DU PhD in informatics IIC

Topic:- DU_J18_PHD_INFO

1) Customers arrive at a one-man barber shop according to a Poisson process with a mean interarrival time of 12 min. Customers spend an average of 10 min in the barber's chair. What is the expected number of customers in the barber shop .

[Question ID = 52631]

1. 3 [Option ID = 90517]
2. 2 [Option ID = 90516]
3. 5 [Option ID = 90519]
4. 4 [Option ID = 90518]

Correct Answer :-

- 5 [Option ID = 90519]

2) The mass of a rocket is M and the total mass of the rocket and the fuel is M_0. The average exhaust velocity of gases ejected from rocket motors is u and the final velocity attained by the rocket after using up all fuel is v. The final velocoti v is proportional to

[Question ID = 52583]

1. $\left(\frac{Mu}{M_0}\right)$ [Option ID = 90325]
2. $(M_0 - M)^{-1}$ [Option ID = 90327]
3. $(M - M_0)$ [Option ID = 90326]
4. $\log\left(\frac{M_0}{M}\right)$ [Option ID = 90324]

Correct Answer :-

- $\log\left(\frac{M_0}{M}\right)$ [Option ID = 90324]

3) A signal is carrying data in which one data element is encoded as one signal element ($r = 1$). If the bit rate is $100kbps$, what is the average value of the baud rate if c is between 0 and 1.

[Question ID = 52611]

1. 50kbaud [Option ID = 90438]
2. 10kbaud [Option ID = 90436]
3. 100kbaud [Option ID = 90439]
4. 20kbaud [Option ID = 90437]

Correct Answer :-

- 50kbaud [Option ID = 90438]

4)

The solution of the differential equation

$$x\frac{dy}{dx} + y = x^4$$

with the boundary condition that $y = 1$ at $x = 1$, is

[Question ID = 52618]

1. $y = \frac{4x^4}{5} + \frac{4}{5x}$ [Option ID = 90467]
2. $y = \frac{4x^4}{5} + \frac{1}{5x}$ [Option ID = 90466]
3. $y = 5x^4 - 4$ [Option ID = 90464]
4. $y = \frac{x^4}{5} + \frac{4x}{5}$ [Option ID = 90465]

Correct Answer :-

- $y = \frac{4x^4}{5} + \frac{4}{5x}$ [Option ID = 90467]

5) Can the following scalar and vector potential describe an electromagnetic field?

$$\phi(\vec{x}, t) = 3xyz - 4t, \quad \vec{A}(\vec{x}, t) = (2x - \omega t)\hat{i} + (y - 2z)\hat{j} + (z - 2e^{i\omega t})\hat{k}$$

where ω is constant.

[Question ID = 52593]

1. Yes, in the Coulomb gauge [Option ID = 90364]
2. Yes, provided $\omega = 0$ [Option ID = 90366]
3. Yes, in the Lorentz gauge [Option ID = 90365]
4. Yes , provided $\omega \neq 0$ [Option ID = 90367]

Correct Answer :-

- Yes, in the Lorentz gauge [Option ID = 90365]

6) If the standard deviation of the Poisson's distribution is $\sqrt{2}$, the probability for $r = 2$ is

[Question ID = 52623]

1. $\frac{8}{e^4}$ [Option ID = 90487]
2. $\frac{1}{e^2}$ [Option ID = 90485]
3. $\frac{1}{e}$ [Option ID = 90484]
4. $\frac{2}{e^2}$ [Option ID = 90486]

Correct Answer :-

- $\frac{2}{e^2}$ [Option ID = 90486]

7) For a step index fiber, the normalized frequency $V = 26.6$ at a $1300nm$ wavelength. If the core radius is $25\mu m$. Find out the numerical aperture.

