DU PhD in informatics IIC

Topic:- DU_J19_PHD_INFO

1) If the differential voltage gain and the common mode voltage gain of a differential amplifier are 48dB and 2dB respectively, then its common rejection ratio is [Question ID = 25541]

1. 23dB [Option ID = 42159]
2. 46dB [Option ID = 42162]
3. 50dB [Option ID = 42161]
4. 25dB [Option ID = 42160]

Correct Answer :-

- 46dB [Option ID = 42162]

2) A video transmission system transmits 625 picture frames per second. Each frame consists of a 400×400 pixel grid with 64 intensity levels per pixel. The data rate of the system is [Question ID = 25555]

1. 600Mbps [Option ID = 42218]
2. 6.4Gbps [Option ID = 42216]
3. 100Mbps [Option ID = 42217]
4. 16Mbps [Option ID = 42215]

Correct Answer :-

- 600Mbps [Option ID = 42218]

3) The minimum number of comparators required to build an 8-bit flash ADC is [Question ID = 25550]

1. 256 [Option ID = 42198]
2. 255 [Option ID = 42197]
3. 8 [Option ID = 42195]
4. 63 [Option ID = 42196]

Correct Answer :-

- 255 [Option ID = 42197]

4) The minimum number of MOS transistors required to make a dynamic RAM cell is [Question ID = 25549]

1. 2 [Option ID = 42192]
2. 1 [Option ID = 42191]
3. 3 [Option ID = 42193]
4. 4 [Option ID = 42194]

Correct Answer :-

- 1 [Option ID = 42191]

5) Two 2's complement numbers having signs bits *x* and *y* are added and the sign bit of the result is *z*. Then, the occurrence of overflow is indicated by the Boolean function

[Question ID = 25545]

1. xyz [Option ID = 42175]
2. $xy + yz + zx$ [Option ID = 42178]
3. $\bar{x}\bar{y}\bar{z}$ [Option ID = 42176]
4. $\bar{x}\bar{y}z + x\,y\,\bar{z}$ [Option ID = 42177]

Correct Answer :-

- $\bar{x}\bar{y}z + x\,y\,\bar{z}$ [Option ID = 42177]

6) A 0 and 6 counter consists of 3 flip flops and a combination circuit of 2 input gate(s). The combination circuit consists of [Question ID = 25547]

1. one OR gate [Option ID = 42184]
2. two AND gate [Option ID = 42186]
3. one AND gate and one OR gate [Option ID = 42185]
4. one AND gate [Option ID = 42183]

Correct Answer :-

- two AND gate [Option ID = 42186]

7) X=01110 and Y=11001 are two 5-bit binary numbers represented in two's complement format. The sum of X and Y represented in two's complement format using 6 bits is

[Question ID = 25543]

1. 001000 [Option ID = 42168]
2. 100111 [Option ID = 42167]
3. 101001 [Option ID = 42170]
4. 000111 [Option ID = 42169]

Correct Answer :-

- 000111 [Option ID = 42169]

8) In an M/M/1 queue for arrival rate λ and service rate μ, the average number of customer in the system is given by [Question ID = 25572]

1. $\lambda/(\mu + \lambda)$ [Option ID = 42286]
2. $(\lambda - 1)/\mu$ [Option ID = 42284]
3. $\lambda/(\mu - \lambda)$ [Option ID = 42285]
4. λ/μ [Option ID = 42283]

Correct Answer :-

- $\lambda/(\mu - \lambda)$ [Option ID = 42285]

9) The depth of penetration of electromagnetic wave in a medium having conductivity σ at a frequency of 1*MHz* is 25*cm*. The depth of penetration at a frequency of 4*MHz* will be [Question ID = 25528]

1. 12.50*cm* [Option ID = 42109]
2. 6.25*cm* [Option ID = 42107]
3. 50.0*cm* [Option ID = 42108]
4. 100.0*cm* [Option ID = 42110]

Correct Answer :-

- 12.50*cm* [Option ID = 42109]

10) Three identical amplifiers with each one having a voltage gain of 50, input resistance of 1kΩ and output resistance of 250Ω, are cascaded. The open circuit voltage gain of the combined amplifier is [Question ID = 25542]

1. 98dB [Option ID = 42164]

