Topic:- ME MTECH S2

1) A family of arcs is obtained in the Smith chart by varying normalized reactance in a range of,
[Question ID = 4165]

1. 0 to 1 [Option ID = 16654]
2. -∞ to +∞ [Option ID = 16655]
3. 0 to +∞ [Option ID = 16656]
4. -1 to 0 [Option ID = 16657]

Correct Answer :-

- -∞ to +∞ [Option ID = 16655]

2) A 75 Ω quarter wave transformer is connected to a 125Ω TV receiver. The impedance at the input of this transformer will be,
[Question ID = 4166]

1. 25Ω [Option ID = 16658]
2. 45Ω [Option ID = 16659]
3. 75Ω [Option ID = 16660]
4. 100Ω [Option ID = 16661]

Correct Answer :-

- 45Ω [Option ID = 16659]

3) If a coaxial line has dimensions a × b cm, the conductivity of the conductors is σ and the permittivity of the filled medium is ε. Conductance per unit length of this coaxial transmission line is given as,
[Question ID = 4167]

1. $\frac{2\pi\sigma}{\ln\left(\frac{b}{a}\right)}$ [Option ID = 16662]
2. $\frac{2\pi\varepsilon}{ln\left(\frac{b}{a}\right)}$ [Option ID = 16663]
3. $\frac{1}{2\pi\sigma ln\left(\frac{b}{a}\right)}$ [Option ID = 16664]
4. $\frac{1}{2\pi\varepsilon\ln\left(\frac{b}{a}\right)}$ [Option ID = 16665]

Correct Answer :-

- $\frac{2\pi\sigma}{\ln\left(\frac{b}{a}\right)}$ [Option ID = 16662]

4) A lossless transmission line used in a TV Receiver has a capacitance of 50 pF/m and an inductance of 20 nH/m. The characteristic impedence of a 10 meter long line will be then,
[Question ID = 4168]

1. 50 Ω [Option ID = 16666]
2. 20 Ω [Option ID = 16667]
3. 40 Ω [Option ID = 16668]
4. 100 Ω [Option ID = 16669]

Correct Answer :-

- 20 Ω [Option ID = 16667]

5) A one-half wavelength lossless line of 50 Ω is terminated to a load impedence of 50+j50Ω, its input impedance is,
[Question ID = 4169]

1. 50+j50 Ω [Option ID = 16670]
2. 50-j50 Ω [Option ID = 16671]
3. 25+j25 Ω [Option ID = 16672]
4. 25-j25 Ω [Option ID = 16673]

Correct Answer :-

- 50+j50 Ω [Option ID = 16670]

transmission line of characteristic impedance Z_0 is connected to a load of impedance Z_L, then $\frac{Z_L}{Z_0}$ at a distance d is equal to,

[Question ID = 4170]

1. $\frac{1-\Gamma(d)}{1+\Gamma(d)}$

   [Option ID = 16674]
2. $\frac{\Gamma(d)}{1-\Gamma(d)}$

   [Option ID = 16675]
3. $\frac{\Gamma(d)}{1+\Gamma(d)}$

   [Option ID = 16676]
4. $\frac{1+\Gamma(d)}{1-\Gamma(d)}$

   [Option ID = 16677]

Correct Answer :-

- $\frac{1+\Gamma(d)}{1-\Gamma(d)}$

  [Option ID = 16677]

7) A copper rectangular cavity resonator is structured by 3x4x1 cm^3. The resonant frequency for TM_{110} mode, is
[Question ID = 4171]

1. 6.25 GHz [Option ID = 16678]
2. 5.81 GHz [Option ID = 16679]
3. 8.65 GHz [Option ID = 16680]
4. 2.04 GHz [Option ID = 16681]

Correct Answer :-

- 6.25 GHz [Option ID = 16678]

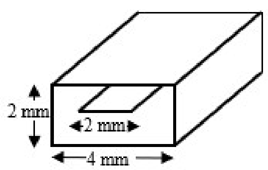
8) A transmission line of characteristics impedance Z_0 is terminated in a load having VSWR=2. The normalized load impedance z_n of the transmission line is
[Question ID = 4172]

1. Z_0 [Option ID = 16682]
2. 1 [Option ID = 16683]
3. 0 [Option ID = 16684]
4. 2 [Option ID = 16685]

Correct Answer :-

- 2 [Option ID = 16685]

9) In a Square coaxial transmission line shown in Fig., if the space between the conductors is filled with a material having a relative permittivity of 4.0 and the capacitance per unit length is 6.3 ε F/m, the characteristic impedance of this line will be,



[Question ID = 4173]

1. 30Ω [Option ID = 16686]
2. 50Ω [Option ID = 16687]
3. 40Ω [Option ID = 16688]
4. 20Ω [Option ID = 16689]

Correct Answer :-

- 30Ω [Option ID = 16686]

[illegible] parabolic antenna is operating at 5 GHz and has an antenna power gain of 216. The diameter of this antenna is

[Question ID = 4174]
1. [illegible] [Option ID = 16690]
2. 16 cm [Option ID = 16691]
3. 25 cm [Option ID = 16692]
4. 36 cm [Option ID = 16693]

Correct Answer :-
- 36 cm [Option ID = 16693]

11) If a signal of 30 MHz is transmitted through a coaxial cable, which has a capacitance of 40 pF/m and an inductance of 900 nH/m. The propagation velocity for a 1m long cable is given by,

[Question ID = 4175]
1. 2.36×10^8 m/s

   [Option ID = 16694]
2. 1.66×10^8 m/s

   [Option ID = 16695]
3. 2.66×10^8 m/s

   [Option ID = 16696]
4. 1.33×10^8 m/s

   [Option ID = 16697]

Correct Answer :-
- 1.66×10^8 m/s

  [Option ID = 16695]

12) A perpendicularly polarized wave is incident at an angle of $\theta_i = 15^o$ and it is propagating from medium 1 to medium 2. Medium 1 is characterized by $\varepsilon_{r1} = 9$, $\mu_{r1} = 1$, $\sigma_1 = 0$ and medium 2 is a free space. If the electric field intensity $E_i = 3.0$ mV/m, the value of the magnetic field intensity H_i, will be,

[Question ID = 4176]
1. 23.87 μA/m

   [Option ID = 16698]
2. 48.53 μA/m

   [Option ID = 16699]
3. 15.46 μA/m

   [Option ID = 16700]
4. 10 μA/m

   [Option ID = 16701]

