DU MTech Microwave Electronics 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 125 Ω 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 \times 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] $2\pi\sigma$ 1. $\ln\left(\frac{b}{a}\right)$ [Option ID = 16662] 2πε 2. $ln\left(\frac{b}{a}\right)$ [Option ID = 16663] 3. $2\pi\sigma ln\left(\frac{b}{\sigma}\right)$ [Option ID = 16664] 1 4. $2\pi \epsilon \ln \left(\frac{b}{-}\right)$ [Option ID = 16665] Correct Answer :-2πσ $\ln\left(\frac{b}{a}\right)$ [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+j50 Ω , 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]

6) If a 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] $\Gamma(d)$ 2. $1 - \Gamma(d)$ [Option ID = 16675] $\Gamma(d)$ 3. - $1 + \Gamma(d)$ [Option ID = 16676] 4. $\frac{1+\Gamma(d)}{1-\Gamma(d)}$ [Option ID = 16677] Correct Answer :- $1 + \Gamma(d)$ [Option ID = 16677] 7) A copper rectangular cavity resonator is structured by 3x4x1 cm³. The resonant frequency for TM₁₁₀ 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. Z₀ [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]

 10) A 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. 49 cm [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]
 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 $\theta_i = 15^{\circ}$ 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 $_{\varepsilon}$, then the current through this capacitor is expressed as,
[Question ID = 4177] 1. $\frac{\varepsilon}{Ad} \frac{\partial v}{\partial t}$
$2. \frac{Ad}{\varepsilon} \frac{\partial v}{\partial t}$
[Option ID = 16703] 3. $\frac{\varepsilon A}{d} \frac{\partial v}{\partial t}$
$\begin{bmatrix} \text{Option ID} = 16704 \end{bmatrix}$ 4. $\frac{d}{\epsilon A} \frac{\partial v}{\partial t}$
[Option ID = 16705]
Correct Answer :- • $\frac{\varepsilon A}{d} \frac{\partial v}{\partial t}$
[Option ID = 16704]

14) A wave with a frequency of 100 MHz is propagating in a free Space, the propagation constant of this wave will be, [Question 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. Z_0 B $Z_0/2$ Z₀ 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] 1.8Ω [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 [Ouestion 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

[Option ID = 16725]		
Correct 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		
$P_{in} = 10 \text{ mW} \qquad 25 \text{ dB} \qquad -35 \text{ dB} \qquad P_{out}$		
[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 $5 \angle 0^{\circ}$ V at 1.2 MHz. If the line is terminated by $Z_L(= Z_{\circ})$ 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. 8π [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/m² [Option ID = 16758] 2. 3.6 x 10^{-14} W/m² [Option ID = 16759] 3. 0.614 × 10⁻¹⁴ W/m² [Option ID = 16760] 4. $2.0 \times 10^{-14} \text{ W/m}^2$ [Option ID = 16761] Correct Answer :-• 0.614 × 10⁻¹⁴ W/m² [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 :-• 20π² W [Option ID = 16764] 29) Charge needed within a unit sphere centred at the origin for producing a potential field, V = - $6r^{5}/\epsilon_{0}$ for the distance r \leq 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

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in the medium is equal to displacement current is
[Question ID = 4194]
1. 90 MHz [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 \Omega. 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 \lambda/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 \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 \{(\rho, \phi, z): 3 \le \rho \le 5, \frac{\pi}{8} \le \phi \le \frac{\pi}{4}, 3 \le z \le 4.5\} in cylindrical coordinates has volume of
[Question ID = 4198]
1. 4.712
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[Option ID = 16786] 2. 2.712 [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. $x = \frac{1}{2}$ [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 = 15, 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 $\frac{s+3}{(s+1)(s+3)}$ 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}

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38) A 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 \omega_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]
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[Option ID = 16801]

42) The Nyquist sampling frequency for the signal $\frac{\sin{(500\pi t)}}{x} \frac{\sin{(700\pi t)}}{x}$ is given by s(t) =πt πt [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] 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] 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]

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



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    1. 12 V
[Option ID = 16830]
    2. 10 V
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[Option ID = 16831] 3. 0.8 V



[Question ID = 4212] 1. L = 0.1 H, R = 0.5 Ω , C = 5 F [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 (1)(2)(4) [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]

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Correct Answer :-
• 1/3
   [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<sup>x</sup> − 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]
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56) If 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 \end{cases}
                     0 < x < 6 and 0 < y < 4
                                     else where
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 = \lambda /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 :-
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• 0.493 Ω [Option ID = 16888]

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60) The Nyquist sampling rate for the signal g(t) = 10 \cos(50\pi t) \cos(100\pi t) 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);
}
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[Question ID = 4227]
1. 0
   [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]
2.8V
   [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
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[Option ID = 16918] 2. 5000 pF to 760 pF