2. 102dB [Option ID = 42166]
3. 51dB [Option ID = 42165]
4. 49dB [Option ID = 42163]

Correct Answer :-

- 98dB [Option ID = 42164]

11) A master-slave flip-flop has the characteristic that [Question ID = 25548]

1. change in the output occurs when the state of the slave is affected. [Option ID = 42189]
2. change in the output occurs when the state of the master is affected. [Option ID = 42188]
3. change in the input immediately reflected in the output [Option ID = 42187]
4. both the master and the slave states are affected at the same time. [Option ID = 42190]

Correct Answer :-

- change in the output occurs when the state of the slave is affected. [Option ID = 42189]

12) For an energy state *E* of a photon gas , the density of states is proportional to [Question ID = 25536]

1. $E^{3/2}$ [Option ID = 42141]
2. E^2 [Option ID = 42140]
3. $\sqrt{E}$ [Option ID = 42139]
4. E [Option ID = 42142]

Correct Answer :-

- $\sqrt{E}$ [Option ID = 42139]

13) The equation of motion of a bead sliding on a uniform rod rotating in a force free space is [Question ID = 25525]

1. $\ddot{r} - r\,\dot{r}\omega = 0$ [Option ID = 42095]
2. $\ddot{r} - r\,\omega^2 = 0$ [Option ID = 42098]
3. $\ddot{r} - \dot{r}\omega = 0$ [Option ID = 42096]
4. $\ddot{r} - \dot{r}\omega + r\omega^2 = 0$ [Option ID = 42097]

Correct Answer :-

- $\ddot{r} - r\,\omega^2 = 0$ [Option ID = 42098]

14) The line code that has zero dc component for pulse transmission of random binary data is [Question ID = 25554]

1. alternate mark inversion (AMI) [Option ID = 42213]
2. non-return to zero (NRZ) [Option ID = 42211]
3. return to zero(RZ) [Option ID = 42212]
4. none of these [Option ID = 42214]

Correct Answer :-

- alternate mark inversion (AMI) [Option ID = 42213]

15)

An integral I over the counter-clockwise circle C is given by

$$I = \oint \frac{z^2 - 1}{z^2 + 1} e^z dz$$

If C is defined as $|z| = 3$, then the value of I is

[Question ID = 25565]

1. $-3\pi i \sin(1)$ [Option ID = 42257]
2. $-2\pi i \sin(1)$ [Option ID = 42256]
3. $-4\pi i \sin(1)$ [Option ID = 42258]
4. $-\pi i \, sin(1)$ [Option ID = 42255]

Correct Answer :-

- $-4\pi i \sin(1)$ [Option ID = 42258]

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16) If the vector function

$$\vec{F} = (3y - az)\vec{i} + (bx - 2z)\vec{j} - (cy + z)\vec{k}$$

Is ir-rotational then the values of the constants a, b and c are

[Question ID = 25561]

1. 0.3, -2.5, 0.5 [Option ID = 42239]
2. 4.0, 3.0, 2.0 [Option ID = 42242]
3. 0.0, 3.0, 2.0 [Option ID = 42240]
4. 0.3, 0.33, 0.5 [Option ID = 42241]

Correct Answer :-

- 0.0, 3.0, 2.0 [Option ID = 42240]

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17) The Fourier transform of a signal $h(t)$is $H(j\omega) = (2\cos\omega)(\sin 2\omega)/\omega$. The value of $h(0)$ is

[Question ID = 25568]

1. $1/2$ [Option ID = 42267]
2. 2 [Option ID = 42269]
3. $1/4$ [Option ID = 42268]
4. 1 [Option ID = 42270]

Correct Answer :-

- 1 [Option ID = 42270]

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18) The Fourier transform $F\{e^{-t}u(t)\}$is equal to $1/(1 + j2\pi f)$. Therefore ,$F\left\{1/(1 + j2\pi t)\right\}$is

[Question ID = 25567]

1. $e^{-f}u(-f)$ [Option ID = 42266]
2. $e^{f}u(-f)$ [Option ID = 42265]
3. $e^{-f}u(f)$ [Option ID = 42264]
4. $e^{f}u(f)$ [Option ID = 42263]

Correct Answer :-

- $e^{f}u(-f)$ [Option ID = 42265]

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19) The eigenvalues and the corresponding eigenvectors of a 2×2 matrix are given by

