QUESTION BANK

Title of the Subject: Engineering Physics BTBS102/ BTBS202	
Title of the Unit: Oscillation, Ultrasonic and Dielectric Materials	**Unit No:- 1**

Multiple Choice Questions		
Question No.	**Question Description**	**Expected Marks**
1	Oscillations become damped due to i) normal force ii) friction iii) tangential force iv) parallel force	**1**
2	If an object moves back and forth repeatedly around a mean position it is called i) oscillating ii) revolving iii) rotating iv) motion	**1**
3	Maximum displacement from equilibrium position is i) frequency ii) amplitude iii) wavelength iv) period	**1**
4	Materials whose bounded dominant charges that are not free to travel are **i. Dielectrics** ii. semiconductors iii. superconductors iv. conductors	**1**
5	Dielectrics are basically **i. insulators** ii. semiconductors iii. superconductors iv. conductors	**1**
6	Materials whose dominant charges in molecules are bound negative and positive charges that are held in place by atomic and molecular forces are known as **i. Dielectrics** ii. conductors iii. semiconductors iv. superconductors	**1**

7	Dielectric material's atoms and molecules are microscopically i. positive ii. negative **iii. neutral** iv. None of these	**1**
8	Dielectric don't contain any **i. free charge** ii. bound charge iii. proton iv. neutron	**1**
9	In absence of applied electric field in nonpolar dielectric materials, charges are averaged in such a way that i. opposite charges add each other **ii. opposite charges cancel each other** iii. similar charges add each other iv. similar charges repel each other	**1**
10	In conductors, opposite charges are separated by i. dielectric ii. insulator **iii. microscopic distances** iv. large distances	**1**
11	When electric field reduces to zero, the material still remained polarized and polarization vector has a certain value, this process is known as **i. remanent polarization** i. permanent polarization i. ions polarization v. atomic polarization	**1**
12	Electrical polarity's measurement of charges present in as system is termed as **i. electric dipole moment** ii. transition dipole moment iii. bond dipole moment iv. magnetic dipole moment	**1**
13	Sounds of frequency higher than 20,000 Hz which are inaudible to normal human ear are called i. noise ii. frequency **iii. ultrasonics**	**1**

	iv. amplitude	
14	Ultrasonic waves carry more i. energy ii. frequency iii. heat iv. both frequency and energy	**1**
15	Oscillations are damped due to presence of i. linear motion ii. restoring force **iii. frictional force** iv. mechanical force	**1**
16	When friction reduces the mechanical energy of the system as time passes, the motion is said to be i. simple **ii. damped** iii. random iv. linear	**1**
17	The oscillations of a system in the presence of some resistive force are i. linear oscillations ii. simple harmonic oscillations **iii. damped oscillations** iv. random oscillations	**1**
18	Shock absorbers in automobiles are one particle application of i. linear motion ii. simple harmonic motion **iii. damped motion** iv. random motion	**1**
19	Oscillations become damped due to A. normal force **B. friction** C. tangential force D. parallel force	**1**
Short Answer Question		

Question No.	Question Description	Expected Marks
1	Define Ultrasonic Wave	**2**
2	Give engineering applications of Ultrasonic Wave	**2**
3	What are forces involved in forced oscillations.	**2**
4	Explain the term Dielectric constant	**2**
5	Explain the term Electric displacement	**2**
6	Explain the term polarizibility	**2**
7	Calculate the natural frequency of 40 mm length of a pure iron rod. Give the density of pure iron is $7.25X\ 10^3\ kg/m^3$ and $Y=115X10^9\ N/m^2$. can you use it in magnestriction oscillator to produce ultrasonic waves	**2**
8	Calculate the natural frequency of cast iron of 2.6 cm in length density of cast iron $7.25X\ 10^3\ kg/m^3$ and $Y=1.16X\ 10^{11}\ N/m^2$	**2**
9	Define Resonance give one example of it	**2**
10	State types different of dielectric polarization	**2**
11	What is the difference between Free and Forced oscillation	**2**

Long Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	Explain the production of Ultrasonic wave with the help of Magnetostriction generator.	**6**
2	Explain the production of Ultrasonic wave with the help of piezoelectric method	
3	Obtain the differential equation of forced oscillations	**6**
4	Explain the term Dielectric polarization	**6**
5	Explain how temperature is dependent of dielectric materials	**6**
6	Explain Free oscillation & forced oscillations	**6**
7	Explain damped oscillation,	**6**
8	Derive differential wave equation,	**6**
9	Explain how frequency is dependent of dielectric materials	**6**

