Program: FE (All Branches)

Curriculum Scheme: Revised 2016

Examination: First Year Semester I

Course Code: FEC 102 **Course Name: Applied physics I**

Time: 1 hour Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	What is the probability of an electron being thermally excited to the conduction band is Si at 27^{o}C. The band gap energy is 1.12 eV.
Option A:	3.5×10^{-5}
Option B:	6.3×10^{-6}
Option C:	**1.5×10^{-6}**
Option D:	5.6×10^{-6}
Q2.	Effective number of atoms for HCP is _____
Option A:	**6**
Option B:	4
Option C:	2
Option D:	1
Q3.	For a particle inside a box, the potential is maximum at x = _____
Option A:	**L**
Option B:	2L
Option C:	L/2
Option D:	3L
Q4.	Ultrasonic waves are produced by converting
Option A:	Optical energy to sound energy
Option B:	Magnetic energy to sound energy
Option C:	Nuclear energy to sound energy
Option D:	**Mechanical energy to sound energy**
Q5.	In superconductivity, the electrical resistance of material becomes
Option A:	**Zero**
Option B:	Infinite
Option C:	Finite
Option D:	All of the above
Q6.	N-type Ge sample has donor concentration 10^{21} atoms/m^3 .What Hall voltage would you expect if current of 1 mA and magnetic field 0.5T is applied across 2mm thick sample.

Option A:	2.50 mV
Option B:	**1.56mV**
Option C:	3.56 mV
Option D:	9 mV
Q7.	A hall of volume 6000 m^3 has a reverberation time 3 sec. if the absorbing surface of the hall has an area of 4000 m^3 Calculate the average coefficient of absorption.
Option A:	**0.08 OWU**
Option B:	0.06 OWU
Option C:	0.09 OWU
Option D:	0.02 OWU
Q8.	Determine the de-Brogile wavelength of an electron accelerated by a potential difference of 150 V.
Option A:	2.0056×10^{-10} m
Option B:	2.5213×10^{-10} m
Option C:	**1.0031×10^{-10} m**
Option D:	1.9068×10^{-10} m
Q9.	The temperature at which conductivity of a material becomes infinite is called
Option A:	**Critical temperature**
Option B:	Absolute temperature
Option C:	Mean temperature
Option D:	Crystallization temperature
Q10.	Sabine's formula is given by
Option A:	**T = 0.161 x V/A**
Option B:	$T = 0.161 \times V^2 / A$
Option C:	$T = 0.161 \times V/A^2$
Option D:	$T = 0.161 \times (V/A)^2$
Q11.	Calculate the glancing angle on the (100) plane of a rock salt crystal with lattice constant 2.125 A^o for 2nd order maximum having wavelength of incident X-ray is 0.592 A^o .
Option A:	$\Theta = 10.12^o$
Option B:	**$\Theta = 16.17^o$**
Option C:	$\Theta = 9.50^o$
Option D:	$\Theta = 20.18^o$
Q12.	The resistivity of Cu is 1.72×10^{-8} ohm-m. Calculate the mobility of electron in Cu. Given the number of electrons per unit volume is 10.41×10^{28} /m^3
Option A:	3.482×10^{-4} m^2/V-sec.
Option B:	3.482×10^{-2} m^2/V-sec.
Option C:	**3.482×10^{-3} m^2/V-sec.**
Option D:	3.482×10^{-6} m^2/V-sec.

Q13.	When is ultrasonic waves produced using piezo electric oscillator?
Option A:	At constant temperature
Option B:	**At resonance**
Option C:	At constant pressure
Option D:	At constant voltage
Q14.	Addition of pentavalent impurity to a semiconductor creates many ……..
Option A:	**Free electrons**
Option B:	Holes
Option C:	Valence electrons
Option D:	Bound electrons
Q15.	A superconductor has a critical temperature 3.7 K at zero magnetic field . At 0K the critical magnetic field is 0.0306 tesla . What is the critical magnetic field at temperature 2K?
Option A:	0.02565 Tesla
Option B:	**0.01406 Tesla**
Option C:	0.09651 Tesla
Option D:	0.03698Tesla
Q16.	A plane is parallel to an axis. What is its Miller Index?
Option A:	Infinity
Option B:	**Zero**
Option C:	One
Option D:	Finite
Q17.	Find out the lowest energy of an electron in a one dimensional box width of 4 A^o
Option A:	3.60 eV
Option B:	**2.35 eV**
Option C:	1.55 eV
Option D:	4.63 eV
Q18.	Find the echo time of ultrasonic pulse travelling with velocity 5.9 $x10^3$ m/sec in a mild steel whose correct thickness displayed by gauge meter is 1.8 mm
Option A:	5.6 µ-sec
Option B:	**6.1 µ-sec**
Option C:	1 µ-sec
Option D:	8 µ-sec
Q19.	Which of the following is not a characteristic of wave function?
Option A:	Continuous
Option B:	Single-valued
Option C:	Differentiable
Option D:	**Physically significant**

Q20.	At temperature =37^{o}C,the energy gained by electron is = ev
Option A:	**0.0267 eV**
Option B:	2.67 eV
Option C:	0.267eV
Option D:	26.7eV
Q21.	Schottky defect is observed in crystals when_____
Option A:	some cations move from their lattice site to interstitial sites
Option B:	**equal number of cations and anions are missing from the lattice**
Option C:	some lattice sites are occupied by electrons
Option D:	some impurity is present in the lattice
Q22.	When the temperature of either n-type or p-type increases, determine the movement of the position of the Fermi energy level?
Option A:	Towards up of energy gap
Option B:	Towards down of energy gap
Option C:	**Towards centre of energy gap**
Option D:	Towards out of page
Q23.	An ultrasonic wave is used to detect the position of defect in a steel bar of thickness 50 cm. If the echo times are 40 and 90 µ-sec. locate the position of the defect.
Option A:	22 cm above the top surface
Option B:	**22 cm below the top surface**
Option C:	None of these
Option D:	22 cm middle of the top surface
Q24.	The interplaner spacing of (110) plane is 2 A^{o} for a FCC crystal. Find the atomic radius.
Option A:	**1 A^{o}**
Option B:	6A^{o}
Option C:	5A^{o}
Option D:	9 A^{o}
Q25.	Which of the following materials can be used to make a light-emitting diode?
Option A:	Silicon
Option B:	Germanium
Option C:	**Gallium arsenide**
Option D:	Phosphorescent material