Eigenvalue	Eigenvector
$\lambda_1 = 8v_1$	$= \begin{bmatrix} 1 \\ 1 \end{bmatrix}$
$\lambda_2 = 4v_2$	$= \begin{bmatrix} 1 \\ -1 \end{bmatrix}$

[Question ID = 25559]

1. $\begin{bmatrix} 4 & 6 \\ 6 & 4 \end{bmatrix}$ [Option ID = 42232]
2. $\begin{bmatrix} 6 & 2 \\ 2 & 6 \end{bmatrix}$ [Option ID = 42231]
3. $\begin{bmatrix} 2 & 4 \\ 4 & 2 \end{bmatrix}$ [Option ID = 42233]
4. $\begin{bmatrix} 4 & 8 \\ 8 & 4 \end{bmatrix}$ [Option ID = 42234]

Correct Answer :-

- $\begin{bmatrix} 6 & 2 \\ 2 & 6 \end{bmatrix}$ [Option ID = 42231]

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20)

The wave function in the ground state of H-atom is given by $\psi(x) = \sqrt{\frac{1}{\pi a^3}}\, e^{-r/a}$, the average value of r is

[Question ID = 25531]

1. $3a/2$ [Option ID = 42120]
2. ∞ [Option ID = 42122]
3. $2a/3$ [Option ID = 42121]
4. zero [Option ID = 42119]

Correct Answer :-

- $3a/2$ [Option ID = 42120]

21)

Given that $_3Li^7$ = 7.01816amu, $_3Li^6$=6.01692amu, and $_0n^1$ =1.00893amu. The binding energy of neutron in a $_3Li^7$ nucleus is

[Question ID = 25537]

1. 0.51MeV [Option ID = 42143]
2. 1.04MeV [Option ID = 42144]
3. 7.17MeV [Option ID = 42146]
4. 2.08NeV [Option ID = 42145]

Correct Answer :-

- 1.04MeV [Option ID = 42144]

22)

The intrinsic carrier concentration of silicon sample at 300K is $1.5 \times 10^{16} m^{-3}$. If after doping , the number of majority carriers is $5 \times 10^{20} m^{-3}$, the minority carrier density is

[Question ID = 25540]

1. $5.0 \times 10^{20} m^{-3}$ [Option ID = 42157]
2. $4.50 \times 10^{11} m^{-3}$ [Option ID = 42155]
3. $3.0 \times 10^{-5} m^{-3}$ [Option ID = 42158]
4. $3.33 \times 10^{4} m^{-3}$ [Option ID = 42156]

Correct Answer :-

- $5.0 \times 10^{20} m^{-3}$ [Option ID = 42157]

23)

Consider the Fermi-Dirac distribution function $f(E)$ at room temperature (300K) , where E refers to energy. If E_F is the Fermi energy , which of the following is true?

[Question ID = 25535]

1. $f(E)$ is a step function [Option ID = 42135]
2. $f(E)$ is large and tends to infinity as E decreases much below E_F. [Option ID = 42138]
3. States with $E < E_F$ are filled completely [Option ID = 42137]
4. $f(E_F)$ has a value of 0.5 [Option ID = 42136]

Correct Answer :-

- $f(E_F)$ has a value of 0.5 [Option ID = 42136]

24)

The transition probability matrix of a Markov chain $\{X_n\}, n = 1,2,3,\ldots$ having 3 states 1, 2 and 3 is

$$P = \begin{bmatrix} 0.1 & 0.5 & 0.4 \\ 0.6 & 0.2 & 0.2 \\ 0.3 & 0.4 & 0.3 \end{bmatrix}$$

and the initial distribution is $p^{(0)} = (0.7, 0.2, 0.1)$. Find $P(X_2 = 3)$.

[Question ID = 25571]

1. 0.379 [Option ID = 42280]
2. 0.479 [Option ID = 42281]
3. 0.579 [Option ID = 42282]
4. 0.279 [Option ID = 42279]

Correct Answer :-

- 0.279 [Option ID = 42279]

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25)

A rectangular waveguide of internal dimensions ($a = 4cm$ and $b = 3cm$) is to be operated in TE_{11} mode. The minimum operating frequency is

[Question ID = 25529]

1. 5.0 *MHz* [Option ID = 42114]
2. 5.0 *GHz* [Option ID = 42113]
3. 6.25 *GHz* [Option ID = 42111]
4. 6.25 *MHz* [Option ID = 42112]

Correct Answer :-

- 6.25 *GHz* [Option ID = 42111]

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26)

The state of an oscillator of angular frequency ω is $\psi(x) = e^{-m\omega x^2/\hbar}$. Find $< x >$?

