DU MSc Electronics

Topic:- ELEC MSC S2

1) The equation of the plane through the points $(1,-1,2)$, $(1,1,-2)$ and $(-1,1,2)$ is

[Question ID = 1584]

1. $x+3y+2z-2=0$

   [Option ID = 6330]
2. $x-y+2z-2=0$

   [Option ID = 6331]
3. $2x+2y+z-2=0$

   [Option ID = 6332]
4. $x+y-z-2=0$

   [Option ID = 6333]

Correct Answer :-

- $2x+2y+z-2=0$

  [Option ID = 6332]

2) Unit vector perpendicular to $\hat{A}=3\hat{\imath}+\hat{\jmath}+2\hat{k}$ and $\hat{B}=2\hat{\imath}-2\hat{\jmath}+4\hat{k}$ vectors is

[Question ID = 1585]

1. $\pm\frac{1}{\sqrt{3}}(-\hat{\imath}-\hat{\jmath}-\hat{k})$

   [Option ID = 6334]
2. $\pm\frac{1}{\sqrt{3}}(\hat{\imath}+\hat{\jmath}+\hat{k})$

   [Option ID = 6335]
3. $\pm\frac{1}{\sqrt{3}}(\hat{\imath}-\hat{\jmath}+\hat{k})$

   [Option ID = 6336]
4. $\pm\frac{1}{\sqrt{3}}(\hat{\imath}-\hat{\jmath}-\hat{k})$

   [Option ID = 6337]

Correct Answer :-

- $\pm\frac{1}{\sqrt{3}}(\hat{\imath}-\hat{\jmath}-\hat{k})$

  [Option ID = 6337]

3) The two complex numbers $Z_1=2+i\,{}^{2}/_{\sqrt{3}}$ and $Z_2=\sqrt{3}+i$. The argument of $\frac{Z_1}{Z_2}$ in degree is ____

[Question ID = 1586]

1. 0°

   [Option ID = 6338]
2. 90°

   [Option ID = 6339]
3. 30°

   [Option ID = 6340]
4. 60°

   [Option ID = 6341]

Correct Answer :-

- 0°

[Option ID = 6338]

4) The value of given definite integral $\int_0^{\frac{\pi}{2}} \sin 2x log(tanx)\, dx$ is

[Question ID = 1587]

1. 1

   [Option ID = 6342]
2. 0

   [Option ID = 6343]
3. π

   [Option ID = 6344]
4. -π

   [Option ID = 6345]

Correct Answer :-

- 0

  [Option ID = 6343]

5) If we differentiate the $f(x) = x^x$ then $\frac{df}{dx} =$

[Question ID = 1588]

1. $1 + logx$

   [Option ID = 6346]
2. $-x^x(1 + logx)$

   [Option ID = 6347]
3. $x^x(1 + logx)$

   [Option ID = 6348]
4. $x^x(logx)$

   [Option ID = 6349]

Correct Answer :-

- $x^x(1 + logx)$

  [Option ID = 6348]

6) The absolute maximum and minimum values points of $x^3 - 6x^2 + 9x - 7$ in [0 5] are

[Question ID = 1589]

1. the point of maxima is 3 and the point of minima is 5

   [Option ID = 6350]
2. the point of maxima is 5 and the point of minima is 0

   [Option ID = 6351]
3. the point of maxima is 5 and the point of minima is 3

   [Option ID = 6352]
4. There is no maxima and minima points in [0 5]

   [Option ID = 6353]

Correct Answer :-

- the point of maxima is 5 and the point of minima is 3

  [Option ID = 6352]

7) The Laplace transform of given unit step function $f(t-\beta) = \begin{cases} 0 & t < \beta \\ 1 & t > \beta \end{cases}$ is

[Question ID = 1590]

1. $\beta \frac{e^{-2s}}{s}$

   [Option ID = 6354]
2. $\frac{e^{-\beta s}}{s}$

[Option ID = 6355]

3. $\beta s e^{-2s}$

[Option ID = 6356]

4. e^{-2s}

[Option ID = 6357]

Correct Answer :-

- $\frac{e^{-\beta s}}{s}$

[Option ID = 6355]

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8) If 2 and 4 are the eigen values of square matrix A then the Eigen values of A^T are

[Question ID = 1591]

1. 0.5, 0.25 [Option ID = 6358]
2. 2, 4 [Option ID = 6359]
3. 4, 16 [Option ID = 6360]
4. 3, 2 [Option ID = 6361]

Correct Answer :-

- 2, 4 [Option ID = 6359]

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9) The system of equation x - 2y + z = 0, 2x - y + 3z = 0 and λ x + y - z = 0 has non zero solution, if λ is

[Question ID = 1592]

1. λ = 0.4 [Option ID = 6362]
2. λ = -2 [Option ID = 6363]
3. λ = 2 [Option ID = 6364]
4. λ = -0.8 [Option ID = 6365]

Correct Answer :-

- λ = -0.8 [Option ID = 6365]

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10) If A is skew-Hermitian, then (iA) is

[Question ID = 1593]

1. Skew-symmetric [Option ID = 6366]
2. Symmetric [Option ID = 6367]
3. Hermitian [Option ID = 6368]
4. Skew-Hermitian [Option ID = 6369]

Correct Answer :-

- Hermitian [Option ID = 6368]

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11) The integrating factor of the differential equation $\frac{dy}{dx} + \frac{y}{x} = x^3 - 3$ is

[Question ID = 1594]

1. - x

[Option ID = 6370]

2. x log x

[Option ID = 6371]

3. x

[Option ID = 6372]

4. log x

[Option ID = 6373]

Correct Answer :-

- x

[Option ID = 6372]

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12) The solution of $\frac{dy}{dx} - y \tan x = y^2 \sec x$ is given by:-

[Question ID = 1595]

1. $y^{-1} = \sin x + c_1 \cos x$

[Option ID = 6374]

2. $y^{-1} = \cos x + c_3 \sin x$

[Option ID = 6375]

3. $y^{-1} = -\cos x + c_4 \sin x$

[Option ID = 6376]

4. $y^{-1} = -\sin x + c_2 \cos x$

[Option ID = 6377]

Correct Answer :-

- $y^{-1} = -\sin x + c_2 \cos x$

[Option ID = 6377]

