DU PhD in Electronics

Topic:- DU_J18_PHD_ELEC

1) An optical fiber consists of a core of refractive index 2.0 and a cladding of refractive index 1.732. For total internal reflection of light inside the optical fiber, the maximum angle that the light rays can make with the axis of the optical fiber is

[Question ID = 52503]

1. 60° [Option ID = 90006]
2. 30° [Option ID = 90004]
3. 90° [Option ID = 90007]
4. 15° [Option ID = 90005]

Correct Answer :-

- 30° [Option ID = 90004]

2) The solution of the following differential equation is

$$x \ln x \frac{dy}{dx} + y = 2 \ln x$$

[Question ID = 52525]

1. $y = (\ln x)^2 + C$ [Option ID = 90093]
2. $y = 2 \ln x + C$ [Option ID = 90092]
3. $y = x(\ln x)^2 + C$ [Option ID = 90095]
4. $y \ln x = (\ln x)^2 + C$ [Option ID = 90094]

Correct Answer :-

- $y \ln x = (\ln x)^2 + C$ [Option ID = 90094]

3) If $\phi = \tan^{-1}\left(\frac{y}{x}\right)$, $\vec{\nabla} \cdot (\vec{\nabla}\phi)$ is

[Question ID = 52523]

1. 2 [Option ID = 90087]
2. 0 [Option ID = 90085]
3. 1 [Option ID = 90084]
4. -1 [Option ID = 90086]

Correct Answer :-

- 0 [Option ID = 90085]

4) The longest wavelength that can be absorbed by silicon,which has the band gap of 1.12 eV, is 1.1 mm. If the longest wavelength that can be absorbed by another material is 0.87mm, then the band gap of this material is

[Question ID = 52500]

1. 0.706 eV [Option ID = 89995]
2. 0.854 eV [Option ID = 89994]
3. 0.886 eV [Option ID = 89993]
4. 1.416 eV [Option ID = 89992]

Correct Answer :-

- 1.416 eV [Option ID = 89992]

5) The Newton Raphson method formula for finding the square root of a real number R from the equation $x^2 - R = 0$ is

[Question ID = 52483]

1. $x_{i+1} = \frac{1}{2}(3x_i - \frac{R}{x_i})$ [Option ID = 89927]
2. $x_{i+1} = \frac{x_i}{2}$ [Option ID = 89925]
3. $x_{i+1} = \frac{1}{2}(x_i + \frac{R}{x_i})$ [Option ID = 89926]
4. $x_{i+1} = \frac{3x_i}{2}$ [Option ID = 89924]

Correct Answer :-

- $x_{i+1} = \frac{1}{2}(x_i + \frac{R}{x_i})$ [Option ID = 89926]

6) The velocity of a body is given by

$$v(t) = 2t \quad 1 \le t \le 5$$
$$= 5t^2 + 3 \quad 5 < t \le 14$$

where t is in secs and v in m/s. Using 2 segment Trapezoidal rule, the distance covered from t=2 to t=8 secs is obtained as

[Question ID = 52480]

1. 780 m [Option ID = 89912]
2. 2340 m [Option ID = 89913]

3. $585\ \text{m}$ [Option ID = 89914]
4. $1170\ \text{m}$ [Option ID = 89915]

Correct Answer :-

- $1170\ \text{m}$ [Option ID = 89915]

7) The short-circuit current delivered by a 10 cm by 10 cm photocell (with 100% quantum efficiency) illuminated by monochromatic light of 400 nm wavelength with a power density of $2000\ \text{W/m}^2$ is,

[Question ID = 52501]

1. $8.88\ \text{A}$ [Option ID = 89996]
2. $6.45\ \mu\text{A}$ [Option ID = 89997]
3. $6.45\ \text{A}$ [Option ID = 89999]
4. $11\ \text{A}$ [Option ID = 89998]

Correct Answer :-

- $6.45\ \text{A}$ [Option ID = 89999]

8) Consider a silicon diode with ideality factor $\eta = 1$. For a decade change in current the diode voltage drop changes approximately by

