Program:FE (All Branches)

Curriculum Scheme: Revised 2019

Examination: First Year Semester I

Course Code: FEC 102 **Course Name: Engineering 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.	The critical field of Niobium is $1x10^5$ A/m at 8K and $2x10^5$ A/m at 0K. Calculate critical temperature of the element.
Option A:	T_c = 0.113 K
Option B:	T_c = 113 K
Option C:	**T_c = 11.3 K**
Option D:	T_c = 1.13 K
Q2.	At temperature =37^oC,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
Q3.	The energy of a particle is proportional to
Option A:	n
Option B:	n^{-1}
Option C:	n^{-2}
Option D:	**n^2**
Q4.	Calculate the glancing angle on the plane(100) for a crystal of a rock salt (a =2.125 A. Consider the case of 2nd order maximum and wavelength 0.592 A
Option A:	**Θ = 16.17**
Option B:	Θ = 167
Option C:	Θ = 0.167
Option D:	Θ = 11.6
Q5.	In direct bandgap semiconductor,_____ occurs at the same momentum, when energy is supplied.
Option A:	**maxima of valence band and minima of conduction band**
Option B:	minima of valence band and maxima of conduction band
Option C:	Maxima of valence band and conduction band
Option D:	None of the above
Q6.	Type I multiferroics are the materials in which the ferroelectricity and

	magnetization occurs at
Option A:	Same temperature
Option B:	**Different temperature**
Option C:	Zero temperature
Option D:	None of these
Q7.	In Newton's rings experiment, the diameter of 4^{th} and 12^{th} dark ring are 0.4 cm and 0.7 cm respectively. Find the diameter of 20^{th} dark ring.
Option A:	0.95 cm
Option B:	**0.91 cm**
Option C:	0.93 cm
Option D:	0.99 cm
Q8.	Matter waves travels
Option A:	With the same speed of light
Option B:	**Faster than light**
Option C:	Slower than light
Option D:	None of the above
Q9.	Which of the following equation describes Bragg's law of diffraction? (Assume that all symbols have their usual meaning.)
Option A:	$2d \sin\theta = \lambda$
Option B:	$2d = n\lambda$
Option C:	**$2d \sin\theta = n\lambda$**
Option D:	$2d = n\lambda \sin\theta$
Q10.	In Newton's rings experiment the _____lens is used.
Option A:	Convex
Option B:	Concave
Option C:	**Plano-convex**
Option D:	Plano-concave
Q11.	In intrinsic Ge the carrier concentration is 2.5×10^{19} /m^3 .The electron and hole mobilities are 0.39 m^2/v-sec and 0.17 m^2 /V-sec. Find the resistance of a Ge rod of 2cm x 1mm x1mm dimension.
Option A:	**$8.928 \times 10^3\ \Omega$**
Option B:	$7.065 \times 10^3\ \Omega$
Option C:	$6.546 \times 10^3\ \Omega$
Option D:	$5.546 \times 10^3\ \Omega$
Q12.	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
Q13.	An electron is bound in an one dimensional potential well of width 2 A. Find its energy value in the ground state?
Option A:	**1.51×10^{-18} J**
Option B:	2.53×10^{-18} J
Option C:	$3.52\ 10^{-18}$ J
Option D:	4.62×10^{-18} J
Q14.	Find the thickness of the soap film which appears yellow (λ =5896 A) in reflection when it is illuminated by white light at an angle of 45°.Given refractive index of the thin film =1.33
Option A:	2300 A°
Option B:	3500 A°
Option C:	6500 A°
Option D:	**1308 A°**
Q15.	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**
Q16.	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
Q17.	Calculate the frequency and wavelength of a photon whose energy is 75 eV
Option A:	**Frequency =18.13×10^{15} Hz, Wavelength = 165.5 A°**
Option B:	Frequency = 20.25×10^{15} Hz, Wavelength = 189 A°
Option C:	Frequency =35.56×10^{15} Hz, Wavelength = 192 A°
Option D:	Frequency = 65.23×10^{15} Hz, Wavelength = 175 A°
Q18.	What is a probability of an electron being thermally excited to the conduction band is Si at 30 . The band gap energy is 1.12 eV
Option A:	6.5×10^{-10}
Option B:	8.9×10^{-10}
Option C:	**3.9×10^{-10}**
Option D:	9.6×10^{-10}
Q19.	The magnetic lines of force cannot penetrate the body of a superconductor, a phenomenon is known as
Option A:	Isotopic effect

Option B:	**Meissner effect**
Option C:	BCS theory
Option D:	Josephson effect
Q20.	Calculate the maximum order of diffraction if X-rays of wavelength 0.819 A is incident on a crystal of lattice spacing 0.282 nm.
Option A:	**6**
Option B:	5
Option C:	4
Option D:	3
Q21.	Electrons can not pre-exist in free states in a nucleus . We can prove this using
Option A:	Time dependent Schrödinger equation
Option B:	Time independent Schrödinger equation
Option C:	**Heisenberg's uncertainty principle**
Option D:	Option A & Option B
Q22.	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
Q23.	A wedge shaped air film is illuminated by light of wavelength 4650 A^{o}.The angle of wedge is 40 seconds. Calculate the separation between two consecutive fringes.
Option A:	2.536 $x10^{-3}$ m
Option B:	**1.199 $x10^{-3}$ m**
Option C:	3.650 $x10^{-3}$ m
Option D:	4.569$x10^{-3}$ m
Q24.	Multiferroics are the materials that exhibit properties like
Option A:	Ferromagnetism
Option B:	Ferroelectricity
Option C:	Ferro elasticity
Option D:	**All of the above**
Q25.	A plane is parallel to an axis. What is its Miller Index?
Option A:	Infinity
Option B:	**Zero**
Option C:	One
Option D:	Finite