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13) The family of conic represented by the solution of the differential equation (4x + 3y +1) dx + (3x+2y+1) dy = 0 is
[Question ID = 1596]

1. Parabolas [Option ID = 6378]
2. Circle [Option ID = 6379]
3. Ellipses [Option ID = 6380]
4. Hyperbola [Option ID = 6381]

Correct Answer :-

- Hyperbola [Option ID = 6381]

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14) The function f(x)= x^3 - $6x^2$ + 9x + 25
[Question ID = 1597]

1. maxima at x = 1 and a minima at x = 3 [Option ID = 6382]
2. a maxima at x = 3 and a minima at x = 1 [Option ID = 6383]
3. no maxima, but a minima at x = 1 [Option ID = 6384]
4. a maxima at x = 1,but no minima [Option ID = 6385]

Correct Answer :-

- maxima at x = 1 and a minima at x = 3 [Option ID = 6382]

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15) Consider an optical fiber of 75 μm diameter, core index n_1 = 1.5, and cladding index n_2 = 1.49 for operation at λ = 1.31 μm. How many modes does this fiber support?
[Question ID = 1598]

1. 244 [Option ID = 6386]
2. 312 [Option ID = 6387]
3. 484 [Option ID = 6388]
4. 188 [Option ID = 6389]

Correct Answer :-

- 484 [Option ID = 6388]

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16) When a LED has 2 V applied to its terminals, it draws 100 mA and produces 4 mW of optical power. The LED conversion efficiency from electrical to optical power is:-
[Question ID = 1599]

1. 3% [Option ID = 6390]
2. 4% [Option ID = 6391]
3. 5% [Option ID = 6392]
4. 2% [Option ID = 6393]

Correct Answer :-

- 2% [Option ID = 6393]

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17) Number of electron-hole pairs generated divided by the number of photons is:-
[Question ID = 1600]

1. Dark current [Option ID = 6394]
2. Quantum response [Option ID = 6395]
3. Photo sensitivity [Option ID = 6396]
4. Quantum efficiency [Option ID = 6397]

Correct Answer :-

- Quantum efficiency [Option ID = 6397]

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18) If the refractive index of a media is 1.5, the velocity of light in the medium is:-
[Question ID = 1601]

1. 3×10^8 m/s [Option ID = 6398]
2. 1.5×10^8 m/s [Option ID = 6399]
3. 1×10^8 m/s [Option ID = 6400]
4. 2×10^8 m/s [Option ID = 6401]

Correct Answer :-

- 2×10^8 m/s [Option ID = 6401]

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

int main()

{

int a = 4, b = 7,c; c = a == b; printf("%i",c);

}

[Question ID = 1602]

1. 1

   [Option ID = 6402]
2. 0

   [Option ID = 6403]
3. error

   [Option ID = 6404]
4. 4

   [Option ID = 6405]

Correct Answer :-

- 0

  [Option ID = 6403]

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

int main()

{

int i = 4;

printf("%d%d",i,i++);

}

[Question ID = 1603]

1. 54

   [Option ID = 6406]
2. 45

   [Option ID = 6407]
3. 44

   [Option ID = 6408]
4. 55

   [Option ID = 6409]

Correct Answer :-

- 54

  [Option ID = 6406]

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21) 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 = 1604]

1. 1

   [Option ID = 6410]
2. 2

   [Option ID = 6411]
3. 3

   [Option ID = 6412]
4. None of these

   [Option ID = 6413]

Correct Answer :-

- 1

  [Option ID = 6410]

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

```
main()
{
int x;
x = 4;
while ( x > 1)
{
printf("%d",x);
x=x-1;
}
}
```

[Question ID = 1605]

1. 4323

   [Option ID = 6414]
2. 432

   [Option ID = 6415]
3. 4321

   [Option ID = 6416]
4. 3215

   [Option ID = 6417]

Correct Answer :-

- 432

  [Option ID = 6415]

23) In C "switch" statement, each case instance value must be:-

[Question ID = 1606]

1. constant

   [Option ID = 6418]
2. Variable

   [Option ID = 6419]
3. Special symbol

   [Option ID = 6420]
4. None of these

   [Option ID = 6421]

Correct Answer :-

- constant

  [Option ID = 6418]

24) If mobility of an electrons in Si at 300 K is 0.16 $m^2/V.s$ then the diffusion coefficient of electrons is:-
[Question ID = 1607]

1. 20.7×10^{-4} m^2/s [Option ID = 6422]
2. 62.1×10^{-4} m^2/s [Option ID = 6423]
3. 6.4×10^{-2} m^2/s [Option ID = 6424]
4. 41.4×10^{-4} m^2/s [Option ID = 6425]

Correct Answer :-

- 41.4×10^{-4} m^2/s [Option ID = 6425]

25) If an electric field of 45 V/m is applied to a semiconductor sample whose Hall coefficient is 0.04 m^3/C then the current density in the sample is _____(Given: $\mu_n = 0.36$ m^2/V)
[Question ID = 1608]

1. 203 A/cm^2 [Option ID = 6426]
2. 814 A/m^2 [Option ID = 6427]
3. 414 A/m^2 [Option ID = 6428]
4. 650 A/cm^2 [Option ID = 6429]

Correct Answer :-

- 414 A/m^2 [Option ID = 6428]

26) In a p-type GaAs sample electrons are injected from a contact. If the minority carrier mobility is 8000 $cm^2/V.s$ at 300 K and the radiation recombination time 0.3 ns then the diffusion length for the electron is:-
[Question ID = 1609]

1. 2.50 μm [Option ID = 6430]
2. 1.25 μm [Option ID = 6431]
3. 5.00 μm [Option ID = 6432]
4. 7.98 μm [Option ID = 6433]

Correct Answer :-

- 2.50 μm [Option ID = 6430]

27) Consider a 10 μm diameter p-n junction fabricated in Si. If donor density is 10^{15} /cm^3 and acceptor density is 10^{16} /cm^3 then built in potential in the p-n junction is (Given: intrinsic carrier concentration for Si = 1.75×10^{10} /cm^3)
[Question ID = 1610]

1. 0.31 V [Option ID = 6434]
2. 1.12 V [Option ID = 6435]
3. 1.42 V [Option ID = 6436]
4. 0.63 V [Option ID = 6437]