[Question ID = 52520]

1. $60\ \text{mV}$ [Option ID = 90072]
2. $30\ \text{mV}$ [Option ID = 90075]
3. $80\ \text{mV}$ [Option ID = 90073]
4. $120\ \text{mV}$ [Option ID = 90074]

Correct Answer :-

- $60\ \text{mV}$ [Option ID = 90072]

9) The eigen values of the matrix $\begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ are

[Question ID = 52521]

1. $e^{\pm j\theta/2}$ [Option ID = 90079]
2. $e^{\pm j\theta}$ [Option ID = 90078]
3. $e^{\pm 3j\theta}$ [Option ID = 90076]
4. $e^{\pm 2j\theta}$ [Option ID = 90077]

Correct Answer :-

- $e^{\pm j\theta}$ [Option ID = 90078]

10)

The table below gives values of function $F(x)$ for values of x at intervals of 0.2.

x	1.8	2.0	2.2	2.4	2.6
$F(x)$	6.05	7.39	9.03	11.02	13.46

Using central difference, the second derivative $F''(x)$ at x=2.0 is obtained as

[Question ID = 52481]

1. 7.5 [Option ID = 89919]
2. 5.5 [Option ID = 89916]
3. 6.5 [Option ID = 89918]
4. 4.5 [Option ID = 89917]

Correct Answer :-

- 7.5 [Option ID = 89919]

11) The value of $\hat{i}\times(\vec{a}\times\hat{i})+\hat{j}\times(\vec{a}\times\hat{j})+\hat{k}\times(\vec{a}\times\hat{k})$ is

[Question ID = 52522]

1. $2\vec{a}$ [Option ID = 90081]
2. $-2\vec{a}$ [Option ID = 90083]
3. $-\vec{a}$. [Option ID = 90082]
4. $\vec{a}$ [Option ID = 90080]

Correct Answer :-

- $2\vec{a}$ [Option ID = 90081]

12) The skin depth of copper at a frequency of 3 GHz is 1 μm. At 12 GHz, for a non-magnetic conductor whose conductivity is 1/9 times that of copper, the skin depth will be

[Question ID = 52493]

1. 2.5 cm [Option ID = 89966]
2. 1.5 μm [Option ID = 89964]
3. 1.0 cm [Option ID = 89967]
4. 1.0 μm [Option ID = 89965]

Correct Answer :-

- 1.5 μm [Option ID = 89964]

13) In a *p*-type semiconductor, the Fermi level is 0.2 eV above the valence band at room temperature of 300 K. The position of Fermi level at 400 K will move

[Question ID = 52519]

1. down by 0.047 eV [Option ID = 90070]
2. down by 0.07 eV [Option ID = 90069]
3. up by 0.047 eV [Option ID = 90071]
4. up by 0.07 eV [Option ID = 90068]

Correct Answer :-

- up by 0.07 eV [Option ID = 90068]

14) The real part of $f(z) = \tanh z$, where $z = x + iy$, is

[Question ID = 52524]

1. $\frac{\sinh 2x}{\cosh 2x + \cosh 2y}$ [Option ID = 90090]
2. $\frac{\sinh 2x}{\cosh 2x - \cos 2y}$ [Option ID = 90088]
3. $\frac{-\sinh 2x}{\cosh 2x + \cos 2y}$ [Option ID = 90089]
4. $\frac{\sinh 2x}{\cosh 2x + \cos 2y}$ [Option ID = 90091]

Correct Answer :-

- $\frac{\sinh 2x}{\cosh 2x + \cos 2y}$ [Option ID = 90091]

15) Assuming that for uniaxial Lithium Niobate $n_o = 2.297$ and $n_e = 2.208$ at $\lambda_0 = 890\,\text{nm}$. What should be the thickness of a Lithium Niobate plate to make a half wave plate at $\lambda_0 = 890\,\text{nm}$?