Correct Answer :-
- 23.87 μA/m

  [Option ID = 16698]

13) If capacitor plates of area 'A' are placed 'd' distance apart and the capacitor is filled with a material having dielectric constant ε, then the current through this capacitor is expressed as,

[Question ID = 4177]
1. $\frac{\varepsilon}{Ad}\frac{\partial v}{\partial t}$

   [Option ID = 16702]
2. $\frac{Ad}{\varepsilon}\frac{\partial v}{\partial t}$

   [Option ID = 16703]
3. $\frac{\varepsilon A}{d}\frac{\partial v}{\partial t}$

   [Option ID = 16704]
4. $\frac{d}{\varepsilon A}\frac{\partial v}{\partial t}$

   [Option ID = 16705]

Correct Answer :-
- $\frac{\varepsilon A}{d}\frac{\partial v}{\partial t}$

  [Option ID = 16704]

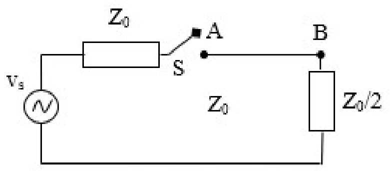
wave with a frequency of 100 MHz is propagating in a free Space, the propagation constant of this wave will be,
ion ID = 4178]

1. j 3.14 [Option ID = 16706]
2. j 5.53 [Option ID = 16707]
3. j 2.09 [Option ID = 16708]
4. j 10.8 [Option ID = 16709]

Correct Answer :-

- j 2.09 [Option ID = 16708]

15) A transmission line of characteristic impedance Z_0 terminated by a load R= (1/2)Z_0 as shown in Fig., is connected to a matched source by a switch for a short time t to produce a pulse on the line.



If the propagation time along the line is T, where T > t, the values of the reflection coefficient at point A and point B are, respectively

[Question ID = 4179]

1. 1, -1/3 [Option ID = 16710]
2. 1, -1 [Option ID = 16711]
3. 2, -1 [Option ID = 16712]
4. 1/2, -1/2 [Option ID = 16713]

Correct Answer :-

- 1, -1/3 [Option ID = 16710]

16) A λ /4 transformer is connected in between generator and load, which have impedence ratio Z_L / Z_G =0.16 and Z_G = 50 Ω.The characteristic impedance of a λ /4 transformer is

[Question ID = 4180]

1. 8 Ω

   [Option ID = 16714]
2. 20 Ω

   [Option ID = 16715]
3. 312 Ω

   [Option ID = 16716]
4. 25 Ω

   [Option ID = 16717]

Correct Answer :-

- 20 Ω

  [Option ID = 16715]

17) The input power needed to generate an output power of 3 W from an amplifier with a power gain of 30 dB is

[Question ID = 4181]

1. 1 W [Option ID = 16718]
2. 100 mW [Option ID = 16719]
3. 1 mW [Option ID = 16720]
4. 3 mW [Option ID = 16721]

Correct Answer :-

- 3 mW [Option ID = 16721]

18) The VSWR of a coaxial line which has a reflection coefficient of $0.6e^{-j\angle 60^{\circ}}$, is

[Question ID = 4182]

1. 4

   [Option ID = 16722]
2. 1

   [Option ID = 16723]
3. 1.6

   [Option ID = 16724]
4. 2

...ion ID = 16725]

Answer :-

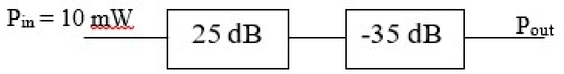
- 4

  [Option ID = 16722]

19) When EM waves travel along a metallic waveguide in which there is a discontinuity due to some lossy material filled in a small length and the other end is terminated with a matched load. The discontinuity will cause
[Question ID = 4183]
1. Progressive waves throughout the line. [Option ID = 16726]
2. Progressive waves on the generator side and standing waves on the matched load side. [Option ID = 16727]
3. Standing waves on the generator side and progressive waves on the matched load side. [Option ID = 16728]
4. Standing waves thoughout the line. [Option ID = 16729]

Correct Answer :-
- Standing waves on the generator side and progressive waves on the matched load side. [Option ID = 16728]

20) The power output of an input power of 10 mW in the following system, is



[Question ID = 4184]
1. 5 dBm [Option ID = 16730]
2. 10 dB [Option ID = 16731]
3. 0 dBm [Option ID = 16732]
4. 10 dBm [Option ID = 16733]

Correct Answer :-
- 0 dBm [Option ID = 16732]

21) At microwave frequency, hybrid(H), admittance (Y) and impedance (Z) parameters can not be measured because,
[Question ID = 4185]
1. Short and open circuit conditions are realizable over broad frequency range. [Option ID = 16734]
2. Short and open circuit conditions are unrealizable over broad frequency range. [Option ID = 16735]
3. Only short circuit condition is realizable over broad frequency range. [Option ID = 16736]
4. Only open circuit condition Is realizable over broad frequency range. [Option ID = 16737]

Correct Answer :-
- Short and open circuit conditions are unrealizable over broad frequency range. [Option ID = 16735]

22) Noise temperature (T) and gain(G) are two important parameters of satellite antenna. Out of the following,the antenna having largest G/T ratio is
[Question ID = 4186]
1. Cassegrain antenna [Option ID = 16738]
2. Pyramidal antenna [Option ID = 16739]
3. Parabolic reflector [Option ID = 16740]
4. Dipole antenna [Option ID = 16741]

Correct Answer :-
- Parabolic reflector [Option ID = 16740]

23) A generator of 50 Ω internal impedance and operating frequency of 1 GHz feeds a 75 Ω load via a coaxial line of characteristics impedance 50 Ω. The reflection coefficient on the feed line is,
[Question ID = 4187]
1. 0.2 [Option ID = 16742]
2. 0.67 [Option ID = 16743]
3. 1.5 [Option ID = 16744]
4. 1.05 [Option ID = 16745]

Correct Answer :-
- 0.2 [Option ID = 16742]

24) A lossless transmission line is excited by a signal of voltage 5∠0° V at 1.2 MHz. If the line is terminated by Z_L(= Z_o) at a distance 1km, the electrical length at the end point of the line is

[Question ID = 4188]
1. 4π

   [Option ID = 16746]
2. 6π

   [Option ID = 16747]

3. ...
[Option ID = 16748]
4. 2π

[Option ID = 16749]

Correct Answer :-

- 8π

[Option ID = 16748]

