Program: FE (All Branches)

Curriculum Scheme: Revised 2012

Examination: First Year Semester I

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

Time: 1 hour Max. Marks: 50

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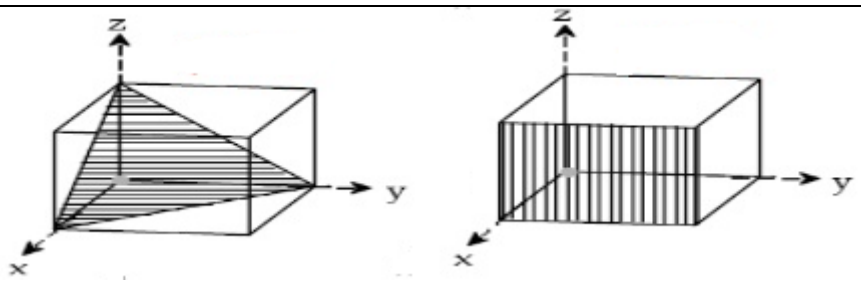
Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	In a certain BCC structure the free volume/unit cell is 61.72×10^{-30} /m^3 . Calculate the lattice parameter.
Option A:	**4.64 A°**
Option B:	4.63 A°
Option C:	0.464 A°
Option D:	464 A°
Q2.	Mobilities of electrons and holes in a sample of intrinsic Ge at room temperature are 3600 cm^2 V-sec and 1700 cm^2 V-sec respectively. If the electron and hole densities are each equal to 2.5×10^{13} /cm^3 .Calculate the conductivity.
Option A:	21.2 mho/m
Option B:	**2.12 mho/m**
Option C:	0.212 mho/m
Option D:	212 mho/m
Q3.	Calculate the reverberation time of al hall of volume 2400 m^3 and seating capacity of 150 people when the hall is empty?
Option A:	5 sec
Option B:	**3. 09 sec**
Option C:	0.44 sec
Option D:	2.40 sec
Q4.	The Hall coeffient of a specimen is 3.66×10^{-4} m^3/C,its resistivity is 8.93×10^{-3} Ωm,find μ ie mobility.
Option A:	0.035 m^2/V-sec
Option B:	0.040 m^2/V-sec
Option C:	0.039 m^2/V-sec
Option D:	**0.041 m^2/V-sec**
Q5.	A quartz crystal of thickness 1mm is vibrating at resonance. Calculate its fundamental frequency if the Young's modulus of quartz =7.9×10^{10} N/m^2 and density of quartz =2650 kg/m^3
Option A:	**2.73 MHz**
Option B:	2.73 KHz

Option C:	0.273 MHz
Option D:	27.3 KHz
Q6.	Two parallel plates of a capacitor having equal and opposite charges are separated by a 2 cm thick dielectric slab with dielectric constant 3. If the electric field is 10^6 V, calculate displacement density.
Option A:	0.256 x10^{-3} c/m^2
Option B:	0.2654 x10^{-4}c/m^2
Option C:	**2.656 x10^{-5} c/m^2**
Option D:	26.56 x10^{-6}c/m^2
Q7.	The S.I. unit of mobility
Option A:	m/v
Option B:	**m^2 /V-sec**
Option C:	m^3 /V-sec
Option D:	m/sec
Q8.	Which of the following equation describes Bragg's law of diffraction? (Assume that all symbols have their usual meaning.)
Option A:	2d sinθ = λ
Option B:	2d = nλ
Option C:	2d = nλ sinθ
Option D:	**2d sinθ = nλ**
Q9.	Iron has a relative permeability of 5000. Calculate its magnetic susceptibility
Option A:	3500
Option B:	4500
Option C:	**4999**
Option D:	4800
Q10.	Magnetic materials which are easily magnetized or demagnetized are called
Option A:	Hard magnetic materials
Option B:	**Soft magnetic materials**
Option C:	Semi soft magnetic materials
Option D:	Semi hard magnetic materials
Q11.	 Find the miller indices for shown crystal structure .
Option A:	**(111) , (100)**
Option B:	(121) , (001)

Option C:	(101,010)
Option D:	None of these
Q12.	In reverberation time the intensity level drops by
Option A:	30 dB
Option B:	50 dB
Option C:	40 dB
Option D:	**60 dB**
Q13.	In a solid there is an energy level lying 0.012 eV below Fermi level . What is the probability of this level not being occupied by an electron at 27^{o} K?
Option A:	**0.614**
Option B:	0.516
Option C:	$1.5x10^{-6}$
Option D:	0.386
Q14.	Frenkel effect is a combination of
Option A:	Anions
Option B:	Anions vacancy and one cation interstitial defect
Option C:	Option A & option B
Option D:	**Cation vacancy and one cation interstitial defect**
Q15.	When the direction of an external magnetic field is reversed and the rest energy is lost in the form heat . This loss of energy is
Option A:	remanent induction
Option B:	hysteresis loss
Option C:	hysteresis curve
Option D:	hysteresis loop
Q16.	A solenoid consisting of 500 turns and carrying 4 amp.current is 0.05 m long ,calculate magneto motive force .
Option A:	2500 Amp-turn
Option B:	**2000 Amp-turn**
Option C:	2100 Amp-turn
Option D:	1500 Amp-turn
Q17.	Calculate the ratio of the number of vacancies to the number of atoms when the average energy required to create a vacancy is 1.95 eV at 500K
Option A:	4.30×10^{19}
Option B:	3.15×10^{16}
Option C:	**4.34×10^{19}**
Option D:	4.02×10^{16}
Q18.	A mild steel ring having cross sectional area 5 cm^2 withh its diameter 20 cm has a coil of 200 turns wound over it. Determine the reluctance.

Option A:	2.63 x 10^6 Amp-turn/Wb
Option B:	1.50 x10^5 Amp-turn/Wb
Option C:	2.50 x 10^6 Amp-turn/Wb
Option D:	3 x 10^6 Amp-turn/Wb
Q19.	To represent crystal direction, the Miller indices should be enclosed in
Option A:	**square brackets**
Option B:	round brackets
Option C:	curly brackets
Option D:	none
Q20.	Fermi energy level
Option A:	is the top most filled energy level at 0K temperature
Option B:	is the top most filled energy level at 0^{o}C temperature
Option C:	separates valance band and conduction band
Option D:	**Option A and Option c**
Q21.	Which of the following effects can be used to produce ultrasonic waves?
Option A:	Magnetostriction effect
Option B:	Doppler Effect
Option C:	Magnetic effect
Option D:	Sound effect
Q22.	Find the echo time of ultrasonic pulse travelling with velocity 5.9 x 10^3 m/sec in a mild steel whose correct thickness displayed by gauge meter is 1.8 mm
Option A:	4 µ-sec
Option B:	5 µ-sec
Option C:	**6.1 µ-sec**
Option D:	8 µ-sec
Q23.	With the help of which of the following equations is the distance calculated from a known wavelength of the source and measured angle?
Option A:	Coolidge equation
Option B:	Bragg's equation
Option C:	Debye equation
Option D:	Scherrer equation
Q24.	Diamond structure has its cube edge 3.75 A and atomic weight 12.01 ,calculate its density
Option A:	**3.03 gms/cm^3**
Option B:	2.63 gms/cm^3
Option C:	2.50 gms/cm^3
Option D:	1 .30 gms/cm^3
Q25.	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}