[Question ID = 52507]

1. 5 nm [Option ID = 90021]
2. 5 μm [Option ID = 90023]
3. 25 μm [Option ID = 90022]
4. 2.5 μm [Option ID = 90020]

Correct Answer :-

- 5 μm [Option ID = 90023]

16)

A silicon *pn* junction with doping profile of $N_a = 10^{16}$ cm^{-3} and $N_d = 10^{15}$ cm^{-3} with mobility $\mu_n = 1350\,\text{cm}^2/\text{V}-\text{s}$ and $\mu_p = 480\,\text{cm}^2/\text{V}-\text{s}$ has a cross sectional area of 10^{-2} cm^2. The length of the *p*-region is 200 mm and length of the *n*-region is 100 mm. The approximately series resistance of the diode is

[Question ID = 52517]

1. $81\ \Omega$ [Option ID = 90063]
2. $43\ \Omega$ [Option ID = 90062]
3. $72\ \Omega$ [Option ID = 90060]
4. $62\ \Omega$ [Option ID = 90061]

Correct Answer :-

- $72\ \Omega$ [Option ID = 90060]

17) For pure silica the refractive index variation can be assumed to be given by an empirical formula $n(\lambda_0) = 1.451 - a\lambda_0^{\,2} + \frac{a}{\lambda_0^{\,2}}$; $a = 0.003$ and λ_0 is in microns. The group velocity dispersion (GVD) will be zero at the wavelength is

[Question ID = 52506]

1. $0.8\ \mu\text{m}$ [Option ID = 90016]
2. $2.0\ \mu\text{m}$ [Option ID = 90018]
3. $1.5\ \mu\text{m}$ [Option ID = 90017]
4. $1.31\ \mu\text{m}$ [Option ID = 90019]

Correct Answer :-

- $1.31\ \mu\text{m}$ [Option ID = 90019]

18) Electrons are accelerated by 900 V and reflected by a crystal. If the reflection maximum occurs when the glancing angle is 60°, then the spacing of the crystal is

[Question ID = 52514]

1. 0.059 Å [Option ID = 90048]
2. 0.029 nm [Option ID = 90051]
3. 0.059 nm [Option ID = 90050]
4. 0.029 Å [Option ID = 90049]

Correct Answer :-

- 0.029 nm [Option ID = 90051]

19)

The rates of spontaneous and stimulated emission are equal for a transition at room temperature for a wavelength approximately given by [given that kT at room temperature of 300 K is 0 .025 eV]

[Question ID = 52509]

1. $72\,\mu m$ [Option ID = 90031]
2. $92\,\mu m$ [Option ID = 90028]
3. $50\,\mu m$ [Option ID = 90030]
4. $100\,\mu m$ [Option ID = 90029]

Correct Answer :-

- $72\,\mu m$ [Option ID = 90031]

20) The solution of the partial differential equation $\frac{\partial u}{\partial x} - x\frac{\partial u}{\partial y} = 0$ is

[Question ID = 52497]

1. $u = ke^{\lambda x^2} e^{2\lambda y}$ [Option ID = 89981]
2. $u = ke^{\lambda x} e^{2\lambda y}$ [Option ID = 89982]
3. $u = ke^{\lambda x^2} e^{-2\lambda y}$ [Option ID = 89980]
4. $u = ke^{\lambda x^2} e^{2y}$ [Option ID = 89983]

Correct Answer :-

- $u = ke^{\lambda x^2} e^{2\lambda y}$ [Option ID = 89981]

21) What is the polarization of a plane wave propagating in free space with electric field given as $\vec{E} = (2\hat{x} + j\,2\hat{y})e^{j(\omega t - kz)}$ V/m ?

