 8, 8, 20
(C) 8, 20, 13, 12
(D) 5, 8, 8, 12

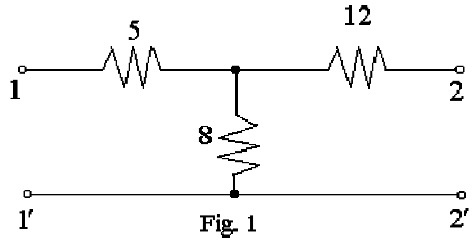


Fig. 1

Ans: B
The Z parameters of the T - network at Fig 1.1 are given by **13, 8, 8, 20**
$Z_{11} = Z_1 + Z_3 = 5 + 8 = 13,\ Z_{12} = Z_3 = 8,\ Z_{21} = Z_3 = 8,\ Z_{22} = Z_2 + Z_3 = 12 + 8 = 20$

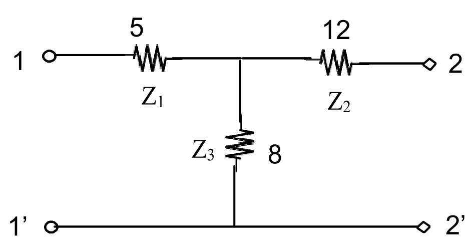


Fig 1.1

Q.28 To a highly inductive circuit, a small capacitance is added in series. The angle between voltage and current will
(A) decrease. **(B)** increase.
(C) remain nearly the same. **(D)** become indeterminant.

Ans: C

To a highly inductive circuit, a small capacitance is added in series. The angle between voltage and current will **remain nearly the same**.

Q.29 The equivalent inductance of Fig.2 at terminals 1 1' is equal to

(A) $L_1 + L_2 + 2M$

(B) $L_1 + L_2 - 2M$

(C) $L_1 + L_2$

(D) $L_1 - L_2 + 2M$

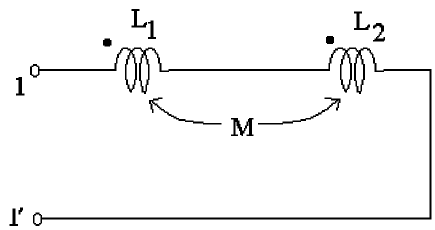


Fig. 2

Ans: A

The equivalent inductance of Fig 1.2 at terminals 11' is equal to

$L_1 + L_2 + 2M$

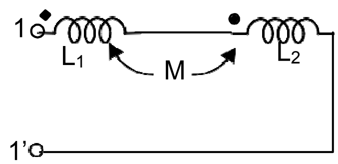


Fig 1.2

Q.30 The characteristic impedances z_0 of a transmission line is given by, (where R, L, G, C are the unit length parameters)

(A) $(R + j\omega L)/(G + j\omega C)$

(B) $(R + j\omega L)(G + j\omega C)$

(C) $(R + j\omega L)^2/(G + j\omega C)$

(D) $[(R + j\omega L)/(G + j\omega C)]^{1/2}$

Ans: D

The characteristic impedance Z_o of a transmission line given by, (where R, L, G, C are the unit length parameters

$$Z_o = \sqrt{\frac{(R + j\omega L)}{(G + j\omega C)}}$$

Q.31 The relation between R_1 and R_2 for the given symmetrical lattice attenuator shown in Fig.3 is

(A) $R_1 = R_2 = R_0$

(B) $R_1 = R_0^2 / R_2$

(C) $R_1 = R_2^2 / R_0$

(D) $R_2 = R_1^2 / R_0$

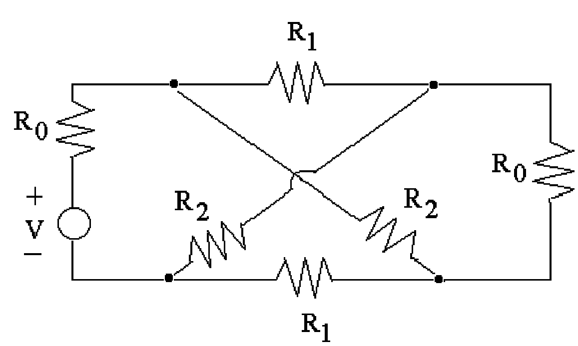


Fig. 3

Ans: B

The relation between R_1 and R_2 for the given symmetrical lattice attenuator shown in Fig 1.3 is

