P P SAVANI UNIVERSITY

1st /2nd Semester of B. Tech. Examination

December 2022

SESH1210 Applied Physics

02.12.2022, Friday **Time: 01:00 p.m. To 3:30 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in same answer sheet.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

			CO	BTL
Q - 1	**Choose the correct answer.**	**[10]**		
(i)	Matter waves are.....		2	2
	(a)Elastic waves (b) Electromagnetic waves			
	(c) Show diffraction (d) Transverse wave			
(ii)	Dual nature of matter was predicted by		2	1
	(a)Schrodinger (b) Louis de-Brogli			
	(c) G.P. Thomson (d)Werner Heisenberg			
(iii)	Sounds of frequency higher than 20,000 Hz which are inaudible to normal human ear are called		5	1/2
	(a) noise (b) frequency (c) ultrasonic (d) amplitude			
(iv)	O.W.U. is the unit of		5	1
	(a) Absorption (b) Absorption coefficient			
	(c) Reverberation time (d) Loudness			
(v)	SONAR is the abbreviation of		5	1
	(a) small navigation and random			
	(b) sky navigation and ranging			
	(c) sun nuclear ranging			
	(d) sound navigation and ranging			
(vi)	Which of the following is a piezoelectric material?		5	4
	(a) Iron (b) Nickel (c) Quartz (d) None of above			
(vii)	Nanoscience is the study of objects whose size is		1	1
	(a)1-10 nm (b) 1-100 mm (c) 1-1000 nm (d) 1-100 nm			
(viii)	The colour of the nano gold particles is.....		1	4
	(a)Yellow (b) Orange (c) Red (d) Variable			
(ix)	In superconductivity the conductivity of a material becomes.....		5	2
	(a) zero (b) infinite (c) finite (d) none of the above			
(x)	The superconducting state is perfectly.....in nature.		5	1
	(a) Diamagnetic (b) Paramagnetic (c) Ferromagnetic (d) Ferrimagnetic			
Q - 2 (a)	Derive time dependent Schrödinger's equation.	**[05]**	2	2
Q - 2 (b)	List any four Characteristics of Sound.	**[05]**	5	1
	OR			
Q - 2 (a)	Give the difference between matter waves and electromagnetic waves.	**[05]**	2	5
Q - 2 (b)	Define Ultrasonic Wave and list properties of it.	**[05]**	5	1/2

Q - 3 (a)	Explain: PVD (Physical vapour deposition technique) for the synthesis nano materials.	[05]	1	4
Q - 3 (b)	Give the difference between type-I and type-II superconductors	[05]	5	2/4
	OR			
Q - 3 (a)	Give any five applications of nano materials.	[05]	1	2/4
Q - 3 (b)	Write a short note on Meissner effect	[05]	5	1/2
	SECTION – II			
Q - 1	**Choose the correct answer.**	[10]		
(i)	Which of the following is not a characteristic of LASERS? (a) Monochromatic (b) Coherent (c) Divergent (d) Intense		4	2
(ii)	In1960, the first laser device was developed by T.H. Maiman called as.... (a) He-Ne laser (b) CO_2 laser (c) Ruby laser (d) Dye laser		4	1
(iii)	Process in which a photon is absorbed by the atom, causing an electron to jump from a lower energy level to a higher energy level. (a) Stimulated Emission (b) Spontaneous Emission (c) Population Inversion (d) Absorption of Radiation.		4	4
(iv)	Which types of lasers use gas as a medium? (a) Semiconductor Lasers (b) Gas Lasers (c) Solid State Lasers (d) Dye Lasers		4	1
(v)	The light beam acting as carrier wave is capable of carrying more information because of having frequency ..... (a) 10 Hz (b) 10^{15} Hz (c) 10^{10} Hz (d) 10^{4} Hz		4	1
(vi)	The cladding has refractive index ..... than refractive index of core. (a) greater (b) higher (c) immeasurable (d) less		4	1/2
(vii)	Optical fibers are..... (a) Conductor (b) Insulator (c) Semiconductor (d) None		4	1
(viii)	When a pure semiconductor is heated, its resistance ..... (a) Goes up (b) Goes down (c) Remains the same (d) Can't say		4/5	1
(ix)	A forward biased pn junction diode has a resistance of the order of..... (a) Ω (b) kΩ (c) MΩ (d) None of the above		4/5	2/4
(x)	A pn junction acts as a..... (a) Controlled switch (b) Bidirectional switch (c) Unidirectional switch (d) None of the above		4/5	1/2
Q - 2 (a)	What is the difference between ordinary light and laser light?	[05]	1	4
Q - 2 (b)	Classify metal, semiconductor and insulator using band theory.	[05]	4	2
	OR			
Q - 2 (a)	What is the difference between spontaneous emission and stimulated emission?	[05]	4	1/2
Q - 2 (b)	What is UJT? Explain the characteristics of UJT with an proper diagram.	[05]	4/5	4
Q - 3 (a)	Explain: Total Internal Reflection and Numerical Aperture	[05]	4	1/2

Q - 3 (b)	(I) What is metastable state?	**[02]**	**4**	**1**
	(II)Give the advantages of Semiconductor Devices.	**[03]**	**4/5**	**2/4**
	OR			
Q - 3 (a)	What are the applications of Optical Fiber?	**[05]**	**4**	**3**
Q - 3 (b)	(I)What is population inversion?	**[02]**	**4**	**1**
	(II)What do you mean by intrinsic and extrinsic semiconductor?	**[03]**	**4/5**	**1/2**

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CO : Course Outcome Number BTL : Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create