CMRTECHNICALCAMPUS
UGC AUTONOMOUS
B.Tech.I Semester, Question Bank
Department of H&S

Subject: APPLIED PHYSICS
Academic Year:-2024-25 **Semester:-I**
Subject Code: 22PH102BS

PART-A

Q. No	Question	Marks	BL	CO	Unitno
1	Define Blackbody radiation.	2M	CO1	L1	I
2	State Heisenberg uncertainty principle.	2M	CO1	L2	I
3	What is photoelectric effect? Write Einstein's photoelectric equation.	2M	CO1	L2	I
4	Deduce Wein's and Rayleigh Jeans law.	2M	CO1	L4	I
5	Explain the physical significance of wave function (or) Explain Born's interpretation of the wave function?	2M	CO1	L2	I
6	What is Fermi Dirac distribution function?	2M	CO1	L1	I
7	What is a semiconductor. Classify the types of semiconductors with examples.	2M	CO2	L1	II
8	Explain direct band gap and indirect band gap semiconductors.	2M	CO2	L2	II
9	What are the applications of LED.	2M	CO2	L1	II
10	Discuss the V-I characteristics of a PN-junction diode.	2M	CO2	L6	II
11	What is a zener diode and give its applications.	2M	CO2	L1	II
12	Draw the symbols of a PNP and an NPN transistor.	2M	CO2	L3	II
13	Define Dielectric constant.	2M	CO3	L1	III
14	Define polarizability.	2M	CO3	L1	III
15	What are pyroelectric materials.What are its applications.	2M	CO3	L2	III
16	Define Electric susceptibility.	2M	CO3	L1	III
	UP TO MID-I				
17	What are ferromagnetic materials? Give examples.	2M	CO3	L1	III
18	Classify the soft and hard magnetic materials.	2M	CO3	L1	III
19	Outline the applications of magnetic materials.	2M	CO3	L1	III
20	Define a nanoparticle and what is the size range of nanomaterials?	2M	CO4	L1	IV
21	What is meant by Quantum confinement of a Nanoparticles- Explain.	2M	CO4	L1	IV
22	Write about the significance of specific surface area of nanomaterials.	2M	CO4	L3	IV
23	Give examples for the different Nano dimensional structures.	2M	CO4	L3	IV
24	What are the characteristics of Laser beam?	2M	CO4	L1	IV

25	What are the different Pumping methods for Laser?	2M	CO4	L2	IV
26	What is population inversion?	2M	CO4	L2	IV
27	Explain the following with a neat diagram: Absorption, spontaneous emission, Stimulated emission	2M	CO4	L2	IV
28	Explain the principle of optical fiber.	2M	CO5	L2	V
29	Calculate the Numerical aperture, acceptance angle and critical angle from the following data: n_1 =1.50, n_2= 1.45	2M	CO5	L3	V
30	Summarize the applications of optical fibres.	2M	CO5	L3	V

PART-B

Q. No	Question	Marks	BL	CO	Unit no
1	Evaluate Planck's radiation law.	8M	L4	CO1	I
2	Explain an experimental analysis to prove the de Broglie concept of dual nature of matter waves.	8M	L2	CO1	I
3	Derive Time independent schrodinger wave equation.	8M	L4	CO1	I
4	Determine the expressions for energy levels and wave functions of a particle enclosed in one dimensional potential box of infinite height.	8M	L5	CO1	I
5	Explain the assumptions of Drude and Lorentz theory of classical mechanics and sommerfeild theory of quantum mechanics.	4M	L3	CO1	I
6	Explain Bloch's theorem.	4M	L2	CO1	I
7	Explain Kronig- Penny model to explain the behaviour of electrons in a periodic potential.	8M	L2	CO1	I
8	Construct the E-K diagramand make use of it to explain the effective mass of an electron.	4M	L3	CO1	I
9	Classify conductor, Insulator and semi conductor.	4M	L3	CO1	I
10	Determine the carrier concentration of electrons and holes in an intrinsic semiconductor.	8M	L5	CO2	II
11	Determine the carrier concentration of intrinsic semiconductor.	8M	L5	CO2	II
12	Determine the carrier concentration of an n-type extrinsic semiconductor.	8M	L5	CO2	II
13	Determine the carrier concentration of an P-type extrinsic semiconductor.	8M	L5	CO2	II
14	Explain Hall effect and mention its applications.	4M	L2	CO2	II
15	Write a note on PIN diode.	4M	L2	CO2	II
16	What is BJT and explain the operation of a PNP or a NPN transistor.	8M	L2	CO2	II
17	Explain the principle, construction and working of Solar cell.	4M	L2	CO2	II
18	Explain the principle, construction and working of APD diode.	4M	L2	CO2	II
19	Explain electronic polarization in Dielectrics.	4M	L2	CO3	III
20	Explain ionic polarization in Dielectrics.	4M	L2	CO3	III

21	What are Piezoelectric materials, What are its applications?	4M	L2	CO3	III
22	What are Ferroelectric materials, What are its applications?	4M	L2	CO3	III
UP TO MID-I					
23	Explain the Magnetostriction effect.	4M	L2	CO3	III
24	Explain Magneto resistance.	4M	L2	CO3	III
25	Explain hysteresis curve in magnetism.	4M	L3	CO3	III
26	What are Bubble memory devices?	4M	L1	CO3	III
27	Explain about Magnetic field sensors.	4M	L1	CO3	III
28	Explain the Physical vapor deposition (PVD) method.	8M	L2	CO4	IV
29	Explain Ball milling method.	4M	L2	CO4	IV
30	Explain the Sol-Gel method.	8M	L2	CO4	IV
31	Explain co-precipitation method.	4M	L2	CO4	IV
32	Explain the use of Scanning electron microscope -SEM used for nanomaterial characterization?	8M	L2	CO4	IV
33	Explain the use of Transmission electron microscope-TEM for nanomaterial characterisation.	8M	L2	CO4	IV
34	Explain the principle and working of XRD analysis of nanomaterials.	8M	L2	CO4	IV
35	Mention the applications of nano materials.	4M	L2	CO4	IV
36	Explain the construction and working principle of a He-Ne Laser with energy level diagram.	8M	L2	CO5	V
37	Summarize the applications of lasers.	4M	L2	CO5	V
38	What are the necessary conditions for lasing action in laser?	4M	L1	CO5	V
39	Explain the construction and working of a Semiconductor laser.	8M	L2	CO5	V
40	Obtain Einstein coefficients and their relations.	8M	L3	CO5	V
41	Explain the construction and working of a Ruby Laser.	8M	L3	CO5	V
42	what is mode in a fibre and explain in detail the types of optical based on the refractive index profiles. Obtain an expression for acceptance angle and numerical aperture of the optical fibre.	8M	L1	CO5	V
43	Explain Attenuation in Optical fiber?	4M	L2	CO5	V
44	Explain the block diagram of Optical fiber for communication system.	8M	L1	CO5	V