Correct Answer :-

- 0.63 V [Option ID = 6437]

28) In an *n*-type GaAs crystal at 300 K, the electron concentration varies as $n(x) = 1.5 \times 10^{15} exp\left(-\frac{x}{L}\right)$ /cm2. If the electron diffusion co-efficient is 250 cm2/s then the diffusion current density at $x = 0$ is _____ (where $L = 1.5\mu m$ and $x > 0$)

[Question ID = 1611]

1. 1.5 kA/cm^2

   [Option ID = 6438]
2. 1.0 kA/cm^2

   [Option ID = 6439]
3. 10.0 kA/cm^2

   [Option ID = 6440]
4. 0.4 kA/cm^2

   [Option ID = 6441]

Correct Answer :-

- 0.4 kA/cm^2

  [Option ID = 6441]

29) In a MOSFET the transfer characteristics are used to determine which of the following device parameter?
[Question ID = 1612]

1. threshold voltage and output resistance [Option ID = 6442]
2. threshold voltage and transconductance [Option ID = 6443]
3. transconductance and output resistance [Option ID = 6444]
4. transconductance and channel length modulation [Option ID = 6445]

Correct Answer :-

- threshold voltage and transconductance [Option ID = 6443]

30) The maximum voltage gain obtained from FET having $g_m = 5mS$ and $r_d = 20k\Omega$ is ___

[Question ID = 1613]

1. 100 [Option ID = 6446]
2. 10 [Option ID = 6447]
3. 0 [Option ID = 6448]
4. infinity [Option ID = 6449]

Correct Answer :-

- 100 [Option ID = 6446]

31) The drain of n-channel MOSFET is shorted to the gate and threshold voltage is 1.5V. If the drain current (I_D) is 2 mA for V_{GS} = 2.5 V then for V_{GS} = 3.5 V the I_D is _____.
[Question ID = 1614]

1. 2 mA [Option ID = 6450]
2. 4 mA [Option ID = 6451]
3. 8 mA [Option ID = 6452]
4. 1 mA [Option ID = 6453]

Correct Answer :-

- 8 mA [Option ID = 6452]

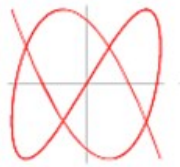
32) If a BJT has base current 250 µA and emitter current of 15 mA then its collector current and ß are:-
[Question ID = 1615]

1. 14.75 µA and 99 [Option ID = 6454]
2. 14.75 A and 59 [Option ID = 6455]
3. 14.75 µA and 99.8 [Option ID = 6456]
4. 14.75 mA and 59 [Option ID = 6457]

Correct Answer :-

- 14.75 mA and 59 [Option ID = 6457]

33) For the following Lissajous figure, the ratio of frequencies of signals applied to two inputs of CRO is



[Question ID = 1616]

1. 3/2

   [Option ID = 6458]
2. 3/4

   [Option ID = 6459]
3. 2/3

   [Option ID = 6460]
4. 5/3

   [Option ID = 6461]

Correct Answer :-

- 5/3

  [Option ID = 6461]

34) Electrical Zero Position (EZP) in Linear Variable Differential Transformer (LVDT) is:-
[Question ID = 1617]

1. Position of primary winding coil [Option ID = 6462]
2. Position of secondary winding coil [Option ID = 6463]
3. Position of core [Option ID = 6464]
4. Position of ac input voltage terminal [Option ID = 6465]

Correct Answer :-

- Position of core [Option ID = 6464]

35) A half-wave rectifier type AC voltage meter is fed with a 10 V_{rms} signal. The equivalent DC output (V_{dc}) is:-
[Question ID = 1618]

1. 9 V [Option ID = 6466]
2. 15 V [Option ID = 6467]
3. 4.5 V [Option ID = 6468]
4. 6.7 V [Option ID = 6469]

Correct Answer :-

- 4.5 V [Option ID = 6468]

36) The voltage output of a Hall-Effect transducer is 5 mV. If the plate is made of Si whose Hall coefficient is 6×10^{-6} Vm/AT (where T: Tesla), given plate thickness is 2 mm and the current passing through the plate is 2A. The value of flux density is:-

[Question ID = 1619]

1. 0.83 T

   [Option ID = 6470]
2. 1.2 T

   [Option ID = 6471]
3. 1.66 T

   [Option ID = 6472]
4. 2.44 T

   [Option ID = 6473]

Correct Answer :-

- 0.83 T

[Option ID = 6470]

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37) One Hartley oscillator circuit has two inductors of 0.5 mH and each is tuned to resonate with a capacitor which can be varied from 100 pF to 500 pF, the upper and lower frequencies of oscillation are, respectively:-
[Question ID = 1620]

1. 712 kHz, 225 kHz [Option ID = 6474]
2. 503 kHz, 318 kHz [Option ID = 6475]
3. 503 kHz, 225 kHz [Option ID = 6476]
4. 712 kHz, 318 kHz [Option ID = 6477]

Correct Answer :-

- 503 kHz, 225 kHz [Option ID = 6476]

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38) A source alphabet consists of N symbols with the probability of the first two symbols being the same. A source encoder increases the probability of the first symbol by a small amount and decreases the probability of the second by same amount. After encoding, the entropy of the source
[Question ID = 1621]

1. Increases [Option ID = 6478]
2. Remains the same [Option ID = 6479]
3. Increases only if N=2 [Option ID = 6480]
4. decreases [Option ID = 6481]

Correct Answer :-

- decreases [Option ID = 6481]

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39) The nyquist sampling rate for the signal $s(t) = \frac{\text{Sin}(500\pi t)}{\pi t} X \frac{\text{Sin}(700\pi t)}{\pi t}$ **is given by**

[Question ID = 1622]

1. 600 Hz

   [Option ID = 6482]
2. 400 Hz

   [Option ID = 6483]
3. 1200 Hz

   [Option ID = 6484]
4. 1400 Hz

   [Option ID = 6485]

Correct Answer :-

- 1200 Hz

  [Option ID = 6484]

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40) Source encoding in a data communication system is done in order to:-
[Question ID = 1623]

1. enhance the information transmission [Option ID = 6486]
2. bandpass filters and envelop rate detectors [Option ID = 6487]
3. conserve the transmitted power [Option ID = 6488]
4. discriminator detection [Option ID = 6489]