QUESTION BANK

Title of the Subject: Engineering Physics BTBS102/ BTBS202	
Title of the Unit: Optics, Fibre Optics and Laser	**Unit No:- 2**

Multiple Choice Questions		
Question No.	**Question Description**	**Expected Marks**
1	Light waves are transverse in nature, can be demonstrated by observing the phenomenon of i) dispersion ii) interference iii) **polarization** iv) diffraction	**1**
2	A system in which population inversion is achieved is called i) parallel system ii) **active system** iii) metastable state iv) pumping	**1**
3	Optical fibre works on the principle of i) photo-electric effect ii) laser effect iii) **total internal reflection** iv) refraction	**1**
4	Principle of laser is i. spontaneous absorption ii. simulated emission iii. induced emission **iv. both b and c**	**1**
5	**if a light travels in a certain medium and it gets reflected off an optically denser medium with high refractive index, then it is regarded as _____** **i. . External Reflection** ii. Internal Reflection iii. Both a and b iv. None of the above	**1**
6	**In an optical fiber, the concept of Numerical aperture is applicable in describing the ability of _____** **a. Light Collection**	**1**

	b. Light Scattering **c.** Light Dispersion **d.** Light Polarization	
7	**Which type of photonic crystal fiber exhibit/s its/their similarity to the periodic crystalline lattice in a semiconductor?** i. Index guiding fiber ii. **Photonic bandgap fiber** iii. Both a and b iv. None of the above	**1**
8	Founded the wave theory of light i. Francesco Grimaldi ii. Edward Appleton iii. James Clerk Maxwell **iv. Christian Huygens**	**1**
9	Developed the first laser i. Charles Townes ii. **Theodore Maiman** iii. Gordon McKenzie iv. Albert Einstein	**1**
10	What generates a light beam of a specific visible frequency? i. **Laser** ii. Maser iii. Infrared iv. Flashlight	**1**

Short Answer Question

Question No.	Question Description	Expected Marks
1	Fiber Optic Cables are preferred instead of Copper. Give reason	**2**
2	The refrective index of core and cladding material of a step index fibre are 1.48 and 1.45 respectively. Calculate: 1. Numerical aperature 2. Acceptance angle	**2**
3	Why the center of Newton ring is dark	**2**
4	State principle of laser	**2**
5	Define acceptance angle,	**2**

6	Define acceptance cone,	**2**
7	Give the diagrammatic representation of polarized and unpolarized light	**2**
8	Explain the concept of metastable state in LASER	**2**
9	Write any two applications of optical Fiber.	**2**
10	Draw typical diagram for Fiber Optics.	**2**

Long Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	Explain construction and working of He-Ne laser	**6**
2	Explain construction and working of Ruby Laser	**6**
3	Explain Principle and structure of optical fibre	**6**
4	Explain Laurent's half shade Polarimeter	**6**
5	Explain numerical aperture	**6**
6	Explain Huygen's theory of double refraction,	**6**
7	Explain methods for production of polarized light by Reflection, Refraction	**6**
8	Explain methods for production of polarized light by Double refraction	**6**
9	Explain wedge shaped film	**6**
10	Explain Interference of light in thin film	**6**

QUESTION BANK

Title of the Subject: Engineering Physics BTBS102/ BTBS202	
Title of the Unit: Electron Optics, Nuclear Physics and Quantum Mechanics	**Unit No:- 3**

Multiple Choice Questions		
Question No.	**Question Description**	**Expected Marks**
1	Heisenberg gave his concept in i. 1923 **ii. 1927** iii. 1980 iv. 1990	**1**
2	Bohr stated that electron is **i. material particle** ii. wave iii. energy iv. none	**1**
3	Delta x is related to delta p i. directly **ii. inversely** iii. no relation iv. none	**1**

4	Uncertainty principle is applicable to **i. macroscopic particles** ii. microscopic particles iii. gases iv. none	**1**
5	Uncertainty principle can be easily understandable with help of i. Dalton's effect **ii. Compton's effect** iii. electron effect iv. none	**1**
6	The concepts of a "particle" and a "wave **i. are clear and completely distinct from one another in both classical and modern physics** ii. are not clear and not completely distinct from one another in classical physics iii. have found little use in quantum physics iv. all of the above are true	**1**
7	In Electron microscope, light source is replaced by a beam of very fast moving **electron** neutron proton photon	**1**