[Question ID = 25530]

1. zero [Option ID = 42117]
2. $1/x$ [Option ID = 42116]
3. ∞ [Option ID = 42118]
4. x [Option ID = 42115]

Correct Answer :-

- zero [Option ID = 42117]

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27)

The PDF of a Gaussian random variable X is given by $P_X(x) = \frac{1}{3\sqrt{2\pi}} e^{-\frac{(x-4)^2}{18}}$. The probability of the even $\{X = 4\}$ is

[Question ID = 25570]

1. $1/8$ [Option ID = 42278]
2. $1/4$ [Option ID = 42277]
3. 0 [Option ID = 42276]
4. $1/2$ [Option ID = 42275]

Correct Answer :-

- 0 [Option ID = 42276]

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28) The Boolean expression

$$(X+Y)(X+\bar{Y})+\overline{(\bar{X}\bar{Y})+\bar{X}}$$

simplifies to

[Question ID = 25546]

1. X [Option ID = 42179]
2. X+Y [Option ID = 42182]
3. XY [Option ID = 42181]
4. Y [Option ID = 42180]

Correct Answer :-

- X [Option ID = 42179]

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29)

The time averaged Poynting vector , in W/m^2, for a wave with $\vec{E}=24e^{j(\omega t+\beta z)}\vec{j}\ V/m$ in free space is

[Question ID = 25527]

1. $4.8\vec{k}/\pi$ [Option ID = 42105]
2. $2.4\vec{k}/\pi$ [Option ID = 42103]
3. $-4.8\vec{k}/\pi$ [Option ID = 42106]
4. $-2.4\vec{k}/\pi$ [Option ID = 42104]

Correct Answer :-

- $-2.4\vec{k}/\pi$ [Option ID = 42104]

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30)

Work done when a force $\vec{F}=(\vec{i}+2\vec{j}+3\vec{k})N$ acting on a particle takes it from the point $\vec{r_1}=(\vec{i}+\vec{j}+\vec{k})m$ to the point $\vec{r_2}=(\vec{i}-\vec{j}+2\vec{k})m$ is

[Question ID = 25524]

1. $3J$ [Option ID = 42093]
2. $1J$ [Option ID = 42094]

3. $-3J$ [Option ID = 42091]
4. $-1J$ [Option ID = 42092]

Correct Answer :-

- $-1J$ [Option ID = 42092]

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31) Let $\delta(t)$ denote the delta function. The value of the integral $\int_{-\infty}^{\infty} \delta(t) \cos\left(\frac{3t}{2}\right) dt$ is

[Question ID = 25551]

1. 1 [Option ID = 42199]
2. $\pi/2$ [Option ID = 42202]
3. -1 [Option ID = 42200]
4. 0 [Option ID = 42201]

Correct Answer :-

- 1 [Option ID = 42199]

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32)

A DSB –SC signal is to be generated with a carrier frequency $f_c = 1MHz$ using a nonlinear device with input –output characteristic $V_0 = a_0 v_i + a_1 v^3{}_i$, where a_0 and a_1 are constants. The output of the non-linear device can be filtered by an appropriate band-pass filter.

Let $V_i = A^i{}_c \cos(2\pi f^i{}_c t) + m(t)$ where $m(t)$ is the message signal. Then the value of $f^i{}_c$(inMHz) is

[Question ID = 25553]

1. 0.5 [Option ID = 42210]
2. 0.333 [Option ID = 42208]
3. 1 [Option ID = 42207]
4. 3 [Option ID = 42209]

Correct Answer :-

- 0.5 [Option ID = 42210]

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33)

Given an orthogonal matrix $A = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & -1 & -1 \\ 1 & -1 & 0 & 0 \\ 0 & 0 & 1 & -1 \end{bmatrix}$. Then $[AA^T]^{-1}$

[Question ID = 25558]

1. $\begin{bmatrix} 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix}$ [Option ID = 42228]