[Option ID = 16919] 3. 1410 pF to 507 pF		
[Option ID = 16920]		
4. 3500 pF to 150 pF [Option ID = 16921]		
Correct Answer :-		
• 1410 pF to 507 pF		
 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 $\hat{a} = \hat{i} - \hat{k}$ is		
[Question ID = 4236] 1. 4 [Option ID = 16938] 2. $-\frac{4}{\sqrt{2}}$		
$\begin{array}{l} \text{[Option ID = 16939]} \\ 3. \frac{4}{\sqrt{2}} \end{array}$		
[Option ID = 16940] 44		
[Option ID = 16941]		
Correct Answer :- • $-\frac{4}{\sqrt{2}}$		
[Option ID = 16939]		

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73) 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<sup>i5s</sup>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. <u>-</u>π
    [Option ID = 16951]
      π
3. 🗕
      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}{2}\right)
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1 3/ [Option 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⁻²/2 [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. _25 40 [Option ID = 16962] 21 2. 20 [Option ID = 16963] 3. $\frac{41}{40}$ [Option ID = 16964] 4. – 20 7 [Option ID = 16965] Correct Answer :-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]

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4. OR gate [Option ID = 16977]
Correct Answer :-
• OR gate [Option ID = 16977]
82) What is the output of the following code?
#include < iostream.h >
void main ()
{
int main;
main = 100;
count << main ++<< endl;</pre>
}
[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 \Omega is terminated by a load impedance of (100 - j50)\Omega 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]
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85) 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. $\frac{D_p}{\mu_p} = \frac{D_n}{\mu_n} = \frac{11600}{T}$ 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 :- $\frac{D_p}{D_p} = \frac{D_n}{D_n} = \frac{D_n}{D_n}$ T 11600 μn μ_p [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]
$K_H = -\frac{1}{\rho}$
[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] 0.2 [Option ID = 17018] 0.25 [Option ID = 17019] 0.5 [Option ID = 17020] 1.0 [Option ID = 17021]
Correct Answer :- • 0.25 [Option ID = 17019]
93) A silicon bar is doped with donor impurities $N_D = 2.25 \times 10^{15}$ / cm ³ . Given the intrinsic carrier concentration of silicon at T = 300K is $n_i = 1.5 \times 10^{10}$ /cm ³ . Assuming complete impurity ionization, the equilibrium electron and hole concentrations are [Question ID = 4257] 1. $n_0=1.5 \times 10^{16}$ /cm ³ and $p_0=1.5 \times 10^5$ /cm [Option ID = 17022] 2. $n_0=1.5 \times 10^{10}$ /cm and $P_0=1.5 \times 10^{15}$ /cm ³ [Option ID = 17023] 3. $n_0=2.25 \times 10^{15}$ /cm ³ and $p_0=1.5 \times 10^{10}$ /cm ³ [Option ID = 17024] 4. $n_0=2.25 \times 10^{15}$ /cm ³ and $p_0=1 \times 10^{5}$ /cm ³ [Option ID = 17025]
Correct Answer :- • $n_0=2.25 \times 10^{15}/cm^3$ and $p_0=1 \times 10^5/cm^3$ [Option ID = 17025]
 94) Consider a Ge diode operating at 27° C and just beyond the threshold voltage of Ge, the value of dV/dT is [Question ID = 4258] 12.3 mV/°C [Option ID = 17026] 2 2.0 mV/°C [Option ID = 17027] 32.1 mV/°C [Option ID = 17028] 41.9 mV/°C [Option ID = 17029]
Correct Answer :- • -2.3 mV/°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° C, What is the final temperature? [Question ID = 4259] 1. 72° C [Option ID = 17030] 2. 45° C [Option ID = 17031] 3. 90° C [Option ID = 17032] 4. 50° C [Option ID = 17033]
• 90° C [Option ID = 17032]



3. 1.765 Ω [Option ID = 17048]

4. 3.85 Ω [Option ID = 17049]

Co	orrect Answer :-
٠	1.765 Ω [Option ID = 17048]

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



[Question ID = 4264] 1. $\frac{1 + RCs}{R + Ls}$ [Option ID = 17050] 2. $\frac{1 + RCs + LCs^2}{R + Ls}$ [Option ID = 17051] 3. $\frac{s + RCs^2 + LC}{R + Ls + Cs^2}$ [Option ID = 17052] 4. $\frac{1 + LCs^2}{R + Ls}$ [Option ID = 17053]

Correct Answer :-

• $\frac{1 + RCs + LCs^2}{R + Ls}$

[Option ID = 17051]