$$R_1 = \frac{R_o^2}{R_2}$$

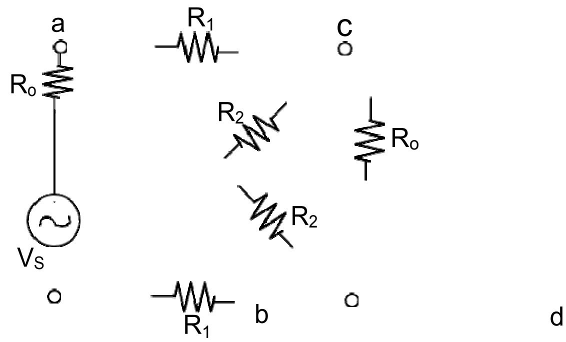


Fig 1.3

Q.32 If Laplace transform of x(t) = X(s), then Laplace transform of $x(t-t_0)$ is given by

(A) $(-t_0)X(s)$ **(B)** $X(s-t_0)$

(C) $e^{t_0 s}X(s)$ **(D)** $e^{-t_0 s}X(s)$

Ans: D

If Laplace transform of x(t) = X(s), then laplace transform of $x(t - t_0)$ is given by

$$e^{-t_0 s}X(s)$$

Q.33 The following constitutes a bilateral element

(A) A resistor. **(B)** FET.

(C) Vacuum tube. **(D)** metal rectifier.

Ans: A

Q.34 Voltages v_1 and v_2 in the given circuit are

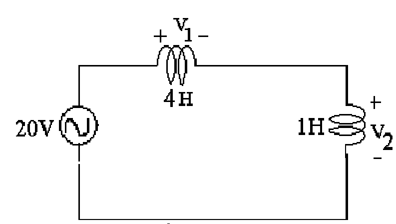


Figure 1b

(A) 20 volts each.

(B) 10 volts each.

(C) 16 volts, 4 volts.

(D) 4 volts, 16 volts.

Ans: B

Voltages v_1 and v_2 in the given circuit are

Q.35 Step response of series RC circuit with applied voltage V is of the form

(A) $i(t) = \frac{V}{R}e^{-t/RC}$ **(B)** $i(t) = \frac{V}{R}\left(1 - e^{-t/RC}\right)$

(C) $i(t) = -\frac{V}{R}e^{-t/RC}$ **(D)** $i(t) = -\frac{V}{R}\left(1 - e^{-t/RC}\right)$

Ans: Step response of series RC circuit with applied voltage V is of the form

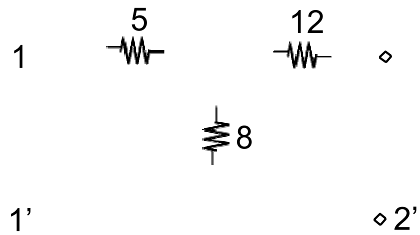


Fig 1.1

Q.36 In the given circuit switch S is opened at time t=0, then $\frac{dv}{dt}\left(0^{+}\right)$ is

(A) 10^6 volt / sec.
(B) 100 volt / sec.
(C) 10^5 volt / sec.
(D) 10 volt / sec.