2. $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 1 \end{bmatrix}$ [Option ID = 42230]

3. $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ [Option ID = 42229]

4. $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & -1 \end{bmatrix}$ [Option ID = 42227]

Correct Answer :-

- $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ [Option ID = 42229]

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34)
The first order perturbed Hamiltonian, when an external uniform electric field $\vec{E}$ is applied to the z-axis on an atom is

[Question ID = 25534]

1. $H' = -eEZ$ [Option ID = 42132]
2. $H' = eE/Z$ [Option ID = 42133]
3. $H' = eEZ$ [Option ID = 42131]
4. $H' = eZ/E$ [Option ID = 42134]

Correct Answer :-

- $H' = -eEZ$ [Option ID = 42132]

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35) If the characteristic equation of the differential equation

$$\frac{d^2y}{dx^2} + 2\alpha\frac{dy}{dx} + y = 0$$

has two equal roots, then the values of α are

[Question ID = 25562]

1. $0,0$ [Option ID = 42244]
2. $\pm j$ [Option ID = 42245]
3. $\pm 1/2$ [Option ID = 42246]
4. ± 1 [Option ID = 42243]

Correct Answer :-

- ± 1 [Option ID = 42243]

36) The families of curves represented by the solution of the equation

$$\frac{dy}{dx} = -\left(\frac{x}{y}\right)^n$$

For $n = -1$ and $n = +1$, respectively are

[Question ID = 25563]

1. Circles and Hyperbolas [Option ID = 42250]
2. Hyperbolas and Circles [Option ID = 42248]
3. Hyperbolas and Parabolas [Option ID = 42247]
4. Parabolas and Circles [Option ID = 42249]

Correct Answer :-

- Hyperbolas and Parabolas [Option ID = 42247]

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37) The Hamiltonian corresponding to the Lagrangian $L = a\dot{x}^2 + b\dot{y}^2 - kxy$ is

[Question ID = 25526]

1. $\frac{{p_x}^2}{4a} + \frac{{p_y}^2}{4b} + kxy$ [Option ID = 42101]
2. $\frac{{p_x}^2}{2ab} + \frac{{p_y}^2}{2ab} + kxy$ [Option ID = 42102]
3. $\frac{{p_x}^2}{4a} + \frac{{p_y}^2}{4b} - kxy$ [Option ID = 42100]
4. $\frac{{p_x}^2}{2a} + \frac{{p_y}^2}{2b} + kxy$ [Option ID = 42099]

Correct Answer :-

- $\frac{{p_x}^2}{4a} + \frac{{p_y}^2}{4b} + kxy$ [Option ID = 42101]

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38) The nuclear spins of ${}_6C^{14}$ and ${}_{12}Mg^{25}$ nuclei are respectively

[Question ID = 25538]

1. zero and half integer [Option ID = 42147]
2. half integer and zero [Option ID = 42148]
3. Both half integer [Option ID = 42150]
4. an integer and half integer [Option ID = 42149]

Correct Answer :-

- an integer and half integer [Option ID = 42149]

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39) If $x = \sqrt{-1}$, then the value of x^x is

[Question ID = 25564]

1. $e^{-\frac{\pi}{2}}$ [Option ID = 42252]
2. $e^{\pi/2}$ [Option ID = 42251]

3. x [Option ID = 42253]

4. 1 [Option ID = 42254]

Correct Answer :-

- $e^{-\frac{\pi}{2}}$ [Option ID = 42252]

40) For real values of x, the minimum value of the function $f(x) = \exp(x) + \exp(-x)$ is

[Question ID = 25560]

1. 2 [Option ID = 42237]
2. 0 [Option ID = 42236]
3. 1 [Option ID = 42235]
4. 3 [Option ID = 42238]

Correct Answer :-

- 2 [Option ID = 42237]

41) For $l = 1$, correct representation of L_x is

[Question ID = 25532]

1. $\frac{\hbar}{2}\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ [Option ID = 42123]

2. $\frac{\hbar}{\sqrt{2}}\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ [Option ID = 42126]

3. $\frac{\hbar}{2}\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ [Option ID = 42125]

4. $\frac{\hbar}{\sqrt{2}}\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ [Option ID = 42124]

Correct Answer :-

- $\frac{\hbar}{\sqrt{2}}\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ [Option ID = 42124]