[Question ID = 52486]

1. elliptically polarized [Option ID = 89937]
2. unpolarized [Option ID = 89936]
3. linearly polarized [Option ID = 89938]
4. circularly polarized [Option ID = 89939]

Correct Answer :-

- circularly polarized [Option ID = 89939]

22) If the vector potential in a region is given as $\vec{A} = -y\hat{a}_x + 2x\hat{a}_y$, the associated magnetic field $\vec{B}$ is

[Question ID = 52495]

1. $\vec{B} = 3\hat{a}_z$ [Option ID = 89974]
2. $\vec{B} = -\hat{a}_x + \hat{a}_y + \hat{a}_z$ [Option ID = 89975]
3. $\vec{B} = \hat{a}_x + \hat{a}_z$ [Option ID = 89973]
4. $\vec{B} = -\hat{a}_x + 2\hat{a}_y$ [Option ID = 89972]

Correct Answer :-

- $\vec{B} = 3\hat{a}_z$ [Option ID = 89974]

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23) The electron concentration in a sample of uniformly doped *n*-type silicon at 300 K varies linearly from 10^{17} cm^{-3} at $x = 0$ to $6x10^{16}$ cm^{-3} at $x = 2$ μm. Assuming a situation that electrons are supplied to keep this concentration gradient with time. and considering that no electric field is present, the current density J_x in the silicon is (Diffusion constant $D_n = 35$ cm^2/s)

[Question ID = 52512]

1. 560 A/cm^2 [Option ID = 90043]
2. 1120 A/cm^2 [Option ID = 90040]
3. -560 A/cm^2 [Option ID = 90042]
4. -1120 A/cm^2 [Option ID = 90041]

Correct Answer :-

- -1120 A/cm^2 [Option ID = 90041]

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24) Using a unit step size, the value of integral $\int_1^2 x \ln x dx$ by trapezoidal rule is

[Question ID = 52484]

1. 0.543 [Option ID = 89930]
2. 0.693 [Option ID = 89931]
3. 0.715 [Option ID = 89929]
4. 0.621 [Option ID = 89928]

Correct Answer :-

- 0.693 [Option ID = 89931]

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25) If $f(x) = (x+1)/(x-1)$, $g(x) = (2x+5)/(4x-3)$ then $f(g(x))$ is

[Question ID = 52498]

1. $\frac{3x+1}{4-x}$ [Option ID = 89984]
2. $\frac{5x+3}{x+2}$ [Option ID = 89986]

3. $\frac{7x-3}{x+7}$ [Option ID = 89985]

4. $\frac{x-5}{2x+3}$ [Option ID = 89987]

Correct Answer :-

- $\frac{3x+1}{4-x}$ [Option ID = 89984]

26) The lowest resonant frequency of a rectangular cavity resonator with cavity dimensions $a = 2\,\text{cm}, b = 1\,\text{cm}$ and $d = 3\text{cm}$ is

[Question ID = 52494]

1. $6\ \text{GHz}$ [Option ID = 89968]
2. $7\ \text{GHz}$ [Option ID = 89969]
3. $9\ \text{GHz}$ [Option ID = 89971]
4. $3\ \text{GHz}$ [Option ID = 89970]

Correct Answer :-

- $9\ \text{GHz}$ [Option ID = 89971]

27) Inverse Laplace transform of $f(s) = \frac{9}{s^2 + 3s}$ is given by

[Question ID = 52526]

1. $\frac{9}{2}(e^{t} - 1)$ [Option ID = 90098]
2. $\frac{9}{2}(e^{-t} - 1)$ [Option ID = 90099]
3. $\frac{9}{2}(1 - e^{-3t})$ [Option ID = 90096]
4. $\frac{9}{2}(1 - e^{3t})$ [Option ID = 90097]

Correct Answer :-

- $\frac{9}{2}(1 - e^{-3t})$ [Option ID = 90096]

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

[Question ID = 52513]

1. $4.5\times10^{11}\,\mathrm{m}^{-3}$ [Option ID = 90044]
2. $3\times10^{5}\,\mathrm{m}^{-3}$ [Option ID = 90047]
3. $3.33\times10^{4}\,\mathrm{m}^{-3}$ [Option ID = 90045]
4. $5\times10^{20}\,\mathrm{m}^{-3}$ [Option ID = 90046]

Correct Answer :-

- $4.5\times10^{11}\,\mathrm{m}^{-3}$ [Option ID = 90044]