25) The modulated microwave signal with 1 kHz square wave modulating signal is detected by
[Question ID = 4189]
1. Tunable detector [Option ID = 16750]
2. VSWR meter [Option ID = 16751]
3. Spectrum analyzer [Option ID = 16752]
4. Slotted line [Option ID = 16753]

Correct Answer :-

- Tunable detector [Option ID = 16750]

26) A parabolic dish has a gain of 40 dB at 3GHz. The diameter of this dish is
[Question ID = 4190]
1. 4.08 m [Option ID = 16754]
2. 8.02 m [Option ID = 16755]
3. 3.04 m [Option ID = 16756]
4. 1.25 m [Option ID = 16757]

Correct Answer :-

- 4.08 m [Option ID = 16754]

27) A satellite operates with 12 GHz at a distance of 36000 km has effective isotropic radiated power (EIRP) of 20 dBW.The flux density at receiving antenna of each station is
[Question ID = 4191]
1. 2.21×10^{-14} W/m^2 [Option ID = 16758]
2. 3.6×10^{-14} W/m^2 [Option ID = 16759]
3. 0.614×10^{-14} W/m^2 [Option ID = 16760]
4. 2.0×10^{-14} W/m^2 [Option ID = 16761]

Correct Answer :-

- 0.614×10^{-14} W/m^2 [Option ID = 16760]

28) A broadside array operating at 100cm wavelength consist of 4 half-wave dipoles spaced 50cm apart. Each element carries radio frequency current In the same phase and of magnitude 0.5 A. The radiated power will be
[Question ID = 4192]
1. $34\pi^2$ W [Option ID = 16762]
2. $16\pi^2$ W [Option ID = 16763]
3. $20\pi^2$ W [Option ID = 16764]
4. $50\pi^2$ W [Option ID = 16765]

Correct Answer :-

- $20\pi^2$ W [Option ID = 16764]

29) Charge needed within a unit sphere centred at the origin for producing a potential field, $V = -6r^5/\varepsilon_0$ for the distance r ≤ 1 meter, is

[Question ID = 4193]
1. 30 π Coulomb

   [Option ID = 16766]
2. 240 π Coulomb

   [Option ID = 16767]
3. 120 π Coulomb

   [Option ID = 16768]
4. 180 π Coulomb

   [Option ID = 16769]

Correct Answer :-

- 120 π Coulomb

  [Option ID = 16768]

30) A material has conductivity of 10^{-2} mho/m and a relative permittivity of 4.The frequency for which conduction current

medium is equal to displacement current is

[Question ID = 4194]

1. Hz [Option ID = 16770]
2. 180 MHz [Option ID = 16771]
3. 27 MHz [Option ID = 16772]
4. 45 MHz [Option ID = 16773]

Correct Answer :-

- 45 MHz [Option ID = 16773]

31) For a electricity short dipole of length 80 cm operating at 30 MHz, the loss resistance (R_{loss}) is 1.5 Ω. Its radiation efficiency is

[Question ID = 4195]

1. 92.4 %

   [Option ID = 16774]
2. 94.9 %

   [Option ID = 16775]
3. 102.5 %

   [Option ID = 16776]
4. 86.7 %

   [Option ID = 16777]

Correct Answer :-

- 94.9 %

  [Option ID = 16775]

32) A Hertzien dipole of length λ/50 has an efficiency of 6.5%. The total quality factor for this dipole is

[Question ID = 4196]

1. 1

   [Option ID = 16778]
2. 0.20

   [Option ID = 16779]
3. 7

   [Option ID = 16780]
4. 5.5

   [Option ID = 16781]

Correct Answer :-

- 0.20

  [Option ID = 16779]

33) The value of integral $\int_0^\pi sin^3\theta d\theta$ is given by

[Question ID = 4197]

1. 8/3

   [Option ID = 16782]
2. 4/3

   [Option ID = 16783]
3. 1/2

   [Option ID = 16784]
4. 2/3

   [Option ID = 16785]

Correct Answer :-

- 4/3

  [Option ID = 16783]

34) The region specified by $\left\{(\rho,\phi,z): 3 \le \rho \le 5, \frac{\pi}{8} \le \phi \le \frac{\pi}{4}, 3 \le z \le 4.5\right\}$ in cylindrical coordinates has volume of

[Question ID = 4198]

1. 4.712

[Option ID = 16786]
2.
[Option ID = 16787]
3. 2.725

[Option ID = 16788]
4. 5.725

[Option ID = 16789]

Correct Answer :-
- 4.712

[Option ID = 16786]

35) With the initial condition $x(1) = 0.5$ the solution of the differential equation, $t\frac{dx}{dt} + x = t$ is

[Question ID = 4199]
1. $x = \frac{t}{2}$

[Option ID = 16790]
2. $x = t - \frac{1}{2}$

[Option ID = 16791]
3. $x = t^2 - \frac{1}{2}$

[Option ID = 16792]
4. $x = \frac{t^2}{2}$

[Option ID = 16793]

Correct Answer :-
- $x = \frac{t}{2}$

[Option ID = 16790]

36) The Newton - Raphson method is used to solve the equation f(x) = x^3 - $5x^2$ + 6x - 8 = 0. Taking the initial guess as x = 5, the solution obtained at the end of the first iteration is

[Question ID = 4200]
1. 2.2903

[Option ID = 16794]
2. 4.515

[Option ID = 16795]
3. 4.2903

[Option ID = 16796]
4. 2.515

[Option ID = 16797]

Correct Answer :-
- 4.2903

[Option ID = 16796]

37) The inverse Laplace transform of the function $\frac{s+5}{(s+1)(s+3)}$ is equal to

[Question ID = 4201]
1. $2e^{-t} + e^{-3t}$

[Option ID = 16798]
2. $e^{-t} + 2e^{-3t}$

[Option ID = 16799]
3. $e^{-t} - 2e^{-3t}$

[Option ID = 16800]
4. $2e^{-t} - e^{-3t}$

[Option ID = 16801]

Correct Answer :-
- $2e^{-t} - e^{-3t}$

[Option ID = 16801]

38) 4 GHz carrier is DSB - SC modulated by a low-pass message signal is to be ideally sampled. The minimum frequency of the sampling impulse train should be

[Question ID = 4202]
1. 4 MHz

   [Option ID = 16802]
2. 8 GHz

   [Option ID = 16803]
3. 4 GHz

   [Option ID = 16804]
4. 8 MHz

   [Option ID = 16805]

Correct Answer :-
- 8 MHz

  [Option ID = 16805]

39) **A message signal given by $mt = \left(\frac{1}{2}\right) cos\omega_1 t - \left(\frac{1}{2}\right) sin\omega_1 t$ is amplitude-modulated with a carrier of frequency ω_c to generate**

$s(t) = [1 + m(t)]cos\omega_c t.$

What is the power efficiency achieved by this modulation scheme?