Correct Answer :-

- enhance the information transmission [Option ID = 6486]

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41) Consider the signal

$S(t)=m(t)\cos(2\pi f_c t) + \hat{m}(t)\sin(2\pi f_c t)$ where $\hat{m}(t)$ denotes the Hilbert transform of m(t) and the bandwidth of m(t) is very small compared to f_c . The signal s(t) is a

[Question ID = 1624]

1. band pass signal

   [Option ID = 6490]
2. low pass signal

   [Option ID = 6491]
3. high pass signal

   [Option ID = 6492]
4. double sideband suppressed carrier signal

[Option ID = 6493]

Correct Answer :-

- band pass signal

[Option ID = 6490]

42) Consider the frequency modulated signal $10 \cos [2\pi.10^5 t + 5\sin(2\pi.1500t) + 7.5 \sin(2\pi.1000t)]$ with carrier frequency of 10^5 Hz. The modulation index is:-

[Question ID = 1625]

1. 12.5

[Option ID = 6494]

2. 7.5

[Option ID = 6495]

3. 5

[Option ID = 6496]

4. 10

[Option ID = 6497]

Correct Answer :-

- 10

[Option ID = 6497]

43) Match List I with List II

List I	List II
Operations	Function
A. Companding	**I. Improving image rejection**
B. Squelch	**II. Variation of step size in quantization**
C. Preemphasis	**III. Muting the receiver**
D. Double conversion	**IV. Boosting of higher modulating frequencies at the transmitter**

Choose the correct answer from the options given below:

[Question ID = 1626]

1. A - II, B - III, C - IV, D - I

[Option ID = 6498]

2. A - II, B - I, C - IV, D - III

[Option ID = 6499]

3. A - IV, B - III, C - II, D - I

[Option ID = 6500]

4. A - IV, B - I, C - II, D - III

[Option ID = 6501]

Correct Answer :-

- A - II, B - III, C - IV, D - I

[Option ID = 6498]

44) The ramp signal m(t) = at is applied to delta modulator with sampling period T_s and step size δ . Slope overload distortion would occur if:-

[Question ID = 1627]

1. $\delta < a$

[Option ID = 6502]

2. $\delta > a$

[Option ID = 6503]

3. $\delta > a\, T_s$

[Option ID = 6504]

4. $\delta < a\, T_s$

[Option ID = 6505]

Correct Answer :-

- $\delta < a\, T_s$

[Option ID = 6505]

45) A voltage of 1 volt rms is applied at the sending end of a telephone cable of length 2000 meters. The attenuation in the cable is 1 dB/m. What will be the rms voltage at receiving end of the cable?
[Question ID = 1628]
1. 10^{100} volt [Option ID = 6506]
2. 10^{50} volt [Option ID = 6507]
3. 10^{-100} volt [Option ID = 6508]
4. 10^{-50} volt [Option ID = 6509]

Correct Answer :-
- 10^{-100} volt [Option ID = 6508]

46) In PCM system, if the quantization levels are increased from 3 to 9, the relative bandwidth requirement wil:-
[Question ID = 1629]
1. be doubled [Option ID = 6510]
2. be tripled [Option ID = 6511]
3. remain same [Option ID = 6512]
4. become four times [Option ID = 6513]

Correct Answer :-
- be doubled [Option ID = 6510]

47) The Nyquist sampling rate for the signal $s(t) = \frac{\sin(50\pi t)}{\pi t} \times \frac{\sin(80\pi t)}{\pi t}$ is given by

[Question ID = 1630]
1. 120 Hz

   [Option ID = 6514]
2. 130 Hz

   [Option ID = 6515]
3. 80 Hz

   [Option ID = 6516]
4. 40 Hz

   [Option ID = 6517]

Correct Answer :-
- 130 Hz

  [Option ID = 6515]

48) A system has three stage cascaded amplifier each stage having a power gain of 10 dB and noise figure of 6 dB. the overall noise figure is:-
[Question ID = 1631]
1. 1 [Option ID = 6518]
2. 0 [Option ID = 6519]
3. 10 [Option ID = 6520]
4. 20 [Option ID = 6521]

Correct Answer :-
- 1 [Option ID = 6518]

49) A 2 MHz carrier is amplitude modulated by a 500 Hz modulating signal to a depth of 60%. If the unmodulated carrier power is 2 kW, the power of the modulated signal is:-
[Question ID = 1632]
1. 1 kW [Option ID = 6522]
2. 2.17 kW [Option ID = 6523]
3. 4.45 kW [Option ID = 6524]
4. 22 kW [Option ID = 6525]

Correct Answer :-
- 2.17 kW [Option ID = 6523]

50) A 1000 KHz carrier is simultaneously modulated with 300 Hz, 800 Hz and 2 KHz signals. Which of the following is least likely to be present in the output?
[Question ID = 1633]
1. 1002 KHz [Option ID = 6526]
2. 1000 KHz [Option ID = 6527]
3. 999.2 KHz [Option ID = 6528]
4. 998.0 KHz [Option ID = 6529]

Correct Answer :-
- 1000 KHz [Option ID = 6527]

51) The positive peak of an AM wave is 16 V and the minimum value is 4 V. Assuming single tone modulation, the modulation index is:-

[Question ID = 1634]

1. 0.25 [Option ID = 6530]
2. 4 [Option ID = 6531]
3. 0.36 [Option ID = 6532]
4. 0.6 [Option ID = 6533]

Correct Answer :-

- 0.6 [Option ID = 6533]

52) 24 channels are to be time multiplexed using PCM. If the sampling frequency is 10 KHz and the number of quantization levels is 128, the required bandwidth of PCM is:-

[Question ID = 1635]

1. 240 KHz [Option ID = 6534]
2. 1.68 MHz [Option ID = 6535]
3. 81.6 KHz [Option ID = 6536]
4. 3.072 MHz [Option ID = 6537]

Correct Answer :-

- 1.68 MHz [Option ID = 6535]

53) Square law modulators utilizes:-

[Question ID = 1636]