Question No.	**Short Questions**	
1	State De-Broglie's hypothesis of Matter wave	**2**
2	What is Uncertainty principle	**2**
3	State Principle for Bainbridge mass spectrograph	**2**
4	Draw diagram for Bainbridge mass spectrograph	**2**
5	Draw diagram for G M Counter	**2**

6	Give any two physical significance of wave function.	**2**

Long Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	Derive the time independent Schrodinger's wave equation.	**6**
2	Write down the Schrödinger's time independent wave equation	**6**
3	State Heisenberg's Uncertainty Principle. Prove electron cannot exist in the Nucleus	**6**
4	An electron entering a magnetic field of 10-2 wb/m2 with a velocity of 10^{7} m/s describes a circle of radius 6 X 10-3 m, calculate e/m of an electron	**6**
5	Explain Measurement of 'e/m' by Thomson's method	**6**
6	Determination of electronic charge by Millikan's oil drop method,	**6**
7	Explain Bainbridge mass spectrograph	**6**
8	Give physical significance of wave function	**6**
9	Explain G.M. counter	**6**
10	An electron entering a magnetic field of 10^{-3} wb/m2 with a velocity of 10^{8} m/s describes a circle of radius 6 X 10^{-3} m, calculate e/m of an electron	**6**

QUESTION BANK

Title of the Subject: Engineering Physics BTBS102/ BTBS202	
Title of the Unit: Crystal Structure, X-rays and Electrodynamics	**Unit No:- 4**

Multiple Choice Questions		
Question No.	**Question Description**	**Expected Marks**
1	Lattice points have another name which is called **i. lattice sites** ii. lattice arrangements iii. lattice circles iv. lattice array	**1**
2	In crystal lattice ions are arranged in i. two dimensions ii. four dimensions **iii. three dimensions** iv. single dimension	**1**
3	Points which shows position of atoms in a crystal are called **i. lattice points** ii. lattice lines iii. lattice circles iv. lattice arrangements	**1**
4	Crystal lattice is actually **i. array of points** ii. lines of points iii. sum of points iv. triangle of points	**1**

5	Crystal lattice is also known as i. lattice triangle **ii. space lattice** iii. lattice line iv. lattice array	**1**
6	**The three dimensional graph of lattice points which sets the pattern for the whole lattice is called** i. Space lattice ii. Simple lattice iii. Crystal lattice **iv. Unit cell**	**1**
7	**If Z is the number of atom in the unit cell that represents the closest packing sequence … ABC ABC …, the number of tetrahedral voids in the unit cell is equal to** i. Z **ii. 2Z** iii. Z/2 iv. Z/4	**1**

Question No.	**Short Questions**	
1	How X-Rays are Produced / Originated?	**2**
2	What are the types of X-Rays spectra? How do we get the continuous and sharp	**2**
3	Line spectrum of X- Rays?	**2**
4	Give any two applications of X-Rays.	**2**
5	Give any two Important Characteristics of X-Rays.	**2**
6	Define the term Unit Cell.	**2**
7	What are Miller indices	**2**
8	Mosley's law	**2**

Long Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	Explain Bragg's law	**6**
2	Explain Line and Continuous Spectrum of X-ray	**6**
3	State Maxwell equations give each term involved in it	**6**
4	Give Atomic radius, packing density, relation between lattice constant and density	**6**
5	Explain X-ray diffraction	**6**
6	Explain the concept Electromagnetic wave in free space.	**6**
7	Explain Bragg's law. Derive the Bragg's equation for diffraction of X-Rays and discuss its application in X-Ray Crystallography	**6**
8	What is X-ray An X-ray is operated at 20 kv. Calculate the minimum wavelength of X-rays emitting from it.	**6**
9	Derive the relation between interplaner spacing 'd' defined by Miller Indices (hkl) and lattice parameter 'a'. Calculate the interplaner spacing for (220) plane where the lattice constant is 4.938 A0	**4**

QUESTION BANK

Title of the Subject: Engineering Physics BTBS102/ BTBS202	
Title of the Unit: Magnetic, Superconducting and Semiconducting materials	**Unit No:- 5**