[Question ID = 4203]
1. 20%

   [Option ID = 16806]
2. 11.11%

   [Option ID = 16807]
3. 8.33%

   [Option ID = 16808]
4. 25%

   [Option ID = 16809]

Correct Answer :-
- 20%

  [Option ID = 16806]

40) The number of quantization levels with 8-bits required to reduce the quantization noise by a factor of 4 would be
[Question ID = 4204]
1. 1024 [Option ID = 16810]
2. 64 [Option ID = 16811]
3. 256 [Option ID = 16812]
4. 512 [Option ID = 16813]

Correct Answer :-
- 512 [Option ID = 16813]

41) An ideal band - pass channel 500 Hz - 2000 Hz is deployed for communication. A modem is designed to transmit bits at the rate of 4800 bits/s using 16 - QAM. The roll off factor of a pulse with a raised cosine spectrum that utilizes the entire frequency band is

[Question ID = 4205]
1. 0.20

   [Option ID = 16814]
2. 0.25

   [Option ID = 16815]
3. 0.30

   [Option ID = 16816]
4. 0.15

   [Option ID = 16817]

Correct Answer :-
- 0.25

  [Option ID = 16815]

he Nyquist sampling frequency for the signal $s(t) = \frac{\sin(500\pi t)}{\pi t} \times \frac{\sin(700\pi t)}{\pi t}$ is given by

[Question ID = 4206]

1. 1200 Hz

   [Option ID = 16818]
2. 400 Hz

   [Option ID = 16819]
3. 600 Hz

   [Option ID = 16820]
4. 1400 Hz

   [Option ID = 16821]

Correct Answer :-

- 1200 Hz

  [Option ID = 16818]

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43) The Vestigial Side Band (VSB) modulation is preferred in TV systems because It reduces the bandwidth requirement to half it avoids phase distortion at low frequency

[Question ID = 4207]

1. 1 only

   [Option ID = 16822]
2. 2 only

   [Option ID = 16823]
3. Neither 1 nor 2

   [Option ID = 16824]
4. Both 1 and 2

   [Option ID = 16825]

Correct Answer :-

- Neither 1 nor 2

  [Option ID = 16824]

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44) A communication channel distributed by Gaussian noise has a bandwidth of 6 kHz and S/N ratio of 15.The maximum transmission rate that such a channel can support is

[Question ID = 4208]

1. 48 kbits/s [Option ID = 16826]
2. 24 kbits/sec [Option ID = 16827]
3. 2.4 kbits/s [Option ID = 16828]
4. 32 kbits/s [Option ID = 16829]

Correct Answer :-

- 24 kbits/sec [Option ID = 16827]

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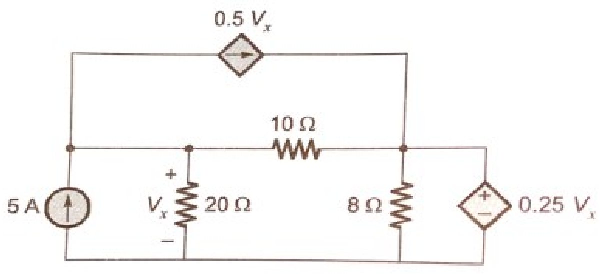
45) In the given circuit,the value of V_x is



[Question ID = 4209]

1. 12 V

   [Option ID = 16830]
2. 10 V

   [Option ID = 16831]
3. 0.8 V

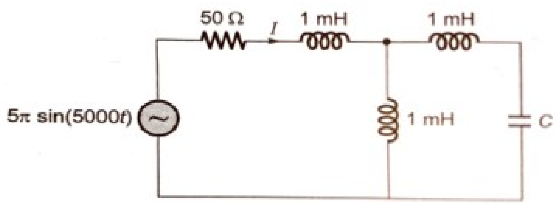
[Option ID = 16832]
4.
[Option ID = 16833]

Correct Answer :-

- 8 V

  [Option ID = 16833]

46) In the circuit shown,the current I flowing through the 50 Ω resistor will be zero if the value of Capacitor C (in μF) is



[Question ID = 4210]

1. 15 μF

   [Option ID = 16834]
2. 20 μF

   [Option ID = 16835]
3. 10 μF

   [Option ID = 16836]
4. 22.5 μF

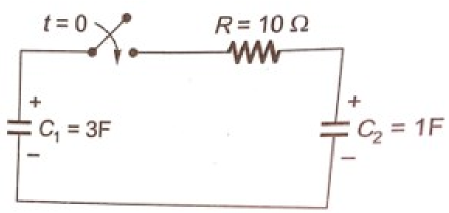
   [Option ID = 16837]

Correct Answer :-

- 20 μF

  [Option ID = 16835]

47) In the circuit shown, the initial voltages across the capacitors C_1 and C_2 are 1V and 3V, respectively. The switch is closed at time t = 0. The total energy dissipated (in Joules) in the resistor R until steady state is reached, is



[Question ID = 4211]

1. 1.5 J

   [Option ID = 16838]
2. 1.0 J

   [Option ID = 16839]
3. 0.5 J

   [Option ID = 16840]
4. 2 J

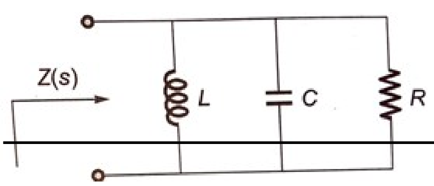
   [Option ID = 16841]

Correct Answer :-

- 1.5 J

  [Option ID = 16838]

48) The driving point impedance of the following network is given by $Z(s) = \dfrac{0.2s}{s^2 + 0.1s + 2}$



The component values are

[Question ID = 4212]

1. L = 0.1 H, R = 0.5 Ω, C = [illegible]

   [Option ID = 16842]
2. L = 5 H, R = 0.5 Ω, C = 0.1 F

   [Option ID = 16843]
3. L = 0.1 H, R = 2 Ω,C = 5 F

   [Option ID = 16844]
4. L = 5H, R = 2 Ω, C = 0.1 F

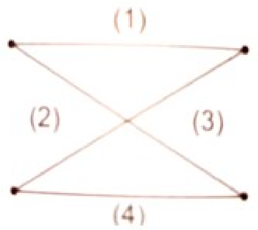
   [Option ID = 16845]