[Question ID = 52610]

1. 0.33 [Option ID = 90433]
2. 0.11 [Option ID = 90435]

3. 0.22 [Option ID = 90432]
4. 0.66 [Option ID = 90434]

Correct Answer :-

- 0.22 [Option ID = 90432]

8) The value of c for which $P(X = k) = ck^2$ can serve as the probability function of a random variable X that takes value $0, 1, 2, 3, 4$ is

[Question ID = 52624]

1. $1/30$ [Option ID = 90489]
2. $1/40$ [Option ID = 90491]
3. $1/15$ [Option ID = 90488]
4. $1/10$ [Option ID = 90490]

Correct Answer :-

- $1/30$ [Option ID = 90489]

9) An arbitrary vector X is an eigen vector of the matrix

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & b \end{bmatrix}$$

if (a, b) is

[Question ID = 52613]

1. $(0, 1)$ [Option ID = 90446]
2. $(1, -1)$ [Option ID = 90444]
3. $(1, 0)$ [Option ID = 90445]
4. $(1, 1)$ [Option ID = 90447]

Correct Answer :-

- $(1, 1)$ [Option ID = 90447]

10) LASER are light source which give almost perfectly parallel beam of high intensity. If a $2kW$ laser beam is concentrated by a lens into sross-sectional area about $10^{-6}cm^2$, then the value of poynting vector is

[Question ID = 52592]

1. $2 \times 10^{14} W/m^2$ [Option ID = 90363]
2. $2 \times 10^{13} W/m^2$ [Option ID = 90362]
3. $2 \times 10^{12} W/m^2$ [Option ID = 90361]
4. $2 \times 10^{11} W/m^2$ [Option ID = 90360]

Correct Answer :-

- $2 \times 10^{13} W/m^2$ [Option ID = 90362]

11)

If the magnetic monopole existed , then which of the following Maxwell's equations will be modified?

[Question ID = 52591]

1. $div\vec{D} = \rho$ [Option ID = 90356]
2. $div\vec{B} = 0$ [Option ID = 90358]
3. $cur\vec{H} = \vec{J} + \frac{\partial \vec{D}}{\partial t}$ [Option ID = 90359]
4. $cur\vec{E} = -\frac{\partial \vec{B}}{\partial t}$ [Option ID = 90357]

Correct Answer :-

- $div\vec{B} = 0$ [Option ID = 90358]

12) Evaluate

$$\int_0^{2\pi} \frac{d\theta}{1 + a\sin\theta}, a^2 < 1.$$

[Question ID = 52622]

1. $\frac{2\pi}{\sqrt{1+a^2}}$ [Option ID = 90481]
2. $\frac{\pi}{\sqrt{1-a^2}}$ [Option ID = 90482]
3. $\frac{\pi}{\sqrt{1+a^2}}$ [Option ID = 90483]
4. $\frac{2\pi}{\sqrt{1-a^2}}$ [Option ID = 90480]

Correct Answer :-

- $\frac{2\pi}{\sqrt{1-a^2}}$ [Option ID = 90480]

13) A voltage signal $V(t)$ has the following Fourier transform

$$V(j\omega) = \begin{cases} e^{-j\omega d}; & for \quad |\omega| < 1 \\ 0; & for \quad |\omega| > 0 \end{cases}$$

The energy that would be dissipated in a 1Ω resistor fed from $V(t)$ is

[Question ID = 52609]

1. $\frac{2}{\pi}\mathbf{J}$ [Option ID = 90428]
2. $\frac{1}{\pi}\mathbf{J}$ [Option ID = 90430]
3. $\frac{1}{2\pi}\mathbf{J}$ [Option ID = 90431]
4. $\frac{2e^{-2d}}{\pi}\mathbf{J}$ [Option ID = 90429]

Correct Answer :-

- $\frac{1}{2\pi}\mathbf{J}$ [Option ID = 90431]

14) A particle describe a circle of radius r. The centripetal acceleration of the particle is $4/r^2$. What will be the momentum of the particle?