1. Non Linear range of V-I characteristics of triode [Option ID = 6538]
2. Non-linear range of V-I characteristics of diode [Option ID = 6539]
3. Linear range of V-I characteristics of diode [Option ID = 6540]
4. Linear range of V-I characteristics of triode [Option ID = 6541]

Correct Answer :-

- Non-linear range of V-I characteristics of diode [Option ID = 6539]

54) A particular material has 3×10^{24} atoms/m^3 and each atom has a dipole moment of $2.5 \times 10^{-25}\ \hat{u}_y$ Am^2. The magnetic field intensity $\vec{H}$ material with $\mu_r = 6$ is

[Question ID = 1637]

1. 0.15 $\hat{u}_y$ A/m

   [Option ID = 6542]
2. 0.22 $\hat{u}_y$ A/m

   [Option ID = 6543]
3. 0.75 $\hat{u}_y$ A/m

   [Option ID = 6544]
4. 2.04 $\hat{u}_y$ A/m

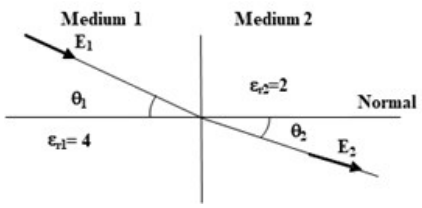
   [Option ID = 6545]

Correct Answer :-

- 0.15 $\hat{u}_y$ A/m

  [Option ID = 6542]

55) In the following figure, the field E_1 makes an angle of θ_1 with the axis normal to the boundary line, while the field E_2 makes an angle of θ_2 in medium 2. The ratio of normal components of E_2 over E_1 (E_{n2}/E_{n1}) is



[Question ID = 1638]

1. 1/2

   [Option ID = 6546]
2. 4

   [Option ID = 6547]
3. 2

   [Option ID = 6548]

4. 1/4

[Option ID = 6549]

Correct Answer :-

- 2

[Option ID = 6548]

56) If the flux density in a certain magnetic material is 0.25 T and the area of the material is 25 mm^2. The magnetic flux through material is:-

[Question ID = 1639]

1. 6.25 μWb

[Option ID = 6550]

2. 2.5 μWb

[Option ID = 6551]

3. 0.5 μWb

[Option ID = 6552]

4. 25 μWb

[Option ID = 6553]

Correct Answer :-

- 6.25 μWb

[Option ID = 6550]

57) A parallel-plate capacitor is formed with a mica dielectric ε_r = 6, a plate area of 10 mm^2 and a separation of 0.01 mm^2. If the potential difference between the lower and upper plates is 100V, the total charge stored in capacitor is:-

[Question ID = 1640]

1. 12.00 μC

[Option ID = 6554]

2. 62.46 μC

[Option ID = 6555]

3. 5.31 μC

[Option ID = 6556]

4. 10.78 μC

[Option ID = 6557]

Correct Answer :-

- 5.31 μC

[Option ID = 6556]

58) The gradient of the field $f = \rho^2 z \cos 2\phi$ at point (2, 90°, 1) is

[Question ID = 1641]

1. $-4(\hat{u}_\rho - \hat{u}_z)$

[Option ID = 6558]

2. $-4(\hat{u}_\rho + \hat{u}_z)$

[Option ID = 6559]

3. $4(\hat{u}_\rho - \hat{u}_\phi)$

[Option ID = 6560]

4. $-4(\hat{u}_\rho - \hat{u}_\phi)$

[Option ID = 6561]

Correct Answer :-

- $-4(\hat{u}_\rho + \hat{u}_z)$

[Option ID = 6559]

59) For a dielectric material in which the electric field is 100 kV/m and electric susceptibility is 4.75, the magnitude of electric flux density is

[Question ID = 1642]

1. 8.62 μC/m^2

   [Option ID = 6562]
2. 5.09 μC/m^2

   [Option ID = 6563]
3. 6.31 μC/m^2

   [Option ID = 6564]
4. 7.12 μC/m^2

   [Option ID = 6565]

Correct Answer :-

- 5.09 μC/m^2

  [Option ID = 6563]

60) The speed of light in a certain medium is 25% of its speed in vacuum. The relative permittivity ε_r of this medium with the relative permeability μ_r = 1 is

[Question ID = 1643]

1. 3 [Option ID = 6566]
2. 5 [Option ID = 6567]
3. 2 [Option ID = 6568]
4. 1/2 [Option ID = 6569]

Correct Answer :-

- 2 [Option ID = 6568]

61) In register index addressing mode the effective address is given by

[Question ID = 1644]

1. The sum of the index register value and the operand [Option ID = 6570]
2. The operand [Option ID = 6571]
3. The difference of the index register value and the operand [Option ID = 6572]
4. The index register value [Option ID = 6573]

Correct Answer :-

- The index register value [Option ID = 6573]

62) In an 8085 microprocessor, the instruction CMP B has been executed while the content of the accumulator is less than that of register B. as a result:-

[Question ID = 1645]

1. Carry flag will be reset but zero flag will be set [Option ID = 6574]
2. Carry flag will be set but zero flag will be reset [Option ID = 6575]
3. Both Carry flag and zero flag will be reset [Option ID = 6576]
4. Both Carry flag and zero flag will be set [Option ID = 6577]

Correct Answer :-

- Carry flag will be set but zero flag will be reset [Option ID = 6575]

63) A microprocessor with a 16-bit address bus is used in a linear memory selection configuration with 4 memory chips. The maximum addressable memory space is:-

[Question ID = 1646]

1. 64 k [Option ID = 6578]
2. 8 k [Option ID = 6579]
3. 4 k [Option ID = 6580]
4. 16 k [Option ID = 6581]

Correct Answer :-

- 16 k [Option ID = 6581]

64) The number of hardware interrupts (which require an external signal to interrupt) present in a 8085 microprocessor are:-

[Question ID = 1647]

1. 4 [Option ID = 6582]
2. 5 [Option ID = 6583]
3. 1 [Option ID = 6584]
4. 13 [Option ID = 6585]

Correct Answer :-

- 5 [Option ID = 6583]

65) An 8085 assembly language program is given below. Assume that the carry flag is initially unset. The content of the accumulator after the execution of the program is

```
MVI A, 07 H
```

```
MVI A, 07 H
RLC
MOV B,A
RLC
RLC
ADD B
RRC
```

[Question ID = 1648]