Correct Answer :-

- L = 0.1 H, R = 2 Ω,C = 5 F

  [Option ID = 16844]

49) In the following graph,the number of trees (P) and the number number of cut - sets (Q)are



[Question ID = 4213]

1. P = 2,Q = 6 [Option ID = 16846]
2. P = 2,Q = 2 [Option ID = 16847]
3. P = 4,Q = 6 [Option ID = 16848]
4. P = 4,Q = 10 [Option ID = 16849]

Correct Answer :-

- P = 4,Q = 6 [Option ID = 16848]

50) If $z = e^x siny, x = log_e t$ and $y = t^2$ then $\frac{dz}{dt}$ is given by

[Question ID = 4214]

1. $\frac{e^x}{t}(\sin y - 2t^2 \cos y)$

   [Option ID = 16850]
2. $\frac{e^x}{t}(\sin y + t^2 \cos y)$

   [Option ID = 16851]
3. $\frac{e^x}{t}(2\sin y + t^2 \cos y)$

   [Option ID = 16852]
4. $\frac{e^x}{t}(\sin y + 2t^2 \cos y)$

   [Option ID = 16853]

Correct Answer :-

- $\frac{e^x}{t}(\sin y + 2t^2 \cos y)$

  [Option ID = 16853]

51) If, $A = \begin{bmatrix} 3x & 0 \\ x & x \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} 1 & 0 \\ -1 & 3 \end{bmatrix}$. Then the value of x is

[Question ID = 4215]

1. 1/3

   [Option ID = 16854]
2. 1/2

   [Option ID = 16855]
3. 1/6

   [Option ID = 16856]
4. 1

   [Option ID = 16857]

Answer :-
[Option ID = 16854]

52) The minimum value of $\left(x^2+\frac{250}{x}\right)$

[Question ID = 4216]
1. 45

   [Option ID = 16858]
2. 50

   [Option ID = 16859]
3. 25

   [Option ID = 16860]
4. 75

   [Option ID = 16861]

Correct Answer :-
- 75

  [Option ID = 16861]

53) $\int \frac{e^x\,dx}{e^x-1}$ is equal to

[Question ID = 4217]
1. $\log(e^x+1)$

   [Option ID = 16862]
2. $\log(1-e^x)$

   [Option ID = 16863]
3. $\log(e^{-x}-1)$

   [Option ID = 16864]
4. $\log(e^x-1)$

   [Option ID = 16865]

Correct Answer :-
- $\log(e^x-1)$

  [Option ID = 16865]

54) A box contains 5 black and 5 red balls.Two balls are randomly picked one after another from the box, without replacement.The probability for balls being red is
[Question ID = 4218]
1. 2/9 [Option ID = 16866]
2. 2/5 [Option ID = 16867]
3. 1/2 [Option ID = 16868]
4. 1/7 [Option ID = 16869]

Correct Answer :-
- 2/9 [Option ID = 16866]

55) The value of $\int_{0.2}^{2.2} x^2 e^x\,dx$ by using one-segment trapezoidal rule is most nearly

[Question ID = 4219]
1. 11.672

   [Option ID = 16870]
2. 43.729

   [Option ID = 16871]
3. 24.119

   [Option ID = 16872]
4. 31.807

   [Option ID = 16873]

Correct Answer :-
- 43.729

  [Option ID = 16871]

the arithmetic mean of two numbers is 10 and their geometric mean is 8, the numbers are

[Question ID = 4220]
1. 24, 5

   [Option ID = 16874]
2. 14, 7

   [Option ID = 16875]
3. 8, 11

   [Option ID = 16876]
4. 16, 4

   [Option ID = 16877]

Correct Answer :-
- 16, 4

  [Option ID = 16877]

---

57) A random process is defined by X (t) = A where A is continous random variable uniformly distributed on (0,2). The auto correlation function and mean of the process are

[Question ID = 4221]
1. 1/2 and 1/3

   [Option ID = 16878]
2. 1/3 and 3

   [Option ID = 16879]
3. 1/2 and 1

   [Option ID = 16880]
4. 8/3 and 2

   [Option ID = 16881]

Correct Answer :-
- 8/3 and 2

  [Option ID = 16881]

---

58) The density function of two random variable X and Y is

$$f_{X,Y}(x,y) = \begin{cases} \frac{1}{12} & 0 < x < 6 \text{ and } 0 < y < 4 \\ 0 & \text{else where} \end{cases}$$

The expected value of the function g(x, y) = $(XY)^2$ is

[Question ID = 4222]
1. 96

   [Option ID = 16882]
2. 32

   [Option ID = 16883]
3. 48

   [Option ID = 16884]
4. 128

   [Option ID = 16885]

Correct Answer :-
- 128

  [Option ID = 16885]

---

59) The radiation resistance of an infinitesimal dipole of overall length l= λ /40 is
[Question ID = 4223]
1. 2 Ω [Option ID = 16886]
2. 50 Ω [Option ID = 16887]
3. 0.493 Ω [Option ID = 16888]
4. 0.316 Ω [Option ID = 16889]

Correct Answer :-
- 0.493 Ω [Option ID = 16888]

The Nyquist sampling rate for the signal g(t) = [illegible]0 cos(50πt) cos2(100πt) where 't' is in seconds, is

[Question ID = 4224]

1. 150 samples per second

   [Option ID = 16890]
2. 300 samples per second

   [Option ID = 16891]
3. 250 samples per second

   [Option ID = 16892]
4. 200 samples per second

   [Option ID = 16893]

Correct Answer :-

- 250 samples per second

  [Option ID = 16892]

61) In a PCM system, if the code word length is increased from 6 to 10 bits, the signal to quantization noise ratio improves by the factor.

[Question ID = 4225]

1. 512

   [Option ID = 16894]
2. 128

   [Option ID = 16895]
3. 64

   [Option ID = 16896]
4. 256

   [Option ID = 16897]

Correct Answer :-

- 256

  [Option ID = 16897]

62) In C language,what is the output of the following code

```
int main ()

{

int a = 1, b = 9, c; c = a == b; printf("%i" ,c);

}
```

[Question ID = 4226]

1. 4

   [Option ID = 16898]
2. 0

   [Option ID = 16899]
3. 1

   [Option ID = 16900]
4. Error

   [Option ID = 16901]

Correct Answer :-

- 0

  [Option ID = 16899]

63) In C language,what is the output of the following code

```
int main ()

{

int a = 63, b = 9 ;

printf( "%d",a>>a/b-2);

}
```

[Question ID = 4227]
1.