[Question ID = 52584]

1. $\frac{2m}{r}$ [Option ID = 90328]

2. $\frac{4m}{\sqrt{r}}$ [Option ID = 90330]
3. $\frac{2m}{\sqrt{r}}$ [Option ID = 90329]
4. $\frac{8m}{\sqrt{r}}$ [Option ID = 90331]

Correct Answer :-

- $\frac{2m}{\sqrt{r}}$ [Option ID = 90329]

15) The equation $x^3 + 4x - 9 = 0$ needs to be numerically solved using the Newton-Raphson method. The iterative equation for this purpose is

[Question ID = 52629]

1. $x_{k+1} = \frac{4x_k^2+9}{9x_k^2+2}$ [Option ID = 90511]
2. $x_{k+1} = \frac{3x_k^2+4}{2x_k^2+9}$ [Option ID = 90509]
3. $x_{k+1} = \frac{2x_k^3+9}{3x_k^2+4}$ [Option ID = 90508]
4. $x_{k+1} = x_k - 3x_k^2 + 4$ [Option ID = 90510]

Correct Answer :-

- $x_{k+1} = \frac{2x_k^3+9}{3x_k^2+4}$ [Option ID = 90508]

16) The ratio of the reverse resistance to the forward resistance of a good solid-state diode is about

[Question ID = 52599]

1. $1:10$ [Option ID = 90389]
2. $10:1$ [Option ID = 90388]
3. $1:100$ [Option ID = 90390]
4. $1:1000$ [Option ID = 90391]

Correct Answer :-

- $1:1000$ [Option ID = 90391]

17) During execution , OP code of an instruction is stored in the

[Question ID = 52602]

1. general purpose register [Option ID = 90400]
2. instruction register [Option ID = 90402]
3. accumulator registor [Option ID = 90401]
4. temporary register [Option ID = 90403]

Correct Answer :-

- instruction register [Option ID = 90402]

18)

Find the complimentary function

$$\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = e^{3x}$$

[Question ID = 52616]

1. $(x^2-1)e^{3x}$ [Option ID = 90459]
2. $xe^{3x}-1$ [Option ID = 90457]
3. $e^{3x}+e2x$ [Option ID = 90456]
4. $(x-1)e^{3x}$ [Option ID = 90458]

Correct Answer :-

- $(x-1)e^{3x}$ [Option ID = 90458]

19) When an 8 bit serial in / serial out register is used for a $24\mu s$ tme delay , the clock frequency must be

[Question ID = 52604]

1. $8MHz$ [Option ID = 90411]
2. $41.67kHz$ [Option ID = 90408]
3. $333kHz$ [Option ID = 90409]
4. $125kHz$ [Option ID = 90410]

Correct Answer :-

- $333kHz$ [Option ID = 90409]

20) Evaluate

$$\int_c \frac{e^{iz}}{z^3} dz,$$

where c is the circle $|z| = 2$.

[Question ID = 52621]

1. $-i\pi$ [Option ID = 90478]
2. $2i\pi$ [Option ID = 90479]
3. $i\pi$ [Option ID = 90477]
4. π [Option ID = 90476]

Correct Answer :-

- $-i\pi$ [Option ID = 90478]

21) Solve

$$x\frac{dy}{dx} - y = (x-1)e^x.$$

[Question ID = 52615]

1. $\frac{x}{y} = \frac{e^x}{x} + c, \quad c = const.$ [Option ID = 90452]
2. $\frac{y}{x} = \frac{e^x}{x} + c, \quad c = const.$ [Option ID = 90453]
3. $\frac{x}{y} = -\frac{e^x}{x} + c, \quad c = const.$ [Option ID = 90454]

4. $\frac{y}{x} = \frac{e^x}{x^2} + c, \quad c = const.$ [Option ID = 90455]

Correct Answer :-

- $\frac{y}{x} = \frac{e^x}{x} + c, \quad c = const.$ [Option ID = 90453]

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22) The eigen values of the matrix

$$A = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$$

are

[Question ID = 52614]