1. 64 H [Option ID = 6586]
2. 23 H [Option ID = 6587]
3. 8C H [Option ID = 6588]
4. 15 H [Option ID = 6589]

Correct Answer :-

- 23 H [Option ID = 6587]

66) In 8085, the pairing of registers B,C,D,E,H,L is

[Question ID = 1649]

1. B-D , C-E , H-L [Option ID = 6590]
2. B-C , D-E , H-L [Option ID = 6591]
3. B-C , D-L, H-E [Option ID = 6592]
4. B-H , D-E, C-L [Option ID = 6593]

Correct Answer :-

- B-C , D-E , H-L [Option ID = 6591]

67) The initial contents of ACC and CY in 8085 are CY = 1 and ACC = 10000001 After instruction RAL is executed twice the contents of CY and ACC respectively will be

[Question ID = 1650]

1. 0 and 00000011 [Option ID = 6594]
2. 1 and 00000111 [Option ID = 6595]
3. 0 and 00000001 [Option ID = 6596]
4. 0 and 00000111 [Option ID = 6597]

Correct Answer :-

- 0 and 00000111 [Option ID = 6597]

68) When we use RRC instruction once in 8085, the number is

[Question ID = 1651]

1. multiplied by 2 [Option ID = 6598]
2. divided by 2 [Option ID = 6599]
3. Multiplied by 4 [Option ID = 6600]
4. Divided by 4 [Option ID = 6601]

Correct Answer :-

- divided by 2 [Option ID = 6599]

69) In a microprocessor

[Question ID = 1652]

1. One machine cycle consists of several clock cycles [Option ID = 6602]
2. One machine cycle is equal to one clock cycle [Option ID = 6603]
3. One clock cycle consists of several machine cycles [Option ID = 6604]
4. One machine cycle is always less than one clock cycle [Option ID = 6605]

Correct Answer :-

- One machine cycle consists of several clock cycles [Option ID = 6602]

70) In 8085

[Question ID = 1653]

1. RST 6.5 and RST 5.5 are low level sensitive interrupts [Option ID = 6606]
2. RST 5.5 is low level sensitive interrupt and RST 6.5 is high level interrupt [Option ID = 6607]
3. RST 6.5 and RST 5.5 are high level sensitive interrupts [Option ID = 6608]
4. RST 5.5 is high level sensitive interrupt and RST 6.5 is low level interrupt [Option ID = 6609]

Correct Answer :-

- RST 6.5 and RST 5.5 are high level sensitive interrupts [Option ID = 6608]

71) 11001, 1001 and 111001 correspond to the 2's complement representation of which one of the following set of numbers?

[Question ID = 1654]

1. 25,9 and 57 respectively [Option ID = 6610]

2. -6,-6 and -6 respectively [Option ID = 6611]
3. -25,-9 and -57 respectively [Option ID = 6612]
4. -7,-7 and -7 respectively [Option ID = 6613]

Correct Answer :-

- -7,-7 and -7 respectively [Option ID = 6613]

72) The Boolean expression for the truth table shown is

A	B	C	F
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

[Question ID = 1655]

1. $B(A+C)(\bar{A}+\bar{C})$

   [Option ID = 6614]
2. $B(A+\bar{C})(\bar{A}+C)$

   [Option ID = 6615]
3. $\bar{B}(A+\bar{C})(\bar{A}+C)$

   [Option ID = 6616]
4. $\bar{B}(A+C)(\bar{A}+\bar{C})$

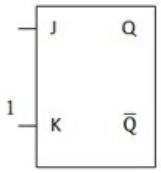
   [Option ID = 6617]

Correct Answer :-

- $B(A+C)(\bar{A}+\bar{C})$

  [Option ID = 6614]

73) In a J-K FF we have J=$\bar{Q}$ and k=1(see figure). Assuming the flip-flop was initially cleared and then clocked for 6 pulses, the sequence at the Q output will be



[Question ID = 1656]

1. 010000

   [Option ID = 6618]
2. 011001

   [Option ID = 6619]
3. 010101

   [Option ID = 6620]
4. 010010

   [Option ID = 6621]

Correct Answer :-

- 010101

  [Option ID = 6620]

74) Among the digital IC-families - ECL, TTL and CMOS

[Question ID = 1657]

1. TTL has largest fan out [Option ID = 6622]
2. CMOS has the biggest noise margin [Option ID = 6623]

3. TTL has the lowest power consumption [Option ID = 6624]
4. ECL has the least propagation delay [Option ID = 6625]

Correct Answer :-

- ECL has the least propagation delay [Option ID = 6625]

75) Choose the correct statement from the following
[Question ID = 1658]

1. PROM contains a programmable AND array and a fixed OR array [Option ID = 6626]
2. PROM contains a fixed AND array and a programmable OR array [Option ID = 6627]
3. PLA contain a fixed AND array and a programmable OR array [Option ID = 6628]
4. PLA contains a programmable AND array and a fixed OR array [Option ID = 6629]

Correct Answer :-

- PROM contains a fixed AND array and a programmable OR array [Option ID = 6627]

76) The American Standard Code for Information Interchange has 256 characters, which are binary coded. If a certain computer generates 1,000,000 character per second, the minimum bandwidth required to transmit this signal will be
[Question ID = 1659]

1. 8 M bits/sec [Option ID = 6630]
2. 0.8 M bits/sec [Option ID = 6631]
3. 16 M bits/sec [Option ID = 6632]
4. 1.6 M bits/sec [Option ID = 6633]

Correct Answer :-

- 8 M bits/sec [Option ID = 6630]

77) If $X\overline{Y} + \overline{X}Y = Z$ then $X\overline{Z} + \overline{X}Z$ is equal to

[Question ID = 1660]

1. $\overline{Y}$

   [Option ID = 6634]
2. Y

   [Option ID = 6635]
3. 0

   [Option ID = 6636]
4. 1

   [Option ID = 6637]

Correct Answer :-

- Y

  [Option ID = 6635]

78) In a digital system, if $(211)_x = (152)_8$, then the value of base x is
[Question ID = 1661]

1. 7 [Option ID = 6638]
2. 5 [Option ID = 6639]
3. 6 [Option ID = 6640]
4. 9 [Option ID = 6641]