[Option ID = 16902]
2. 2

[Option ID = 16903]
3. 3

[Option ID = 16904]
4. 1

[Option ID = 16905]

Correct Answer :-
- 1

[Option ID = 16905]

64) The decimal equivalent of hex number 1A53 is
[Question ID = 4228]
1. 6793 [Option ID = 16906]
2. 6973 [Option ID = 16907]
3. 6379 [Option ID = 16908]
4. 6739 [Option ID = 16909]

Correct Answer :-
- 6739 [Option ID = 16909]

65) A TDM link has 20 signal channels and each channel is sampled 8000 times/sec. Each sample is represented by seven binary bits and contains an additional bit for synchronization.The total bit rate for the TDM link is

[Question ID = 4229]
1. 1280 K bits/sec

[Option ID = 16910]
2. 1180 K bits/sec

[Option ID = 16911]
3. 1280 M bits/sec

[Option ID = 16912]
4. 1180 M bits/sec

[Option ID = 16913]

Correct Answer :-
- 1280 K bits/sec

[Option ID = 16910]

66) The analog output voltage(V_0) of 6-bit digital-to-analog converter(R-2R ladder network) with V_{ref} as 7V, when the digital input is 011100 is

[Question ID = 4230]
1. 4.65 V

[Option ID = 16914]
2. 8 V

[Option ID = 16915]
3. 7.75 V

[Option ID = 16916]
4. 3.06 V

[Option ID = 16917]

Correct Answer :-
- 3.06 V

[Option ID = 16917]

67) If a tuned collector oscillator in a radio receiver has a fixed inductance of 50 μH and has to be tuneable over the frequency band of 600 to 1000 kHz, then the range of variable capacitor to be used is

[Question ID = 4231]
1. 2576 pF to 250 pF

[Option ID = 16918]
2. 5000 pF to 760 pF

...on ID = 16919]
3. ...pF to 507 pF

[Option ID = 16920]
4. 3500 pF to 150 pF

[Option ID = 16921]

Correct Answer :-
- 1410 pF to 507 pF

[Option ID = 16920]

68) If current gain of a transistor in CE mode is 48 then its common - base current gain and the base current when the emitter current is 5mA are
[Question ID = 4232]
1. 0.98 and 1.0 x 10^{-4} A [Option ID = 16922]
2. 0.99 and 2.5 x 10^{-4} A [Option ID = 16923]
3. 0.97 and 1.2 x 10^{-5} A [Option ID = 16924]
4. 0.90 and 1.5 x 10^{-4} A [Option ID = 16925]

Correct Answer :-
- 0.98 and 1.0 x 10^{-4} A [Option ID = 16922]

69) An N- channel JFET requires a series resistor R_s to self bias with I_{DSS} = -6V.The value of this resistor is
[Question ID = 4233]
1. 166 Ω [Option ID = 16926]
2. 18.2 Ω [Option ID = 16927]
3. 83.25 Ω [Option ID = 16928]
4. 333 Ω [Option ID = 16929]

Correct Answer :-
- 333 Ω [Option ID = 16929]

70) In which of the following diodes,the width of the junction barrier is very high
[Question ID = 4234]
1. Photo diode [Option ID = 16930]
2. PIN diode [Option ID = 16931]
3. Schottky diodes [Option ID = 16932]
4. Tunnel diode [Option ID = 16933]

Correct Answer :-
- PIN diode [Option ID = 16931]

71) The sensitivity of photo diode depends on
[Question ID = 4235]
1. Depletion region width and excess carrier lifetime [Option ID = 16934]
2. Excess carrier life time and forward bias current [Option ID = 16935]
3. Forward bias current and light intensity [Option ID = 16936]
4. Light intensity and depletion region width [Option ID = 16937]

Correct Answer :-
- Light intensity and depletion region width [Option ID = 16937]

72) The directional derivative of $f(x,y,z) = x^2 + y^2 + z^2$ at the point $(1,1,3)$ in the direction of the vector $\hat{a} = \hat{\imath} - \hat{k}$ is

[Question ID = 4236]
1. 4 [Option ID = 16938]
2. $-\frac{4}{\sqrt{2}}$

   [Option ID = 16939]
3. $\frac{4}{\sqrt{2}}$

   [Option ID = 16940]
4. -4

   [Option ID = 16941]

Correct Answer :-
- $-\frac{4}{\sqrt{2}}$

  [Option ID = 16939]

If $F(s)$ is the Fourier transform of $f(x)$, then Fourier transform of $f(x-5)$ is
[Question ID = 4237]
1. $\frac{1}{5}F\left(\frac{s}{5}\right)$

[Option ID = 16942]
2. $5F\left(\frac{s}{5}\right)$

[Option ID = 16943]
3. $e^{i5s}F(s)$

[Option ID = 16944]
4. $e^{i5s}F\frac{s}{5}$

[Option ID = 16945]

Correct Answer :-
- $e^{i5s}F(s)$

[Option ID = 16944]

74) The intercepts made by the plane 3x + 4y + 2z - 12 = 0 on the coordinate axes are
[Question ID = 4238]
1. (4,3,6) [Option ID = 16946]
2. (0,-1,0) [Option ID = 16947]
3. (-1,-1,-1) [Option ID = 16948]
4. (1,0,-1) [Option ID = 16949]

Correct Answer :-
- (4,3,6) [Option ID = 16946]

75) The solution of $\int_{-1}^{1}\sqrt{\frac{1+x}{1-x}}\,dx$ =

[Question ID = 4239]
1. $\frac{\pi}{2}$

[Option ID = 16950]
2. $-\pi$

[Option ID = 16951]
3. $-\frac{\pi}{2}$

[Option ID = 16952]
4. π

[Option ID = 16953]

Correct Answer :-
- π

[Option ID = 16953]

76) The argument of the complex number $z=\frac{1+2i}{1-2i}$ is

[Question ID = 4240]
1. $\tan^{-1}\left(-\frac{1}{2}\right)$

[Option ID = 16954]
2. $\tan^{-1}\left(-\frac{1}{3}\right)$

[Option ID = 16955]
3. $\tan^{-1}\left(-\frac{4}{3}\right)$

[Option ID = 16956]
4. $\tan^{-1}\left(-\frac{\sqrt{2}}{3}\right)$

[Option ID = 16957]