1. $e^{\pm\theta}$ [Option ID = 90450]
2. $e^{-\theta}$ [Option ID = 90451]
3. $e^{\pm i\theta}$ [Option ID = 90449]
4. e^{θ} [Option ID = 90448]

Correct Answer :-

- $e^{\pm i\theta}$ [Option ID = 90449]

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23) Consider the following assembly language program

```
        MVI   B,87H
        MOV   A , B
START:  JMP NEXT
        MVI   B, 00H
        XRA   B
        OUT   PORT 1
        HLT
NEXT:   XRA B
        JP    START 1
        OUT   PORT 2
        HLT
```

[Question ID = 52608]

1. infinite looping of the program execution with accumulator data alternaing between 00H and 87H [Option ID = 90427]
2. an output of 87H at PORT 2 [Option ID = 90425]
3. an output of 87H at PORT 1 [Option ID = 90424]
4. infinite looping of the program execution with accumulator data remaining at 00H [Option ID = 90426]

Correct Answer :-

- an output of 87H at PORT 2 [Option ID = 90425]

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24) The contribution of Coulomb energy in the sem-empirical mass formula of a nucleus of mass number A and atomic number Z is of the form (a is a constant)

[Question ID = 52596]

1. $\frac{aZ(Z+1)}{A}$ [Option ID = 90377]
2. $\frac{aZ(Z-1)}{A}$ [Option ID = 90378]
3. $\frac{aZ(Z+1)}{2A}$ [Option ID = 90379]

4. $aZA^{2/3}$ [Option ID = 90376]

Correct Answer :-

- $\frac{aZ(Z-1)}{A}$ [Option ID = 90378]

25) The following programme is run on an 8085 microprocessor

```
2000  LXI SP , 1000
2003  PUSH H
2004  PUSH D
2005  CALL 2050
2008  POP 2050
2009  HIT
```

As the completion of execution of the program , the program counter of the 8085 contains 2056, and the stack pointer contains.....

[Question ID = 52606]

1. $2251, \text{OFFC}$ [Option ID = 90417]
2. $1025, \text{OCCF}$ [Option ID = 90418]
3. $2050, \text{OFFC}$ [Option ID = 90416]
4. 1025 [Option ID = 90419]

Correct Answer :-

- $2050, \text{OFFC}$ [Option ID = 90416]

26) When a transistor amplifier having current gain of 75 is given an input signal

$$V_i = 2\sin\left(157t + \frac{\pi}{2}\right),$$

the output signal is found to be

$$V_0 = 200\sin\left(157t + \frac{3\pi}{2}\right).$$

The transistor is connected as

[Question ID = 52600]

1. a common base amplifier [Option ID = 90393]
2. a common collector amplifier [Option ID = 90392]
3. a oscillator [Option ID = 90395]
4. a common emitter amplifier [Option ID = 90394]

Correct Answer :-

- a common emitter amplifier [Option ID = 90394]

27) If a group is defined as

$$a * b = a + b - 1$$

then inverse of the group is

[Question ID = 52630]

1. a [Option ID = 90512]
2. $1 - a$ [Option ID = 90513]

3. $2-a$ [Option ID = 90514]
4. $a-5$ [Option ID = 90515]

Correct Answer :-

- $2-a$ [Option ID = 90514]

28) A $10MHz$ clock frequency is applied in cascaded counter consisting of a modulus counter , a modulus-8 counter , and two two modulus-10 counters. The lowest output frequency possible is

[Question ID = 52603]

1. $5kHz$ [Option ID = 90406]
2. $25kHz$ [Option ID = 90407]
3. $2.5kHz$ [Option ID = 90405]
4. $10kHz$ [Option ID = 90404]

Correct Answer :-

- $25kHz$ [Option ID = 90407]

29) The equation of motion of a bead sliding on a uniform rod rotating in a force free space is

[Question ID = 52585]

1. $\ddot{r}-r\dot{r}\omega=0$ [Option ID = 90332]
2. $\ddot{r}-\dot{r}\omega=0$ [Option ID = 90334]
3. $\ddot{r}-r\omega^2=0$ [Option ID = 90333]
4. $\ddot{r}-\dot{r}\omega+r\omega^2=0$ [Option ID = 90335]

Correct Answer :-

- $\ddot{r}-r\omega^2=0$ [Option ID = 90333]

30) A particle is described by a wavefunction $\psi(x)=e^{|x|}$ in one dimension. What is the probability that it will be found in the region $|x|\leq a, \quad a>0$?