Correct Answer :-

- 7 [Option ID = 6638]

79) How many AND gates are required to realize Y = CD+EF+G
[Question ID = 1662]

1. 3 [Option ID = 6642]
2. 4 [Option ID = 6643]
3. 2 [Option ID = 6644]
4. 5 [Option ID = 6645]

Correct Answer :-

- 2 [Option ID = 6644]

80) The analog output voltage (V_0) of 6-bit digital-to-analog converter (R-2R ladder network) with V_{ref} as 10V when the digital input is 011100 is
[Question ID = 1663]

1. 8.65 V [Option ID = 6646]
2. 4.37 V [Option ID = 6647]
3. 2.6 V [Option ID = 6648]
4. 10 V [Option ID = 6649]

Correct Answer :-

- 4.37 V [Option ID = 6647]

81) A dc supply voltage has a no load voltage of 30 V, and a full-load voltage of 25 V at a full-load current of 1 A. Its output resistance is:-

[Question ID = 1664]

1. 5 Ω [Option ID = 6650]
2. 30 Ω [Option ID = 6651]
3. 25 Ω [Option ID = 6652]
4. 20 Ω [Option ID = 6653]

Correct Answer :-

- 25 Ω [Option ID = 6652]

82) An *npn* transistor has $f_T = 1.47 \times 10^{10}$ Hz and DC current gain $\beta_0 = 90$. For this transistor, f_β is

[Question ID = 1665]

1. 2.32×10^9 Hz [Option ID = 6654]
2. 1.64×10^8 Hz [Option ID = 6655]
3. 1.64×10^9 Hz [Option ID = 6656]
4. 2.32×10^8 Hz [Option ID = 6657]

Correct Answer :-

- 1.64×10^8 Hz [Option ID = 6655]

83) If the differential voltage gain and common mode gain of a differential amplifier are 48 dB and 2dB respectively. Then the common mode rejection ratio is:-

[Question ID = 1666]

1. 25 dB [Option ID = 6658]
2. 23 dB [Option ID = 6659]
3. 46 dB [Option ID = 6660]
4. 50 dB [Option ID = 6661]

Correct Answer :-

- 46 dB [Option ID = 6660]

84) The ripple factor from a capacitor filter _____ as the load resistance _____.

[Question ID = 1667]

1. decreases, decreases [Option ID = 6662]
2. decreases, increases [Option ID = 6663]
3. Increases, decreases [Option ID = 6664]
4. Increases, increases [Option ID = 6665]

Correct Answer :-

- decreases, increases [Option ID = 6663]

85) A feedback amplifier has an open loop gain of -100. If 4 % of the output is fed back in a degenerative loop, what is the closed loop gain of the amplifier?

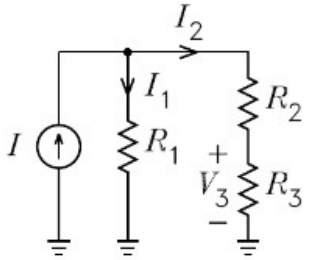
[Question ID = 1668]

1. -25 [Option ID = 6666]
2. -33.3 [Option ID = 6667]
3. -20 [Option ID = 6668]
4. +25 [Option ID = 6669]

Correct Answer :-

- -20 [Option ID = 6668]

86) For I = 250 μA, R_1 = 100 kΩ , R_2 = 70kΩ , and R_3 = 80kΩ in the following figure, the values for I_1, I_2, and V_3 are



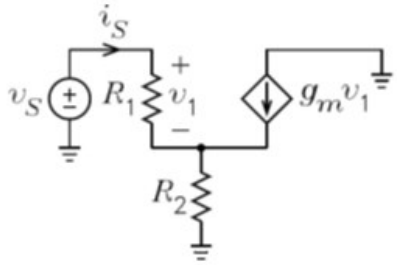
[Question ID = 1669]

1. 100 μA, 150 μA , 8V [Option ID = 6670]
2. 150 μA, 100 μA , 16V [Option ID = 6671]
3. 250 μA, 100 μA , 8V [Option ID = 6672]
4. 150 μA, 100 μA , 8V [Option ID = 6673]

Correct Answer :-

- 150 µA, 100 µA , 8V [Option ID = 6673]

87) Given that R_1 = 3kΩ, R_2 = 2kΩ, and g_m = 0.1 in the following figure, the input resistance to the circuit is



[Question ID = 1670]

1. 560 kΩ [Option ID = 6674]
2. 605 kΩ [Option ID = 6675]
3. 655 kΩ [Option ID = 6676]
4. 596 kΩ [Option ID = 6677]

Correct Answer :-

- 605 kΩ [Option ID = 6675]

88) The second harmonic distortion in an amplifier is reduced from 5% to 1% due to negative feedback. The amplifier gain is 1000, the feedback ratio will be:-

[Question ID = 1671]

1. 0.008 [Option ID = 6678]
2. 0.02 [Option ID = 6679]
3. 0.004 [Option ID = 6680]
4. 0.01 [Option ID = 6681]

Correct Answer :-

- 0.004 [Option ID = 6680]

89) A Zener regulator has an input voltage from 15 to 20 V and a load current 5 to 20 mA. If the Zener voltage is 6.8 V, the maximum value of a series resistor is:-

[Question ID = 1672]

1. 660 Ω [Option ID = 6682]
2. 320 Ω [Option ID = 6683]
3. 570 Ω [Option ID = 6684]
4. 410 Ω [Option ID = 6685]

Correct Answer :-

- 410 Ω [Option ID = 6685]

90) Two bipolar transistors Q_1 and Q_2 have the current gains $\beta_1 = 50$ and $\beta_2 = 60$, respectively. If these transistors are connected as a Darlington pair with Q_2 as output transistor and a resistance R_E of 480 Ω is connected in its emitter lead (h_{ie} is negligible). The approximate input impedance of this Darlington pair is

[Question ID = 1673]

1. 28.8 kΩ [Option ID = 6686]
2. 300 kΩ [Option ID = 6687]
3. 1.44 MΩ [Option ID = 6688]
4. 24 kΩ [Option ID = 6689]

Correct Answer :-

- 1.44 MΩ [Option ID = 6688]

91) In an amplifier with negative feedback, the bandwidth is:-

[Question ID = 1674]