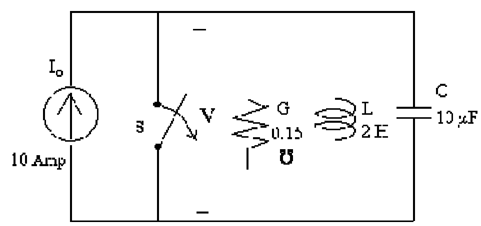
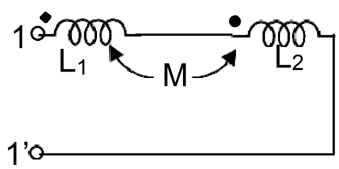


Fig. 1 d

Ans:
In a given circuit, switch S is opened at time t = 0, then



$L_1 + L_2 + 2M$

Fig 1.2

Q.37 In the circuit shown, maximum power will be transferred when

(A) $Z_L = (4.5 + j\ 6.5)\Omega$
(B) $Z_L = (4.5 - j\ 6.5)\Omega$
(C) $Z_L = (6.5 + j\ 4.5)\Omega$
(D) $Z_L = (6.5 - j4.5)\Omega$

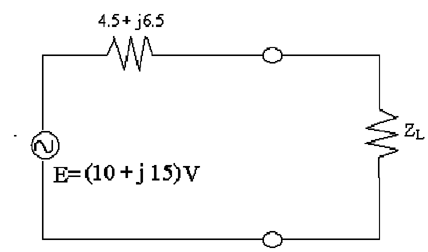


Fig. 1 e

Ans: B
In the circuit shown, maximum power will be transferred when Z_L = **(4.5 – j 6.5)**.fi

Q.38 Voltage Standing Wave Ratio (VSWR) in terms of reflection coefficient ρ is given by

(A) $\frac{1-\rho}{1+\rho}$. **(B)** $\frac{\rho-1}{\rho+1}$.

(C) $\frac{1+\rho}{1-\rho}$. **(D)** $\frac{\rho}{1+\rho}$.

Ans: C

$$VSWR = \frac{1+\rho}{1-\rho}$$

Q.39 For a 2-port network, the output short circuit current was measured with a 1V source at the input. The value of the current gives

(A) h_{12} **(B)** y_{12}

(C) h_{21} **(D)** y_{21}

Ans:

$$R_1 = \frac{R_2}{R_2}$$

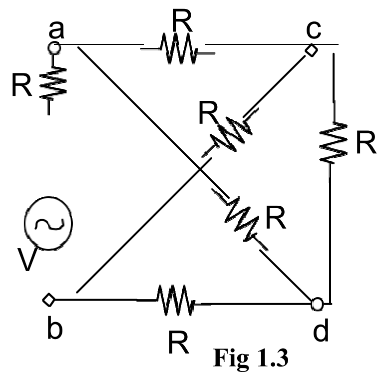


Fig 1.3

Q.40 $H(s) = \frac{V(s)}{I(s)} = \frac{s+3}{(s+2)^2}$ When i(t) is the unit step function, the value of v (t) in the steady state is given by

(A) $\frac{3}{2}$. **(B)** 1.

(C) 0. **(D)** $\frac{3}{4}$.

Ans:

Q.41 An RLC series circuit is said to be inductive if

(A) $\omega L > 1/\omega C$ **(B)** $\omega L = 1/\omega C$

(C) $\omega L < 1/\omega C$ **(D)** $\omega L = \omega C$

Ans: A

A RLC series circuit is said to be inductive if ω**L > 1/**ω**C.**

Q.42 Laplace transform of an unit impulse function is given by

(A) 1 **(B)** -1

(C) $1/s$ **(D)** $1/s^2$

Ans: A
Laplace transform of an unit impulse function is given by **1**.

Q.43 A function $H(s) = 2s/(s^2 + 8)$ will have a zero at

(A) $s = \pm j4$ **(B)** Anywhere on the s-plane.
(C) On the imaginary axis. **(D)** On the origin.

Ans: **D**
A function $H(s) = 2s/(s^2 + 8)$ will have a zero at **the origin**.

Q.44 For a two port reciprocal network, the three transmission parameters are given by A = 4, B = 7 and C = 5. The value of D is equal to

(A) 8.5 **(B)** 9
(C) 9.5 **(D)** 8

Ans: **B**
For a two port reciprocal network, the three transmission parameters are given by A = 4, B = 7 and C = 5. The value of D is equal to **9**.
$AD - BC = 1 \subset 4D = 1 + 35 = 36 \subset D = 36/4 = 9$

Q.45 Higher the value of Q of a series circuit

(A) Sharper is its resonance. **(B)** Greater is its bandwidth.
(C) Broader is its resonant curve. **(D)** Narrower is its bandwidth.