[Question ID = 52595]

1. $1-e^{-2a}$ [Option ID = 90375]
2. e^{-a} [Option ID = 90372]
3. $1-e^{-a}$ [Option ID = 90373]
4. e^{-2a} [Option ID = 90374]

Correct Answer :-

- $1-e^{-2a}$ [Option ID = 90375]

31) The wavefunction in the ground state of H-atom is given by $\psi=\sqrt{\frac{1}{\pi a^3}}e^{-r/a}$. Find the average value of r.

[Question ID = 52594]

1. 0 [Option ID = 90368]
2. $\frac{3}{2}a$ [Option ID = 90369]

3. $\frac{a}{2}$ [Option ID = 90370]
4. $\frac{5}{2}a$ [Option ID = 90371]

Correct Answer :-

- $\frac{3}{2}a$ [Option ID = 90369]

32) The correct sequence of the band -gaps of germanium (E_{g1}) , silicon (E_{g2}) and gallium aresenide (E_{g3}) will be

[Question ID = 52597]

1. $E_{g1} < E_{g2} < E_{g3}$ [Option ID = 90381]
2. $E_{g2} < E_{g1} < E_{g3}$ [Option ID = 90382]
3. $E_{g2} > E_{g1} > E_{g3}$ [Option ID = 90383]
4. $E_{g1} > E_{g2} > E_{g3}$ [Option ID = 90380]

Correct Answer :-

- $E_{g2} < E_{g1} < E_{g3}$ [Option ID = 90382]

33) The Lagrangian of a particle of mass m moving in a plane is given by

$$L = \frac{1}{2}m(\dot{x}^2 + \dot{y}^2) + a(x\dot{y} + y\dot{x})$$

The canonical momenta are given by

[Question ID = 52586]

1. $p_x = m\dot{x} - ay, p_y = m\dot{y} + ax$ [Option ID = 90338]
2. $p_x = m\dot{x} - ay, p_y = m\dot{y} - ax$ [Option ID = 90339]
3. $p_x = m\dot{x} + ay, p_y = m\dot{y} + ax$ [Option ID = 90337]
4. $p_x = m\dot{x}, p_y = m\dot{y}$ [Option ID = 90336]

Correct Answer :-

- $p_x = m\dot{x} + ay, p_y = m\dot{y} + ax$ [Option ID = 90337]

34) Magnetic field in a region is $\vec{\mathbf{B}} = \beta t\hat{z}$., the induced electric field due to this time varying magnetic field is

[Question ID = 52590]

1. $\beta r(\hat{\phi})$ [Option ID = 90354]
2. $\frac{\beta}{2}r(-\hat{\phi})$ [Option ID = 90353]
3. $\frac{\beta}{2}r(\hat{\phi})$ [Option ID = 90352]
4. $\beta r(-\hat{\phi})$ [Option ID = 90355]

Correct Answer :-

- $\frac{\beta}{2}r(-\hat{\phi})$ [Option ID = 90353]

35)

The transition probability matrix of a Markov chain $X_n, n = 1, 2, 3, \cdots$ 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 = 52625]

1. 0.0046 [Option ID = 90495]
2. 0.012 [Option ID = 90493]
3. 0.279 [Option ID = 90492]
4. 0.0048 [Option ID = 90494]

Correct Answer :-

- 0.279 [Option ID = 90492]

36) The Lagrangian for an harmonic oscillator is given by $L = \frac{1}{2}\dot{x}^2 - \frac{\omega^2 x^2}{2} - \alpha x^3$,. Find the Hamiltonian.