1. increased by a factor of $(1 + A\beta)$

   [Option ID = 6690]
2. decreased by a factor of $(1 + A\beta)$

   [Option ID = 6691]
3. increased by a factor of $A\beta$

   [Option ID = 6692]

4. decreased by a factor of $A\beta$

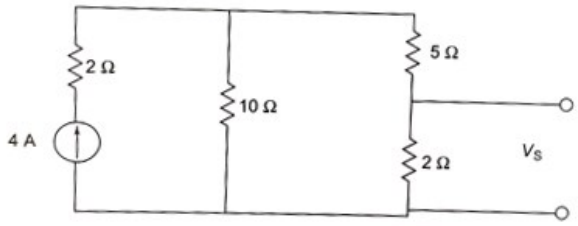
[Option ID = 6693]

Correct Answer :-

- increased by a factor of $(1 + A\beta)$

[Option ID = 6690]

92) In the circuit shown in the figure, v_s is



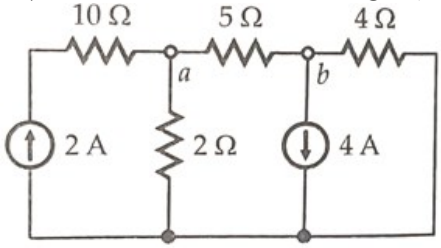
[Question ID = 1675]

1. 2.35 V [Option ID = 6694]
2. 3.5 V [Option ID = 6695]
3. 4.7 V [Option ID = 6696]
4. 6.5 V [Option ID = 6697]

Correct Answer :-

- 4.7 V [Option ID = 6696]

93) In the circuit shown in the figure, the current through the 5 Ω resistor is



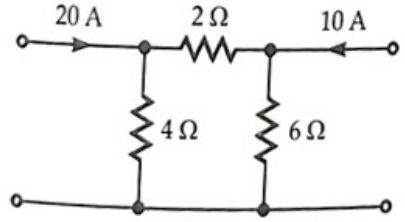
[Question ID = 1676]

1. 1.81 A [Option ID = 6698]
2. 2.96 A [Option ID = 6699]
3. 3.35 A [Option ID = 6700]
4. 4.23 A [Option ID = 6701]

Correct Answer :-

- 1.81 A [Option ID = 6698]

94) In the circuit shown in figure, the current in the 2 Ω resistor is



[Question ID = 1677]

1. 5.25 A [Option ID = 6702]
2. 4.75 A [Option ID = 6703]
3. 6.25 A [Option ID = 6704]
4. 11.67 A [Option ID = 6705]

Correct Answer :-

- 11.67 A [Option ID = 6705]

95) A RL series circuit has resistance 20 Ω and inductance 0.02 H. If the net impedance of the given circuit be $40\angle\phi^0$ Ω, the frequency is:-

[Question ID = 1678]

1. 385 Hz

[Option ID = 6706]

2. 276 Hz

[Option ID = 6707]

3. 135 Hz

[Option ID = 6708]

4. 555 Hz

[Option ID = 6709]

Correct Answer :-

- 276 Hz

[Option ID = 6707]

96) A 220 V, 110 Hz ac source supplies a series LCR circuit with a capacitor and a coil. If the coil has 50 mΩ resistance and 5 mH inductance, find the values of half power frequencies at resonance frequency of 100 Hz:-

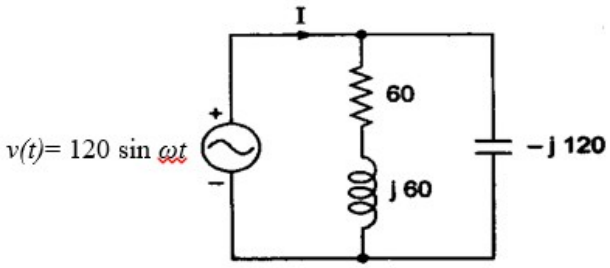
[Question ID = 1679]

1. 89. 215 Hz, 100.725 Hz [Option ID = 6710]
2. 99. 205 Hz, 100.795 Hz [Option ID = 6711]
3. 99. 205 Hz, 110.795 Hz [Option ID = 6712]
4. 79. 235 Hz, 90.335 Hz [Option ID = 6713]

Correct Answer :-

- 99. 205 Hz, 100.795 Hz [Option ID = 6711]

97) For the given circuit, what is the value of I ?



[Question ID = 1680]

1. 1 + j1 A [Option ID = 6714]
2. 2- j1 A [Option ID = 6715]
3. 1 + j0 A [Option ID = 6716]
4. 0 + j0 A [Option ID = 6717]

Correct Answer :-

- 1 + j0 A [Option ID = 6716]

98) Parameters for RLC circuits are R= 2 Ω, L= 1 H and C= 1 F. If these are connect in parallel. The system response will be:-

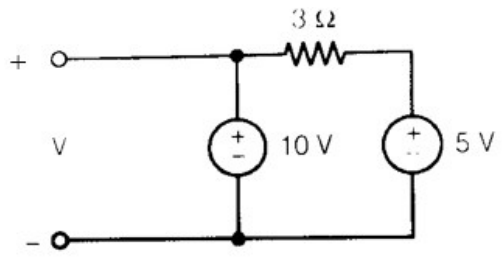
[Question ID = 1681]

1. Critically damped [Option ID = 6718]
2. Overdamped [Option ID = 6719]
3. Undamped [Option ID = 6720]
4. Underdamped [Option ID = 6721]

Correct Answer :-

- Underdamped [Option ID = 6721]

99) The voltage V in Fig. is:-



[Question ID = 1682]

1. 15 V

[Option ID = 6722]

2. 5 V

[Option ID = 6723]

3. 10 V

[Option ID = 6724]

4. None of these

[Option ID = 6725]

Correct Answer :-

- 10 V

[Option ID = 6724]

100) A parallel *RLC* circuit has R = 1KΩ and C= 1 μF. The quality factor at resonance is 200. The value of inductor is:-

[Question ID = 1683]

1. 35.4 μH

[Option ID = 6726]

2. 17.7 μH

[Option ID = 6727]

3. 25 μH

[Option ID = 6728]

4. 50 μH

[Option ID = 6729]

Correct Answer :-

- 25 μH

[Option ID = 6728]