Ans: **D**
Higher the value of Q of a series circuit, **narrower is its pass band**.

Q.46 An ideal filter should have

(A) Zero attenuation in the pass band.
(B) Zero attenuation in the attenuation band.
(C) Infinite attenuation in the pass band.
(D) Infinite attenuation in the attenuation band.

Ans: A
An ideal filter should have **Zero attenuation in the pass band**.

Q.47 For an m-derived high pass filter, the cut off frequency is 4KHz and the filter has an infinite attenuation at 3.6 KHz, the value of m is

(A) 0.436 **(B)** 4.36
(C) 0.34 **(D)** 0.6

Ans: **A**
For an m-derived high pass filter, the cut off frequency is 4KHz and the filter has an infinite attenuation at 3.6KHz, the value of m is **0.436**

$$m = \sqrt{1 - \frac{f_\infty^2}{f_c^2}} = \sqrt{1 - \frac{(3.6 \times 1000)^2}{(4 \times 1000)^2}} = 0.436$$

Q.48 If $Z_{oc} = 120\Omega$ and $Z_{sc} = 30\Omega$, the characteristic impedance is

(A) 30Ω **(B)** 60Ω
(C) 120Ω **(D)** 150Ω

Ans: B
If $Z_{oc} = 120$.fi and $Z_{sc} = 30$ fi, the characteristic impedance is 60fi.

$$Z_o = \sqrt{Z_{oc} Z_{sc}} = \sqrt{120 \times 30} = 60\ \Omega$$

Q.49 The reflection coefficient of a line is – 1 . The line is

(A) Open circuited. **(B)** Short circuited.
(C) Terminated in Z_o. **(D)** Of infinite length.

Ans: A
The reflection coefficient of a line is –1. The line is **open circuited.**

Q.50 If a transmission line of length less than $\lambda/4$ is short circuited, it behaves as

(A) Pure capacitive reactance. **(B)** Series resonant circuit.
(C) Parallel resonant circuit. **(D)** Pure inductive reactance.

Ans: D
If a transmission line of length less than $\lambda/4$ is short circuited, it behaves **as pure inductive reactance**.

Q.51 A line becomes distortion less if

(A) It is properly matched **(B)** It is terminated into Zo
(C) LG = CR **(D)** LR = GC

Ans: C
A line becomes distortion less if **LG = CR**

Q.52 Double stub matching eliminates standing waves on the

(A) Source side of the left stub **(B)** Load side of the right stub
(C) Both sides of the stub **(D)** In between the two stubs

Ans: A
Double stub matching eliminates standing waves on the **Source side of the left stub.**

Q.53 If $Z_{OC} = 100\Omega$ and $Z_{SC} = 64\Omega$, the characteristic impedance is

(A) $400\,\Omega$ **(B)** $60\,\Omega$
(C) $80\ \Omega$ **(D)** $170\,\Omega$

Ans: (C)
If $Z_{oc} = 100\,\Omega$ and $Z_{sc} = 64\,\Omega$ the characteristic impedance is **80fi**

Q.54 The final value of f (t) for a given $F(s) = \frac{s}{(s+4)(s+2)}$

(A) Zero **(B)** 1/15

(C) 1/8 **(D)** 1/6

Ans: (A)

The final value of f(t) for a given $f(s) = \frac{s}{(s+4)(s+2)}$ is **Zero.**

Q.55 If the given network is reciprocal, then according to the reciprocity theorem

(A) $y_{21} = y_{12}$ **(B)** $y_{22} = y_{12}$

(C) $y_{11} = y_{12}$ **(D)** $y_{11} = y_{22}$

Ans: A

If the given network is reciprocal, then according to the reciprocity theorem $\mathbf{y_{21} = y_{12}}$

Q.56 The frequency of infinite attenuation (f_∞) of a low pass m-derived section is

(A) Equal to cut off frequency (f_c) of the filter.