[Question ID = 52587]

1. $H = -\frac{1}{2}\dot{x}^2 - \frac{\omega^2 x^2}{2} - \alpha x^3$ [Option ID = 90341]
2. $H = \frac{1}{2}\dot{x}^2 - \frac{\omega^2 x^2}{2} + \alpha x^3$ [Option ID = 90342]
3. $H = \frac{1}{2}\dot{x}^2 + \frac{\omega^2 x^2}{2} + \alpha x^3$ [Option ID = 90343]
4. $H = \frac{1}{2}\dot{x}^2 - \frac{\omega^2 x^2}{2} - \alpha x^3$ [Option ID = 90340]

Correct Answer :-

- $H = \frac{1}{2}\dot{x}^2 - \frac{\omega^2 x^2}{2} + \alpha x^3$ [Option ID = 90342]

37) The polynomial $2x^2 + x + 3$ in terms of Legendre's polynomial is

[Question ID = 52617]

1. $\frac{1}{3}[4P_2 - 3P_1 - 11P_0]$ [Option ID = 90461]
2. $\frac{1}{3}[4P_2 + 3P_1 - 11P_0]$ [Option ID = 90460]
3. $\frac{1}{3}[4P_2 - 3P_1 + 11P_0]$ [Option ID = 90462]
4. $\frac{1}{3}[4P_2 + 3P_1 + 11P_0]$ [Option ID = 90463]

Correct Answer :-

- $\frac{1}{3}[4P_2 - 3P_1 + 11P_0]$ [Option ID = 90462]

38) In an n-type semiconductor , the Fermi level lies $0.3eV$ below the conduction band at $300K$. If the temperature is increased to $330K$, where does the new position of the Fermi level lie?

[Question ID = 52598]

1. $0.44eV$ below the conduction band [Option ID = 90385]
2. $0.55eV$ below the conduction band [Option ID = 90384]
3. $0.27eV$ below the conduction band [Option ID = 90387]

4. $0.33eV$ below the conduction band [Option ID = 90386]

Correct Answer :-

- $0.27eV$ below the conduction band [Option ID = 90387]

39) For what values of m and n does the complete bipartite graph $K_{m,n}$ have an Euler circuit.

[Question ID = 52628]

1. m, n are both even integers respectively. [Option ID = 90505]
2. m, n are even and odd integers respectively. [Option ID = 90504]
3. m, n are both non integers respectively. [Option ID = 90507]
4. m, n are both odd integers respectively. [Option ID = 90506]

Correct Answer :-

- m, n are both even integers respectively. [Option ID = 90505]

40) The minimum number of resisters required in a 4 bit D/A network of weighted -resister type is

[Question ID = 52605]

1. 15 [Option ID = 90414]
2. 4 [Option ID = 90412]
3. 16 [Option ID = 90415]
4. 8 [Option ID = 90413]

Correct Answer :-

- 16 [Option ID = 90415]

41) The number of edges in a bipartite graph with n vertices is at most

[Question ID = 52627]

1. $\frac{n(n-1)}{2}$ [Option ID = 90501]
2. $\frac{n(n+1)}{2}$ [Option ID = 90502]
3. $\frac{n^3}{2}$ [Option ID = 90503]
4. $\frac{n^2}{2}$ [Option ID = 90500]

Correct Answer :-

- $\frac{n^2}{2}$ [Option ID = 90500]

42) In a microprocessor , the resister which holds the address of the next instruction to be fetched is

[Question ID = 52607]

1. program counter [Option ID = 90421]
2. instructor register [Option ID = 90423]

3. accumulator [Option ID = 90420]
4. stack counter [Option ID = 90422]

Correct Answer :-

- program counter [Option ID = 90421]