42)

An unperturbed two level system has energy eigenvalues E_1 and E_2 and eigenfunctions $\begin{bmatrix}1\\0\end{bmatrix}$ and $\begin{bmatrix}0\\1\end{bmatrix}$. When perturbed its Hamiltonian is represented by

$$\begin{bmatrix}E_1 & a\\ a^* & E_2\end{bmatrix}$$

The first order correction to E_1 is

[Question ID = 25533]

1. *zero* [Option ID = 42127]
2. *4a* [Option ID = 42130]
3. *a* [Option ID = 42129]
4. *2a* [Option ID = 42128]

Correct Answer :-

- *a* [Option ID = 42129]

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43) Let $A = \begin{bmatrix}2 & -0.1\\ 0 & 3\end{bmatrix}$ and $A^{-1} = \begin{bmatrix}0.5 & a\\ 0 & b\end{bmatrix}$. Then (a + b) equals

[Question ID = 25557]

1. $^{7}/_{20}$ [Option ID = 42223]
2. $^{3}/_{20}$ [Option ID = 42224]
3. $^{19}/_{60}$ [Option ID = 42225]
4. $^{11}/_{20}$ [Option ID = 42226]

Correct Answer :-

- $^{7}/_{20}$ [Option ID = 42223]

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44) A solid uniform drum of mass *M* radius *R* rolls without slipping down a plane inclined at an angle *θ*. Find its acceleration?

[Question ID = 25523]

1. $^{(3g\sin\theta)}/_{2}$ [Option ID = 42088]
2. $^{-(2g\sin\theta)}/_{3}$ [Option ID = 42089]
3. $^{-(3g\sin\theta)}/_{2}$ [Option ID = 42090]
4. $^{(2g\sin\theta)}/_{3}$ [Option ID = 42087]

Correct Answer :-

- $^{(2g\sin\theta)}/_{3}$ [Option ID = 42087]

45) Which of the following functions is analytic over the entire complex plane? [Question ID = 25566]

1. $\cos(z)$ [Option ID = 42259]
2. $\ln(z)$ [Option ID = 42261]
3. $1/(1-z)$ [Option ID = 42262]
4. $e^{1/z}$ [Option ID = 42260]

Correct Answer :-

- $\cos(z)$ [Option ID = 42259]

46) The probability that an electron in a metal occupies the fermi level , at any temperature (*T*>0)

[Question ID = 25539]

1. 1 [Option ID = 42152]
2. 2.0 [Option ID = 42154]
3. 0 [Option ID = 42151]
4. 0.5 [Option ID = 42153]

Correct Answer :-

- 0.5 [Option ID = 42153]

47) The Laplace transform of a unit ramp function starting at *t=a*, is

[Question ID = 25569]

1. $e^{-as}/(s+a)^2$ [Option ID = 42272]
2. e^{-as}/s^4 [Option ID = 42274]
3. e^{-as}/s^3 [Option ID = 42273]
4. e^{-as}/s^2 [Option ID = 42271]

Correct Answer :-

- e^{-as}/s^2 [Option ID = 42271]

48) An equivalent 2's complement representation of 2's complement number 1101 is [Question ID = 25544]

1. 110111 [Option ID = 42173]
2. 001101 [Option ID = 42172]
3. 110100 [Option ID = 42171]
4. 111101 [Option ID = 42174]

Correct Answer :-

- 111101 [Option ID = 42174]

49) An FM signal with modulation index 9 is applied to a frequency tripler. The modulation index in the output signal will be [Question ID = 25552]

1. 0 [Option ID = 42203]
2. 9 [Option ID = 42206]
3. 27 [Option ID = 42204]

4. 3 [Option ID = 42205]

Correct Answer :-

- 27 [Option ID = 42204]

50) The bit rate of digital communication system is *R kbits/s*. The modulation used is 32-QAM. The minimum bandwidth required for ISI free transmission is [Question ID = 25556]

1. $\frac{R}{5}kHz$ [Option ID = 42222]
2. $\frac{R}{5}Hz$ [Option ID = 42221]
3. $\frac{R}{10}Hz$ [Option ID = 42219]
4. $\frac{R}{10}kHz$ [Option ID = 42220]

Correct Answer :-

- $\frac{R}{5}kHz$ [Option ID = 42222]