(B) $f_\infty = \infty$.

(C) Close to but greater than the f_c of the filter.

(D) Close to but less than the f_c of the filter.

Ans: C

The frequency of infinite attenuation (f_∞) of a low pass m-derived section is **Close to but greater then the f_c of the filter.**

Q.57 The dynamic impedance of a parallel RLC circuit at resonance is

(A) C/LR **(B)** R/LC

(C) L/CR **(D)** LC/R

Ans: C

The dynamic impedance of a parallel RLC circuit at resonance is $\frac{L}{CR}$

Q.58 Laplace transform of the function e^{-2t} is

(A) 1/2s **(B)** $(s+2)$

(C) $1/(s+2)$ **(D)** 2s.

Ans: (C)

Laplace transform of the function e^{-2t} is $\frac{1}{s+2}$

Q.59 A (3 + 4j) voltage source delivers a current of (4 + j5) A. The power delivered by the source is

(A) 12 W **(B)** 15 W
(C) 20 W **(D)** 32 W

Ans: A
A (3 + 4j) voltage source delivers a current of (4+ j5) A. The power delivered by the source is **12 W**

Q.60 In a variable bridged T-attenuator, with $R_A = R_o$, zero dB attenuation can be obtained if bridge arm R_B and shunt arm R_C are set as

(A) $R_B = 0, R_C = \infty$ **(B)** $R_B = \infty, R_C = 0$
(C) $R_B = R, R_C = \infty$ **(D)** $R_B = 0, R_C = R$

Ans: A
In a variable bridged T-attenuator, with RA = RO, zero dB attenuation can be obtained if bridge arm RB and shunt arm RC are set as RB = 0, RC = ∞.

Q.61 Consider a lossless line with characteristic impedance Ro and VSWR = S. Then the impedance at **the** point of a voltage maxima equals

(A) SR_0 **(B)** R_0/S
(C) S^2R_0 **(D)** R_0

Ans: A
Consider a lossless line with characteristic impedance Ro and VSWR = S. Then the impedance at the point of a voltage maxima equals SRo

Q.62 If f_1 and f_2 are half power frequencies and f_o is the resonance frequency, the selectivity of RLC circuit is given by

(A) $\frac{f_2 - f_1}{f_0}$ **(B)** $\frac{f_2 - f_1}{2f_0}$
(C) $\frac{f_2 - f_1}{f_1 - f_0}$ **(D)** $\frac{f_2 - f_0}{f_1 - f_0}$

Ans: A
If f1 and f2 are half power frequencies and f_0 be resonant frequency, the selectivity of RLC circuit is given by $\frac{f_2 - f_1}{f_0}$

Q.63 A symmetrical T network has characteristic impedance Z_o and propagation constant γ. Then the series element Z_1 and shunt element Z_2 are given by

(A) $Z_1 = Z_o \sinh\gamma$ and $Z_2 = 2Z_o / \tanh \gamma/2$
(B) $Z_1 = Z_o / \sinh\gamma$ and $Z_2 = 2Z_o \tanh \gamma/2$
(C) $Z_1 = 2Z_o \tan \gamma/2$ and $Z_2 = Z_o / \sinh\gamma$

(D) $Z_1 = Z_o \tanh\gamma/2$ and $Z_2 = 2Z_o/\sinh\gamma$

Ans: C
A symmetrical T network has characteristic impedance Zo and propagation constant γ. Then the series element Z1 and shunt element Z2 are given by
Z1 = 2 Zo tan γ/2 and Z2 = Zo / sinh γ

Q.64 A function is given by $F(s) = \frac{2s}{(s^2+8)}$. It will have a finite zero at

(A) Infinity **(B)** Anywhere on the s-plane
(C) On the imaginary axis **(D)** On the origin

Ans: D
A function is given by. It $F(s) = \frac{2s}{(s^2+8)}$ will have a zero on the origin.