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29) For which of the following radii range is a step index fiber with numerical aperture 0.2 and single-moded for operation at the infrared wavelength $\lambda = \pi\,\mu\mathrm{m}$

[Question ID = 52502]

1. $a \le 3.9\,\mu\mathrm{m}$ [Option ID = 90000]
2. $a \le 6\,\mu\mathrm{m}$ [Option ID = 90002]
3. $a \le 7.8\,\mu\mathrm{m}$ [Option ID = 90003]
4. $a \ge 6\,\mu\mathrm{m}$ [Option ID = 90001]

Correct Answer :-

- $a \le 6\,\mu\mathrm{m}$ [Option ID = 90002]

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30) Which of the following is NOT correct for a plane wave with $\vec{H} = 0.5e^{-\alpha x}\cos(2\pi\times10^{8}t - 3x)\,\hat{a}_y$ A/m

[Question ID = 52491]

1. The phase constant is 3 rad/m [Option ID = 89957]
2. The wave frequency is 100 MHz [Option ID = 89956]
3. The wave is travelling in the +ve x-direction [Option ID = 89958]
4. The wave is polarized along the y-direction [Option ID = 89959]

Correct Answer :-

- The wave is polarized along the y-direction [Option ID = 89959]

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31) If a voltage of 6 V is applied across a 2 cm long semiconductor bar the average drift velocity is 10^{4} cm/s. The electron mobility is

[Question ID = 52516]

1. $3\times10^{4}\,\mathrm{cm}^2/\mathrm{V}-\mathrm{s}$ [Option ID = 90056]
2. $3333\,\mathrm{cm}^2/\mathrm{V}-\mathrm{s}$ [Option ID = 90057]
3. $4396\,\mathrm{cm}^2/\mathrm{V}-\mathrm{s}$ [Option ID = 90059]
4. $6\times10^{4}\,\mathrm{cm}^2/\mathrm{V}-\mathrm{s}$ [Option ID = 90058]

Correct Answer :-

- $3333\,cm^2/V-s$ [Option ID = 90057]

32) The attenuation in an optical fiber at 1550 nm is 0.2 dB/km. If 160 μW power is launched into the fiber at 1550 nm, estimate the power in the fiber after 30 km.

[Question ID = 52505]

1. $45\ \mu W$ [Option ID = 90013]
2. $40\ \mu W$ [Option ID = 90015]
3. $15\ \mu W$ [Option ID = 90014]
4. $80\ \mu W$ [Option ID = 90012]

Correct Answer :-

- $40\ \mu W$ [Option ID = 90015]

33) A course WDM optical communication system uses the two wavelengths $\lambda_1 = 1300\,nm$ and $\lambda_2 = 1500\,nm$. The frequency difference between the two channels

[Question ID = 52508]

1. $209\ THz$ [Option ID = 90027]
2. $30.8\ GHz$ [Option ID = 90024]
3. $30.8\ THz$ [Option ID = 90025]
4. $900\ GHz$ [Option ID = 90026]

Correct Answer :-

- $30.8\ THz$ [Option ID = 90025]

34) If the Euler method is used to solve the initial value problem

$$\frac{dy}{dx} = -y \text{ with } y(0) = 1.0$$

with step size $h = 0.01$, the value of $y(0.02)$ is obtained as

[Question ID = 52485]

1. 0.5201 [Option ID = 89934]
2. 0.7210 [Option ID = 89933]
3. 0.9801 [Option ID = 89935]
4. 0.62 [Option ID = 89932]

Correct Answer :-

- 0.9801 [Option ID = 89935]

35) An isolator has a insertion loss of 1 dB over the operating bandwidth. What is the output power, if the input power is 10 mW?