Correct Answer :-
- $\tan^{-1}\left(-\frac{4}{3}\right)$

on ID = 16956]

77) The solution of the ordinary differential equation $\frac{dy}{dx} + y = 0$ for the boundary condition $y = 7$ at $x = 1$ is

[Question ID = 4241]

1. $38.04e^{-3x}$

   [Option ID = 16958]
2. $76.05e^{-2x}$

   [Option ID = 16959]
3. $98.23e^{-\frac{x}{2}}$

   [Option ID = 16960]
4. $19.02e^{-x}$

   [Option ID = 16961]

Correct Answer :-

- $19.02e^{-x}$

  [Option ID = 16961]

78) **Let** $A = \begin{bmatrix} 4 & -0.1 \\ 0 & 1 \end{bmatrix}$ **and** $A^{-1} = \begin{bmatrix} 1/2 & \alpha \\ 0 & \beta \end{bmatrix}$ **then** $\alpha + \beta =$

[Question ID = 4242]

1. $-\frac{25}{40}$

   [Option ID = 16962]
2. $\frac{21}{20}$

   [Option ID = 16963]
3. $\frac{41}{40}$

   [Option ID = 16964]
4. $-\frac{7}{20}$

   [Option ID = 16965]

Correct Answer :-

- $\frac{41}{40}$

  [Option ID = 16964]

79) ------------ store data or information temporarily and pass it on as directed by the control unit

[Question ID = 4243]

1. address [Option ID = 16966]
2. register [Option ID = 16967]
3. number [Option ID = 16968]
4. memory [Option ID = 16969]

Correct Answer :-

- register [Option ID = 16967]

80) Working of the WAN generally involves

[Question ID = 4244]

1. ATM [Option ID = 16970]
2. frame delay [Option ID = 16971]
3. user agent [Option ID = 16972]
4. satellite [Option ID = 16973]

Correct Answer :-

- satellite [Option ID = 16973]

81) Positive AND gate is also a negative

[Question ID = 4245]

1. NOR gate [Option ID = 16974]
2. NAND gate [Option ID = 16975]
3. NOR gate [Option ID = 16976]

82) What is the output of the following code?

```
#include < iostream.h >
void main ()
{
int main ;
main = 100 ;
count << main ++<< endl;
}
```

[Question ID = 4246]

1. Error : one cannot use main as identifier

   [Option ID = 16978]
2. 100

   [Option ID = 16979]
3. 101

   [Option ID = 16980]
4. None of these

   [Option ID = 16981]

Correct Answer :-

- 100

  [Option ID = 16979]

83) What is the output of the following code?

```
#include< iostream.h>
Void main()
{
    bool a = 10 ;
    count << a <<< endl ;
}
```

[Question ID = 4247]

1. error

   [Option ID = 16982]
2. false

   [Option ID = 16983]
3. 10

   [Option ID = 16984]
4. 1

   [Option ID = 16985]

Correct Answer :-

- 1

  [Option ID = 16985]

84) A transmission line of characteristic impedance of 50 Ω is terminated by a load impedance of (100 - j50)Ω and is fed by a matched generator.The measured voltage amplitude at the load terminal is 100 V. The VSWR on the line is
[Question ID = 4248]

1. 1.583 [Option ID = 16986]
2. 2.562 [Option ID = 16987]
3. 2.618 [Option ID = 16988]
4. 1.684 [Option ID = 16989]

Correct Answer :-

- 2.618 [Option ID = 16988]

When a transmission line has a load impedance same as that of the characteristic impedance,the line said to be
[Question ID = 4249]
1. Perpendicular [Option ID = 16990]
2. Polarized [Option ID = 16991]
3. Parallel [Option ID = 16992]
4. Matched [Option ID = 16993]

Correct Answer :-

- Matched [Option ID = 16993]

---

86) The characteristics impedance of a quarter wave line is 50 Ω and load impedance of 20 Ω,the input impedance to this transformer is
[Question ID = 4250]
1. 50 Ω [Option ID = 16994]
2. 125 Ω [Option ID = 16995]
3. 25 Ω [Option ID = 16996]
4. 150 Ω [Option ID = 16997]

Correct Answer :-

- 125 Ω [Option ID = 16995]

---

87) The minimum impedance of a transmission line is 75 Ω with SWR 4 is
[Question ID = 4251]
1. 19.86 Ω [Option ID = 16998]
2. 18.75 Ω [Option ID = 16999]
3. 16.34 [Option ID = 17000]
4. 14.44 Ω [Option ID = 17001]

Correct Answer :-

- 18.75 Ω [Option ID = 16999]

---

88) The power reflected in a transmission line, when its reflection coefficient and input power are 0.45 and 18W
[Question ID = 4252]
1. 3.645 W [Option ID = 17002]
2. 4.563 W [Option ID = 17003]
3. 2.50 W [Option ID = 17004]
4. 5.368 W [Option ID = 17005]

Correct Answer :-

- 3.645 W [Option ID = 17002]

---

89) Diffusion constants D_p , D_n and mobility μ_P and μ_n and absolute temperature T are related as

[Question ID = 4253]
1. $\frac{D_p}{\mu_p} = \frac{D_n}{\mu_n} = \frac{T}{11600}$

   [Option ID = 17006]
2. $\frac{D_p}{\mu_p} = \frac{D_n}{\mu_n} = \frac{11600}{T}$

   [Option ID = 17007]
3. $\frac{D_p}{\mu_p} = \frac{\mu_n}{D_n} = \frac{T}{11600}$

   [Option ID = 17008]
4. $\frac{D_p}{\mu_p} = \frac{\mu_n}{D_n} = \frac{11600}{T}$

   [Option ID = 17009]

Correct Answer :-

- $\frac{D_p}{\mu_p} = \frac{D_n}{\mu_n} = \frac{T}{11600}$

  [Option ID = 17006]

---

90) Hall coefficient K_H and charge density ρ are related as

[Question ID = 4254]
1. $K_H = \rho$

   [Option ID = 17010]
2. $K_H = \frac{1.5}{\rho}$

[Option ID = 17011]
3. $K_H = \frac{1}{\rho}$

[Option ID = 17012]
4. $K_H = \frac{\rho}{1.5}$

[Option ID = 17013]

Correct Answer :-
- $K_H = \frac{1}{\rho}$

[Option ID = 17012]

