Roll No. | | | | | | | | | | |

(121)

COER University

END SEMESTER EXAMINATION, EVEN SEM 2022-23

Time : 3 hours
Program Name : B.Tech (CE, ME, EEE)
Course Name : Physics (Engineering)

Total Marks : 100
Semester : II
Course Code : BTBS202

Note: All questions are compulsory. No student is allowed to leave the examination hall before the completion of the time.

Q. No 1	Attempt Any Four Parts. Each Question Carries 5 Marks.	CO	BL
(a)	What are the conditions for good interference pattern?	CO 1	2
(b)	Define coherent sources. Discuss why two independent sources of light of same wave length cannot show interference of light.	CO 1	1,2
(c)	If a thin plate of material with t=0.001 cm is placed in the path of one of the beams, the central fringe shifts to a place occupied by 10^{th} fringe. Calculate the refractive index of the material of the plate.	CO 1	4
(d)	What are Newton's rings? Draw a clear diagram pointing out the interfering beams in a Newton's ring experiment.	CO 1	4
(e)	Explain the difference between interference and diffraction.	CO 1	2

Q. No 2	Attempt Any Four Parts. Each Question Carries 5 Marks.	CO	BL
(a)	Describe double refraction and specific rotation.	CO 2	2
(b)	What is retardation plate? Draw a ray diagram for extra-ordinary and ordinary rays before and after passing through a quarter wave plate.	CO 2	4
(c)	What is population inversion? How is it achieved? Explain.	CO 2	2
(d)	Describe the construction and working of ruby laser. What are the drawbacks of Ruby Laser.	CO 2	2
(e)	Explain acceptance angle and numerical aperture.	CO 2	3

Q. No 3	Attempt Any Four Parts. Each Question Carries 5 Marks.	CO	BL
(a)	If the magnitude of H in plane e.m wave is 1 Amp/m. Calculate the magnitude of E for plane wave in free space. Assume the values of the constant used.	CO 3	4
(b)	Differentiate dia, para and ferromagnetic substances.	CO 3	4
(c)	Write and derive Maxwell's fourth equation.	CO 3	1,3
(d)	Distinguish diamagnetic, paramagnetic and ferromagnetic materials. Giving one example of each.	CO 3	4
(e)	If the earth receives 2 cal min^{-1} cm^{-2} solar energy, what are the amplitudes of electric and magnetic fields of radiation? Calculate.	CO 3	4

Q. No 4	Attempt Any Two Parts. Each Question Carries 10 Marks.	CO	BL
(a)	Describe Davisson-Germer experiment to demonstrate the wave nature of particle.	CO 4	2
(b)	Derive time independent and time dependent Schrodinger wave equation. Discuss physical significance of the state function ψ? What condition must it fulfil?	CO 4	3
(c)	Solve the Schrodinger equation for a particle enclosed in a one-dimensional rigid box of side L. Obtain its Eigen values and Eigen functions. Draw a graph of its first three Eigen functions and their corresponding probability density.	CO 4	4

Q. No 5	Attempt Any Two Parts. Each Question Carries 10 Marks.	CO	BL
(a)	What is meant by P-type and N-type semiconductor? How are those developed from pure germanium? Explain. Indicate the position of Fermi level in the energy level diagram in both case.	CO 5	2
(b)	Discuss the formation of PN junction. Draw and explain in detail the V-I characteristics of PN junction under forward and reverse biasing.	CO 5	2,4
(c)	Discuss the energy momentum diagram to explain the existence of bandgap in materials? On the basis of energy momentum diagram define direct and indirect band gap semiconductors.	CO 5	2

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