Q.65 For a linear passive bilateral network

(A) $h_{21} = h_{12}$ **(B)** $h_{21} = -h_{12}$
(C) $h_{12} = g_{12}$ **(D)** $h_{12} = -g_{12}$

Ans: B
For a linear passive bilateral network $\mathbf{h_{21} = - h_{12}}$

Q.66 A constant K band-pass filter has pass-band from 1000 to 4000 Hz. The resonance frequency of shunt and series arm is a

(A) 2500 Hz. **(B)** 500 Hz.
(C) 2000 Hz. **(D)** 3000 Hz.

Ans: C
A constant k band pass filter has pass band from 1000 to 4000 Hz. The resonant frequency of shunt and series arm is 2000Hz

Q.67 A constant voltage source with 10V and series internal resistance of 100 ohm is equivalent to a current source of

(A) 100mA in parallel with 100 ohm.
(B) 1000mA in parallel with 100 ohm.
(C) 100V in parallel with 10-ohms.
(D) 100mA in parallel with 1000 ohm.

Ans: A
A constant voltage source with 10V and series internal resistance of 100 ohm is equivalent to a current source of 100mA in parallel with 100 ohm.

Q.68 Input impedance of a short-circuited lossless line with length $\lambda/4$ is

(A) Z_o **(B)** zero
(C) infinity **(D)** z_0^2

Ans: C
Input impedance of a short-circuited loss less line with length □/4 is ∞

Q.69 Laplace transform of unit impulse is

(A) u(s) **(B)** 1
(C) s **(D)** 1/s

Ans: B
Laplace transform of unit impulse is 1

Q.70 In a two terminal network, the open circuit voltage at the given terminal is 100V and the short circuit at the same terminal gives 5A current. If a load of 80 Ω resistance is connected at the terminal, the load current is given by

(A) 1Amp **(B)** 1.25 Amp
(C) 6 Amp **(D)** 6.25 Amp

Ans: A
Ina two terminal network, the open circuit voltage at the given terminal is 100V and the short circuit at the same terminal 5A. If a load of 80 Ω resistance is connected at the terminal, the load current is given by **1 Amp.**

Q.71 Given V_{TH} = 20V and R_{TH} = 5 fi, the current in the load resistance of a network,

(A) is 4A **(B)** is more than 4A.
(C) is 4A or less **(D)** is less than 4A.

Ans: D
Given V_{TH} = 20V and R_{TH} = 5 fi, the current in the load resistance of a network, **is less than 4A.**

Q.72 The Laplace transform of a function is 1/s x Ee^{-as}. The function is

(A) E sin mt **(B)** Ee^{at}
(C) E u(t–a) **(D)** E cos mt

Ans: C
The Laplace transform of a function is 1/s × Ee-as. The function is E u(t - a).

Q.73 For a symmetrical network

(A) $Z_{11} = Z_{22}$ **(B)** $Z_{12} = Z_{21}$
(C) $Z_{11} = Z_{22}$ and $Z_{12} = Z_{21}$ **(D)** $Z_{11} \times Z_{22} - Z_{12}^2 = 0$

Ans: C

Q.74 A constant k low pass T-section filter has Z_0 = 600fi at zero frequency. At f = f_c the characteristic impedance is

(A) 600fi **(B)** 0
(C) ∞ **(D)** More than 600fi

Ans: B

A constant k low pass T-section filter has Zo = 600fi at zero frequency. At f = fc, the characteristic impedance is 0.

Q.75 In m-derived terminating half sections, m =

(A) 0.1 **(B)** 0.3

(C) 0.6 **(D)** 0.95

Ans: C

In m-derived terminating half sections, **m = 0.6**.