43) The equation of motion for a small particle of mass m at position x is $m\ddot{x} + \gamma\dot{x} - mg = 0$. Assuming initial speed to be v_0, the terminal speed of particle will be

[Question ID = 52588]

1. $\sqrt{v_0 + 2gx}$ [Option ID = 90345]
2. $\frac{mg}{\gamma^2 t}$ [Option ID = 90347]
3. $v_0 + gt$ [Option ID = 90346]
4. $\frac{mg}{\gamma}$ [Option ID = 90344]

Correct Answer :-

- $\frac{mg}{\gamma}$ [Option ID = 90344]

44) An object of mass m moving with a velocity v is approaching a seond object of the same mass but at rest. The total kinetic energy of the two onjects as viewed from the centre of mass

[Question ID = 52582]

1. mv^2 [Option ID = 90320]
2. $\frac{1}{4}mv^2$ [Option ID = 90322]
3. $\frac{1}{8}mv^2$ [Option ID = 90323]
4. $\frac{1}{2}mv^2$ [Option ID = 90321]

Correct Answer :-

- $\frac{1}{2}mv^2$ [Option ID = 90321]

45) Suppose that customers arrive at a bank according to a Poisson process with a mean rate of 3 per minute; find the probability that during a time interval of 2 min , exactly 4 customers arrive.

[Question ID = 52626]

1. 0.266 [Option ID = 90497]
2. 0.133 [Option ID = 90498]
3. 0.150 [Option ID = 90496]
4. 0.715 [Option ID = 90499]

Correct Answer :-

- 0.133 [Option ID = 90498]

46) If $f(x) = \begin{cases} x & if \quad -\pi/2 < x < \pi/2 \\ \pi - x & if \quad \pi/2 < x < 3\pi/2 \end{cases}$, then a_0 is equal to

[Question ID = 52619]

1. π [Option ID = 90469]
2. 0 [Option ID = 90468]
3. $-\pi$ [Option ID = 90470]
4. 2π [Option ID = 90471]

Correct Answer :-

- 0 [Option ID = 90468]

47) The matrix

$$A = \begin{bmatrix} 4 & 3 & 3 \\ -1 & 0 & -1 \\ -4 & -4 & -3 \end{bmatrix}$$

is

[Question ID = 52612]

1. unitory [Option ID = 90441]
2. involutory [Option ID = 90443]
3. idempotent [Option ID = 90442]
4. orthogonal [Option ID = 90440]

Correct Answer :-

- involutory [Option ID = 90443]

48) In Boolean algebra , $\overline{(\overline{A}+\overline{B}).C}$ will be equal to

[Question ID = 52601]

1. $(\overline{A}.B)+\overline{C}$ [Option ID = 90396]
2. $(A.\overline{B})+C$ [Option ID = 90397]
3. $A+\overline{B}+C$ [Option ID = 90399]
4. $(A.B)+\overline{C}$ [Option ID = 90398]

Correct Answer :-

- $(A.B)+\overline{C}$ [Option ID = 90398]

49) Laplace transform of $\{e^{-2t}-e^{-3t}\}$ is

[Question ID = 52620]

1. $-\frac{1}{s^2+5s+6}$ [Option ID = 90475]
2. $\frac{1}{s^2+3s+6}$ [Option ID = 90472]
3. $\frac{1}{s^2+5s+6}$ [Option ID = 90474]
4. $-\frac{1}{s^2+3s+6}$ [Option ID = 90473]

Correct Answer :-

- $\frac{1}{s^2+5s+6}$ [Option ID = 90474]

50) A constant current I is flowing through a cylindrical conductor. The direction of poynting vector is

[Question ID = 52589]

1. $\hat{z}$ [Option ID = 90348]
2. $-\hat{r}$ [Option ID = 90350]
3. $\hat{r}$ [Option ID = 90351]
4. $\hat{\phi}$ [Option ID = 90349]

Correct Answer :-

- $-\hat{r}$ [Option ID = 90350]