[Question ID = 52489]

1. $5.0\ \text{mW}$ [Option ID = 89948]
2. $12.0\ \mu\text{W}$ [Option ID = 89950]
3. $7.94\ \text{mW}$ [Option ID = 89949]
4. $2.5\ \text{mW}$ [Option ID = 89951]

Correct Answer :-

- $7.94\ \text{mW}$ [Option ID = 89949]

36) For an short-circuited lossless transmission line of characteristic impedance Z_0 with length $3\lambda/8$, the input impedance is

[Question ID = 52492]

1. infinity [Option ID = 89960]
2. inductive [Option ID = 89961]
3. capacitive [Option ID = 89963]
4. resistive [Option ID = 89962]

Correct Answer :-

- capacitive [Option ID = 89963]

37) The value of $\lim(x \to 0)\dfrac{\cos x + 1}{\tan^2 x}$ is given by

[Question ID = 52496]

1. $1/2$ [Option ID = 89976]
2. -1 [Option ID = 89978]
3. 1 [Option ID = 89977]
4. $-1/2$ [Option ID = 89979]

Correct Answer :-

- $1/2$ [Option ID = 89976]

38) The electric field for a potential given by $V(x, y, z) = 20\ln x + y$ at a point (1,1,0) is

[Question ID = 52488]

1. $20\hat{a}_x$ [Option ID = 89946]
2. $20\hat{a}_x + \hat{a}_y + \hat{a}_z$ [Option ID = 89944]
3. $20\hat{a}_x + \hat{a}_y$ [Option ID = 89945]
4. $-20\hat{a}_x - \hat{a}_y$ [Option ID = 89947]

Correct Answer :-

- $-20\hat{a}_x - \hat{a}_y$ [Option ID = 89947]

39) The following table below gives values of function $F(x)$ obtained for values of x at intervals of 0.25. The value of the integral $\int_0^1 F(x)dx$ using Simpson's rule is

x	0	0.25	0.5	0.75	1.0
$F(x)$	1	0.94	0.8	0.64	0.5

[Question ID = 52529]

1. 3.142 [Option ID = 90108]
2. 2.356 [Option ID = 90109]
3. 0.785 [Option ID = 90110]
4. 7.5 [Option ID = 90111]

Correct Answer :-

- 0.785 [Option ID = 90110]

40) If the orthogonality of Laguerre Polynomials is defined by $\int_0^\infty w(x)L_n(x)L_m(x)dx = \delta_{mn}$, the weight factor $w(x)$ is equal to

[Question ID = 52528]

1. 1.0 [Option ID = 90106]
2. e^{-x} [Option ID = 90104]
3. $\cos(x)$ [Option ID = 90107]
4. e^{-x^2} [Option ID = 90105]

Correct Answer :-

- e^{-x} [Option ID = 90104]

41) A micro-strip line of 50 Ω is terminated in $Z_L = 40 + j\,30\ \Omega$. What is the VSWR of the load?

[Question ID = 52487]

1. 2.0 [Option ID = 89941]
2. 1.5 [Option ID = 89942]
3. 1.3 [Option ID = 89943]
4. 1.8 [Option ID = 89940]

Correct Answer :-

- 2.0 [Option ID = 89941]

42) A system consists of N number of particles, N >>1. Each particle can have only one of the two energies E_1 and $E_1+\varepsilon$ ($\varepsilon > 0$). If the system is in equilibrium at a temperature T, the average number of particles with energy E_1 is

[Question ID = 52511]

1. $N(e^{\frac{\varepsilon}{kT}}+1)^{-1}$ [Option ID = 90038]
2. $\frac{N}{2}$ [Option ID = 90036]
3. $Ne^{-\frac{\varepsilon}{kT}}$ [Option ID = 90039]
4. $N(e^{-\frac{\varepsilon}{kT}}+1)^{-1}$ [Option ID = 90037]

Correct Answer :-

- $N(e^{-\frac{\varepsilon}{kT}}+1)^{-1}$ [Option ID = 90037]

43) Consider the interference of two coherent electromagnetic waves whose electric field vectors are given by $\vec{E}_1 = \hat{i}E_0\cos(\omega t)$ and $\vec{E}_2 = \hat{j}E_0\cos(\omega t+\phi)$. If the intensity of each wave is I_0, the total intensity is

[Question ID = 52504]