Multiple Choice Questions		
Question No.	**Question Description**	**Expected Marks**
1	i. Ferrites are a sub-group of ii. non-magnetic materials iii. ferro-magnetic materials iv. paramagnetic materials **v. ferri-magnetic materials**	**1**
2	Which of the following is ferromagnetic material i. Tungsten ii. Aluminum iii. Cooper	**1**

	iv. Nickel	
3	**In superconductivity the conductivity of a material becomes** i. Zero ii. Finite **iii. Infinite** iv. None of the above	**1**
4	**In superconductivity, the electrical resistance of material becomes** **i. Zero** ii. Infinite iii. Finite iv. All of the above	**1**
5	**The temperature at which conductivity of a material becomes infinite is called** **i. Critical temperature** ii. Absolute temperature iii. Mean temperature iv. Crystallization temperature	**1**
6	**In superconductors, the Fermi energy level is** i. Below the ground state	**1**

	ii. Midway between the ground state and first excited state iii. Above first excited state iv. At first excited state	
7	**The superconducting state is perfectly _____ in nature.** **i. Diamagnetic** ii. Paramagnetic iii. Ferromagnetic iv. Ferromagnetic	**1**
8	Which of the following are the properties of superconductors? i. They are diamagnetic in nature ii. They have zero resistivity iii. They have infinite conductivity **iv. All of the above**	**1**
9	The minimum amount of current passed through the body of superconductor in order to destroy the superconductivity is called i. Induced current **ii. Critical current** iii. Eddy current iv. Hall current	**1**
10	The energy required to break a cooper pair is ___ of the energy gap of superconductor. i. One half **ii. Equal to** iii. Twice iv. Thrice	**1**
11	**There are three important lengths which enter the theory of superconductivity except** a. London penetration length	**1**

	b. Intrinsic coherence length c. Normal electron mean free length **d. Mean path length**	
12	The magnetic lines of force cannot penetrate the body of a superconductor, a phenomenon is known as i. Isotopic effect ii. BCS theory **iii. Meissner effect** iv. London theory	**1**
13	The superconducting state is perfectly _____ in nature. i. **Diamagnetic** ii. Paramagnetic iii. Ferromagnetic iv. d. Ferromagnetic	**1**
14	**Superconductivity was first observed by** i. ohm **ii. H K Onnes** iii. Fermi iv. Schrieffer	**1**
15	**The first successful theory on superconductivity was due to** **i. Bardeen Cooper and Schrieffer** **ii.** Fermi **iii.** Ohm **iv.** London	**1**
16	**The current in a superconductor produces** **i. zero, voltage drop across it** ii. Large voltage drop iii. Small voltage drop iv. Strong electric field	**1**
17	**At the critical temperature, the resistance of a super conductor** **i. decrease rapidly** ii. Increase rapidly iii. Remains constant iv. Increase slowly	**1**
18	**Super conductivity is exhibited by** **i. mercury at 4.2 K** ii. hydrogen at 4.2 K	**1**

	iii. potassium at 4.2 K iv. mercury at 4.0 K	

Question No.	Short Questions	
1	What is the effect of Magnetic field on Superconductors?	**2**
2	Write any two applications of Superconductors.	**2**
3	.What is Hall Effect in Semiconductor?	**2**
4	Write the important applications of Soft and Hard Magnetic materials.	**2**
5	Write any two applications of Magnetic materials.	**2**
6	What is the effect of Magnetic field on Superconductors?	**2**
7	Sate microscopic Ohm's law,	**2**
8	Sate Meissner effect	**2**
9	What is difference between Ferrimagnetic & Antiferromagnetic material	**2**
10	Give types and example of magnetic material	**2**

Long Answer Question		
Question No.	**Question Description**	**Expected Marks**
1	On the basis of domain theory explain B-H curve and hence explain retentively and coercively.	**6**
2	What is Superconductivity? Explain Meissner Effect in Superconductors.	**6**
3	Derive an expression for electromagnetic wave in free space and hence calculate the value of velocity of light in free space.	**6**
4	Explain the construction and working of G.M. counter	**6**
5	Explain type – I and type – II superconductor	**6**
6	Define and distinguish between hard and soft magnetic materials.	**6**
7	Define magnetic materials. Classify diamagnetic, paramagnetic and ferromagnetic Materials in detail giving their differences.	**6**

8	Explain resistivity and its temperature dependence	**6**
9	Give Band theory of solids	**6**
10	Give Classical free electron theory-electrical conductivity	**6**