

University of Mumbai

Examination 2020

Program: First Year Engineering

Curriculum Scheme: REV- 2012

Examination: First Year Semester I

Course Code: FEC102 and Course Name: Applied Physics- I

Time: 2hour

Max. Marks: 60

Q.1 30 Marks	Choose the correct option for the following questions. All the Questions are compulsory and carry equal marks.
1.	Ultrasonic waves carry more
Option A:	Energy only
Option B:	Frequency only
Option C:	Heat
Option D:	Energy and frequency
2.	The wavelength of ultrasonic waves is Sounds of frequency higher than 20,000 Hz which are inaudible to normal human ear are called
Option A:	Noise
Option B:	Frequency
Option C:	Ultrasonic
Option D:	Amplitude
3.	The value of B at H=0 in a Hysteresis curve is called _____
Option A:	Remanence
Option B:	Coercivity
Option C:	Magnetization
Option D:	Porosity
4.	Liquid crystal are generally composed of
Option A:	Circular molecule
Option B:	Rod like molecule
Option C:	Oval molecules
Option D:	Triangular molecules
5.	Identify a good dielectric.
Option A:	Iron
Option B:	Ceramics
Option C:	Plastic
Option D:	Magnesium
6.	What is the velocity when the electric field is 5V/m and the magnetic field is 5A/m?
Option A:	1m/s
Option B:	25m/s
Option C:	0.2m/s
Option D:	0.125m/s

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7.	Find the dielectric constant for a material with electric susceptibility of 4.
Option A:	3
Option B:	5
Option C:	8
Option D:	16
8.	For a dielectric which of the following properties hold good?
Option A:	They are superconductors at high temperatures
Option B:	They are superconductors at low temperatures
Option C:	They can never become a superconductor
Option D:	They have very less dielectric breakdown voltage
9.	For a dielectric which of the following properties hold good?
Option A:	They are superconductors at high temperatures
Option B:	They are superconductors at low temperatures
Option C:	They can never become a superconductor
Option D:	They can never become a superconductor
10.	SONAR stands for
Option A:	Sound navigation and ranging
Option B:	Sound number approximation and ranging
Option C:	Sound nullifying ranging
Option D:	Sound measurement
11.	Magnetostriction transmitter uses _____
Option A:	Electrostrictive phenomena
Option B:	Horizontal vibration of nickel tube
Option C:	Longitudinal vibration of nickel tube
Option D:	Horizontal vibration and Longitudinal vibration of nickel tube
12.	The defect that occurs due to a displacement of an ion is known as _____
Option A:	Vacancy defect
Option B:	Schottky defect
Option C:	Frankel defect
Option D:	Interstitial defect
13.	How does a semiconductor behave at absolute zero?
Option A:	Conductor
Option B:	Insulator
Option C:	Semiconductor
Option D:	Protection device
14.	The loudness (or intensity) of a sound wave is related to its
Option A:	Duration

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Option B:	Frequency
Option C:	Wavelength
Option D:	Amplitude
15.	Materials in which magnetization persists even after the field has been removed are called _____
Option A:	Diamagnetic
Option B:	Paramagnetic
Option C:	Paramagnetic
Option D:	Hard Ferro magnets

Q.2 15 marks	Solve any 3 out of 5	5 Marks each
A	Draw and explain the NaCl unit structure. Calculate coordination number and packing factor.	
B	Calculate the Hall Effect coefficient when number of electrons in a semiconductor is 10^{20}	
C	Derive the formula for conductivity for semiconductor.	
D	Calculate the length of iron rod which can be used for production of ultrasonic wave of 20 KHz. Given $Y=11.6 \times 10^{10} \text{ N/m}^2$ and density $7.23 \times 10^3 \text{ Kg/m}^3$	
E	Calculate reverberation time for an empty hall of size $21 \times 16 \times 10 \text{ m}^3$ with absorption coefficient 0.106	

Q.3 15 marks	Solve any 3 out of 5	5 Marks each
A	Show that for intrinsic semiconductor Fermi level lies in the middle of forbidden gap.	
B	Explain production of Ultrasonic wave using magnetostiction method.	
C	Find the hall coefficient of sodium assuming BCC structure of Na of lattice constant 4.28 \AA .	
D	Difference between Diamagnetic, paramagnetic and ferromagnetic material.	
E	FCC structure having atomic radius is 1.414 \AA . Find the interplanar spacing for (2 0 0) planes.	