1. $2I_0$ [Option ID = 90009]
2. $2I_0\cos^2\phi$ [Option ID = 90010]
3. I_0 [Option ID = 90008]
4. $2I_0\cos\phi$ [Option ID = 90011]

Correct Answer :-

- $2I_0$ [Option ID = 90009]

44) An isotropic transmitting antenna radiates 251 W and a receiving antenna 100 m away has an effective aperture of 500 cm^2. The total power received by the antenna is

[Question ID = 52490]

1. $100\ \mu W$ [Option ID = 89955]
2. $20\ \mu W$ [Option ID = 89952]
3. $10\ \mu W$ [Option ID = 89953]
4. $1\ \mu W$ [Option ID = 89954]

Correct Answer :-

- $100\ \mu W$ [Option ID = 89955]

45) An electron beam strikes a crystal of cadmium sulfide (CdS) (bandgap E_g =2.45 eV). Electrons scattered by the crystal move at a velocity of 4.4×10^5 m/s. The energy (in eV) of the incident beam is

[Question ID = 52518]

1. $4.4\ eV$ [Option ID = 90064]
2. $2.45\ eV$ [Option ID = 90066]
3. $2\ eV$ [Option ID = 90065]
4. $3\ eV$ [Option ID = 90067]

Correct Answer :-

- $3\ eV$ [Option ID = 90067]

46) A potential barrier of 0.5 V exists across a pn-junction. If the depletion region is 5×10^{-7} m wide, what is the intensity of the electric field in this region?

[Question ID = 52515]

1. $1 \times 10^6\ V/m$ [Option ID = 90052]
2. $2.5 \times 10^8\ V/m$ [Option ID = 90055]
3. $2.5 \times 10^{-7}\ V/m$ [Option ID = 90053]
4. $2.5 \times 10^7\ V/m$ [Option ID = 90054]

Correct Answer :-

- $1 \times 10^6\ V/m$ [Option ID = 90052]

47) LEDs fabricated from Gallium Arsenide (GaAs) emit radiation in the

[Question ID = 52499]

1. infrared region [Option ID = 89989]
2. ultraviolet region [Option ID = 89988]
3. ultrasonic region [Option ID = 89991]
4. visible region [Option ID = 89990]

Correct Answer :-

- infrared region [Option ID = 89989]

48) The Erbium Doped Fiber Amplifier (EDFA) is used for optical communication systems in the wavelength range

[Question ID = 52510]

1. 1460 nm-1530 nm (S-Band) [Option ID = 90033]
2. 1360 nm-1460 nm (E-Band) [Option ID = 90035]
3. 1530 nm-1565 nm (C-Band) [Option ID = 90032]
4. 1260 nm-1360 nm (O-Band) [Option ID = 90034]

Correct Answer :-

- 1530 nm-1565 nm (C-Band) [Option ID = 90032]

49) The second degree polynomial to approximate the function $F(x) = 2\sin(x\pi/6)$ by use of nodes $x_0 = 0, \quad x_1 = 1, \quad x_2 = 3$ is given by

[Question ID = 52482]

1. $(6x - 2x^2)$ [Option ID = 89922]
2. $\frac{1}{6}(7x - x^2)$ [Option ID = 89921]
3. $\frac{1}{3}(7x - 2x^2)$ [Option ID = 89923]
4. $(7x - x^2)$ [Option ID = 89920]

Correct Answer :-

- $\frac{1}{6}(7x - x^2)$ [Option ID = 89921]

50) If the Fourier transform $F[\delta(x-a)] = \exp(-j2\pi va)$ then $F^{-1}[\cos(2\pi va)]$ is given by

[Question ID = 52527]

1. $[\delta(x-a) + \delta(x+a)]$ [Option ID = 90101]
2. a constant [Option ID = 90100]
3. $\frac{1}{2}[\delta(x-a) + \delta(x+a)]$ [Option ID = 90103]
4. $\frac{1}{2}[\delta(x-a) + j\delta(x+a)]$ [Option ID = 90102]

Correct Answer :-

- $\frac{1}{2}[\delta(x-a) + j\delta(x+a)]$ [Option ID = 90102]