Q.76 In a symmetrical T attenuator with attenuation N and characteristic impedance R_0, the resistance of each series arm is equal to

(A) R_0 **(B)** $(N-1)R_0$

(C) $\frac{2N}{N^2-1}R_0$ **(D)** $\frac{N}{N^2-1}R_0$

Ans: C

In a symmetrical T attenuator with attenuation N and characteristic impedance R_o, the resistance of each series arm is equal to $\frac{2N}{N^2-1}R_o$

Q.77 For a transmission line, open circuit and short circuit impedances are 20fi and 5fi. The characteristic impedance of the line is

(A) 100 fi **(B)** 50 fi

(C) 25 fi **(D)** 10 fi.

Ans: D

For a transmission line, open circuit and short circuit impedances are 20 fi and 5. fi The characteristic impedance of the line is 10 fi

Q.78 If K is the reflection coefficient and S is the Voltage standing wave ratio, then

(A) $k = \frac{VSWR-1}{VSWR+1}$ **(B)** $|k| = \frac{VSWR-1}{VSWR+1}$

(C) $k = \frac{VSWR+1}{VSWR-1}$ **(D)** $|k| = \frac{VSWR+1}{VSWR-1}$

Ans: B

If K is the reflection coefficient and S is the Voltage standing wave ratio, then

$$|k| = \frac{VSWR-1}{VSWR+1}$$

Q.79 A parallel RLC network has R=4fi, L =4H, and C=0.25F, then at resonance Q=

(A) 1 **(B)** 10

(C) 20. **(D)** 40

Ans: A

A parallel RLC network has R = 4fi, L = 4H, and C = 0.125F, then at resonance Q = 1.

Q.80 A delta connection contains three impedances of 60 fi each. The impedances of the equivalent star connection will be

(A) 15fi each. **(B)** 20fi each.
(C) 30fi each. **(D)** 40fi each.

Ans: B
A delta connection contains three impedances of 60 fi each. The impedances of the equivalent star connection will be 20 fi each.

Q.81 If V_{TH} and R_{TH} are the Thevenin's voltage and resistance and R_L is the load resistance, then Thevenin's equivalent circuit consists of

(A) series combination of R_{TH}, V_{TH} and R_L .
(B) series combination of R_{TH} and V_{TH} .
(C) parallel combination of R_{TH}, V_{TH} and R_L .
(D) parallel combination of R_{TH} and V_{TH} .

Ans: B
If VTH and RTH are the Thevenin's voltage and resistance and RL is the load resistance, then Thevenin's equivalent circuit consists of series combination of RTH and VTH.

Q.82 If $f(t) = r(t - \alpha), F(s) =$

(A) $\frac{e^{-\alpha s}}{s^2}$ **(B)** $\frac{\alpha}{s+\alpha}$
(C) $\frac{1}{s+\alpha}$ **(D)** $\frac{e^{-\alpha s}}{s}$

Ans: A

If f(t) = r(t -α), $F(s) = \frac{e^{-\alpha s}}{s^2}$

Q. 83 The integral of a step function is

(A) A ramp function. **(B)** An impulse function.
(C) Modified ramp function. **(D)** A sinusoid function.

Ans: A
The integral of a step function is **a ramp function**.

Q.84 For a prototype low pass filter, the phase constant β in the attenuation band is

(A) ∞ **(B)** 0
(C) π **(D)** $\pi/2$

Ans: C

For a prototype low pass filter, the phase constant π in the attenuation band is β

Q.85 In the m-derived HPF, the resonant frequency is to be chosen so that it is

(A) above the cut-off frequency. **(B)** Below the cut-off frequency.

(C) equal to the cut-off frequency. **(D)** None of these.

Ans: B

In the m-derived HPF, the resonant frequency is to be chosen so that it is **below the cut off frequency.**

Q.86 In a symmetrical π attenuator with attenuation N and characteristic impedance R_O, the resistance of each shunt arm is equal to

(A) R_O **(B)** $(N-1)R_O$

(C) $\frac{N-1}{N+1}R_O$ **(D)** $\frac{N+1}{N-1}R_O$

Ans: D

In a symmetrical n attenuator with attenuation N and $\left\{\frac{N+1}{N-1}\right\}R_o$ characteristic impedance $R_{o,}$ the resistance of each shunt arm is equal to