91) If E is energy level of electron and E_F is Fermi level, then

[Question ID = 4255]
1. all quantum states with E less than E_F will be empty at T= 0

   [Option ID = 17014]
2. all quantum states with E higher than E_F will be occupied at T = 0

   [Option ID = 17015]
3. all quantum states with E less than E_F will be occupied at T = 0

   [Option ID = 17016]
4. none of these

   [Option ID = 17017]

Correct Answer :-
- all quantum states with E less than E_F will be occupied at T = 0

[Option ID = 17016]

92) In a uniformly doped abrupt pn junction,the doping level of the n side is 4 times the doping level of p side.The ratio of the depletion layer width is
[Question ID = 4256]
1. 0.2 [Option ID = 17018]
2. 0.25 [Option ID = 17019]
3. 0.5 [Option ID = 17020]
4. 1.0 [Option ID = 17021]

Correct Answer :-
- 0.25 [Option ID = 17019]

93) A silicon bar is doped with donor impurities N_D = 2.25 x10^{15} / cm^3. Given the intrinsic carrier concentration of silicon at T = 300K is n_i= 1.5 x10^{10}/cm^3.Assuming complete impurity ionization,the equilibrium electron and hole concentrations are
[Question ID = 4257]
1. n_0=1.5 x 10^{16}/cm^3 and p_0=1.5 × 10^5/cm [Option ID = 17022]
2. n_0=1.5 x 10^{10}/cm and P_0=1.5 x 10^{15}/cm^3 [Option ID = 17023]
3. n_0=2.25 x 10^{15} /cm^3 and p_0= 1.5 x 10^{10}/cm^3 [Option ID = 17024]
4. n_0=2.25 x 10^{15}/cm^3 and p_0=1 x 10^5/cm^3 [Option ID = 17025]

Correct Answer :-
- n_0=2.25 x 10^{15}/cm^3 and p_0=1 x 10^5/cm^3 [Option ID = 17025]

94) Consider a Ge diode operating at 27^o C and just beyond the threshold voltage of Ge, the value of dV/dT is
[Question ID = 4258]
1. -2.3 mV/^{o}C [Option ID = 17026]
2. - 2.0 mV/^{o}C [Option ID = 17027]
3. -2.1 mV/^{o}C [Option ID = 17028]
4. -1.9 mV/^{o}C [Option ID = 17029]

Correct Answer :-
- -2.3 mV/^{o}C [Option ID = 17026]

95) The reverse saturation current of a reverse - biased PN junction diode increases 32 times due to rise in ambiant temperature.If the original temperature was 40^o C, What is the final temperature?
[Question ID = 4259]
1. 72^o C [Option ID = 17030]
2. 45^o C [Option ID = 17031]
3. 90^o C [Option ID = 17032]
4. 50^o C [Option ID = 17033]

Correct Answer :-
- 90^o C [Option ID = 17032]

voltage $V(t) = 2 \sin \omega t$ is applied across a capacitor having time varying capacitance given by $C(t) = 1 + 0.1 \sin \omega t$ F. Then current $i(t)$ is

[Question ID = 4260]

1. $0.2 \sin \omega t \cos\omega t + 2\omega \cos \omega t(1 + 0.1 \sin \omega t)$

   [Option ID = 17034]
2. $0.1 \sin \omega t + 2\omega \cos \omega t$

   [Option ID = 17035]
3. $0.1 \cos \omega t + 2\omega \sin \omega t$

   [Option ID = 17036]
4. $0.2 \sin \omega t + 2\omega \sin(1 + 0.1 \sin \omega t)$

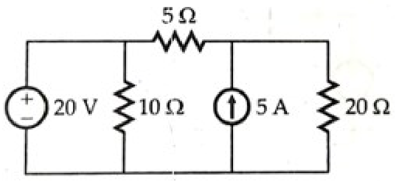
   [Option ID = 17037]

Correct Answer :-

- $0.2 \sin \omega t \cos\omega t + 2\omega \cos \omega t(1 + 0.1 \sin \omega t)$

  [Option ID = 17034]

97) In the circuit shown in figure,the power loss across the 5 Ω resistor is



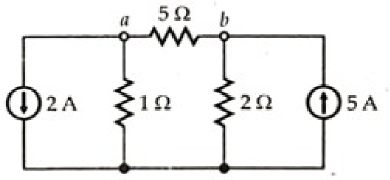
[Question ID = 4261]

1. 12 W [Option ID = 17038]
2. 51.2 W [Option ID = 17039]
3. 24 W [Option ID = 17040]
4. 34 W [Option ID = 17041]

Correct Answer :-

- 51.2 W [Option ID = 17039]

98) In the circuit shown in the figure,the magnitude of current through the 5 Ω resistor is



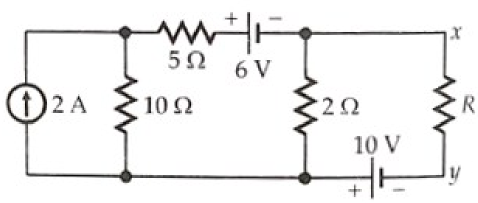
[Question ID = 4262]

1. 0.8 A [Option ID = 17042]
2. 1.5 A [Option ID = 17043]
3. 3.0 A [Option ID = 17044]
4. 2.3 A [Option ID = 17045]

Correct Answer :-

- 1.5 A [Option ID = 17043]

99) What should be the value of R to have maximum power transfer in the circuit shown below



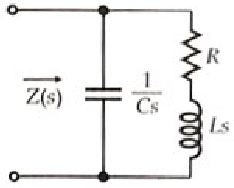
[Question ID = 4263]

1. 1.2 Ω [Option ID = 17046]
2. 12 Ω [Option ID = 17047]
3. 1.765 Ω [Option ID = 17048]
4. 3.85 Ω [Option ID = 17049]

Correct Answer :-

- 5 Ω [Option ID = 17048]

100) The driving point admittance of the network shown in figure is



[Question ID = 4264]

1. $\dfrac{1+RCs}{R+Ls}$

   [Option ID = 17050]

2. $\dfrac{1+RCs+LCs^2}{R+Ls}$

   [Option ID = 17051]

3. $\dfrac{s+RCs^2+LC}{R+Ls+Cs^2}$

   [Option ID = 17052]

4. $\dfrac{1+LCs^2}{R+Ls}$

   [Option ID = 17053]

Correct Answer :-

- $\dfrac{1+RCs+LCs^2}{R+Ls}$

  [Option ID = 17051]