Q.87 In terms of R,L,G and C the propagation constant of a transmission line is

(A) $\sqrt{R+j\omega L}$ **(B)** $\sqrt{(R+j\omega L)(G+j\omega C)}$

(C) $\sqrt{G+j\omega C}$ **(D)** $\sqrt{\frac{R+j\omega L}{G+j\omega C}}$

Ans: B

In terms of R, L, G and C, the propagation constant of a transmission line is

$$\gamma = \sqrt{(R+j\omega L)(G+j\omega C)}$$

Q. 88 A line has $Z_O = 300\angle 0\Omega$. If $Z_L = 150\angle 0\Omega$, Voltage standing wave ratio, S =

(A) 1 **(B)** 0.5

(C) 2 **(D)** ∞

Ans: C

A line has $Z_o = 300\angle 0$ fi. If $Z_L = 150\angle 0$ fi, Voltage standing wave ratio, since $Z_O > Z_L$, **S = 2**

$$\frac{Z_o}{Z_L} = \frac{300\angle 0°}{150\angle 0°}$$

Q.89 In a series resonant circuit, the resonant frequency will be

(A) Geometric mean of half power frequencies.

(B) Arithmetic mean of half power frequencies.

(C) Difference of half power frequencies.

(D) Sum of half power frequencies

Ans: A
In a series resonant circuit, the resonant frequency is the **geometric mean of half power frequencies.**

Q.90 A function is given by $F(S) = \frac{1}{s+3}$. It would have a zero at

(A) real axis of s-plane. **(B)** imaginary axis of s-plane.
(C) at infinity. **(D)** at the origin.

Ans: C
A function is given by $F(S) = \frac{1}{s+3}$. It would have a zero **at infinity.**

Q.91 In a series parallel circuit, any two resistances in the same current path must be in-:
(A) Parallel with each other **(B)** Series with each other
(C) Parallel with the voltage source **(D)** Series with the voltage source

Ans: B
In a series parallel circuit, any two resistances in the same current path must be in **Series with each other**

Q. 92 Superposition theorem is not applicable in:
(A) Voltage responses **(B)** Power responses
(C) Current responses **(D)** All the three

Ans: B
Superposition theorem is not applicable in **Power responses.**

Q.93 Kirchoff's first law is used in the formation of:
(A) Loop equations **(B)** Nodal equations
(C) Both **(D)** None of the above

Ans: B
Kirchoff's first law is used in the formation of **Nodal equations**.

Q.94 Bridged T network can be used as:
(A) Attenuator **(B)** Low pass filter
(C) High pass filter **(D)** Band pass filter

Ans: A
Bridged T network can be used as **Attenuator.**

Q.95 One neper is equal to
(A) 0.8686 dB **(B)** 8.686 dB
(C) 118.686 dB **(D)** 86.86 dB

Ans:
One neper is equal to **0.1151 x attenuation in dB.**

Q.96 Total reflection can take place if the load is:

(A) 0 **(B)** ∞
(C) 0 and ∞ **(D)** Zo

Ans: C
Total reflection can take place if the load is **0 and ∞.**

Q.97 The characteristic impedance of a distortion less line is:

(A) Real **(B)** Inductive
(C) Capacitive **(D)** Complex

Ans: A
The characteristic impedance of a distortion less line is **Real.**

Q.98 Terminating half sections used in composite filters are built with the following value of m:

(A) m = 0.6 **(B)** m = 0.8
(C) m = 0.3 **(D)** m = 1

Ans: A
Terminating half sections used in composite filters are built with the following value of **m = 0.6.**

Q.99 A transmission line works as an

(A) Attenuator **(B)** LPF
(C) HPF **(D)** Neither of the above

Ans: B
A transmission line works as an **LPF (Low Pass Filter).**

Q.100 In a loss free RLC circuit the transient current is:

(A) Sinusoidal **(B)** Square wave
(C) Oscillating **(D)** Non-oscillating

Ans: A
In a loss free RLC circuit the transient current is **Sinusoidal.**