[Total No. of Questions: 5] Seat No.: [Total No. of Pages:2]

G H Raisoni College of Engineering and Management, Pune.

(An Autonomous Institution affiliated to Savitribai Phule Pune University)

F.Y. B. Tech. (Term - I)

ESE Winter Examination-2020 (2020 Pattern)

Engineering Physics (UBSL101)

[Time: 2 Hours] **[Max. Marks: 50]**

COURSE OUTCOME:

CO1: Identify the trajectories of electron in uniform Electric and Magnetic fields and operate related devices.

CO2: Describe the phenomenon of interference & implement it for finding related parameters.

CO3: Explain the working of Laser & use it for different applications.

CO4: Identify various optoelectronic devices and use them for various applications.

CO5: Apply the knowledge of Quantum Mechanics to solve related problems.

Instruction to the candidates:

1) ***(CO1/CO2/CO….)at the beginning of question/sub question indicates the course outcome related to the question.***
2) ***All questions are compulsory.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***
6) ***Use of non-programmable electronic scientific calculator is allowed.***

CO	*Sub Question*	*Question*	*Marks*	*BL*
CO1	a)	Write statement of Bethe's law.	[1]	L1
	b)	State the formula for magnetic deflection sensitivity.	[1]	L2
	c)	An electron having velocity 10^6 m/s experiences a maximum force of 1.6 x 10^{-14} N when it enters a uniform magnetic field. What is the magnitude of the magnetic field?	[2]	L3
	d)	A proton enters a magnetic field of flux 0.5 web/m^2 with a velocity 2.4 x 10^6 m/s at an angle of 45^0 with the field. Find the force on proton.	[3]	L4
	e)	Explain the motion of an electron parallel to electric field.	[3]	L5
CO2	a)	What are the methods used for obtaining coherent sources?	[1]	L1
	b)	When we test the optical flatness of a glass plate by interference, which type of fringe pattern will be observed if surface is optically flat?	[1]	L2
	c)	A parallel film of light $\lambda = 5890A^0$ is incident on a glass plate ($\mu = 1.5$) such	[2]	L3

		that angle of refraction into plane is 60^0 .Calculate the smallest thickness of the plate which will make it appear dark by reflection.		
	d)	What is thin film? Obtain an expression for the path difference in case of interference in the thin film due to reflected light.	[3]	L4
	e)	Can a thin film of water (μ_f = 1.33) formed on a glass window pane (μ_f = 1.52) act as a non-reflecting film? If so, how thick should be the water film?	[3]	L5
CO3	a)	Describe the role of resonant cavity in Lasers?	[1]	L1
	b)	Which type of band gap is used in semiconductor diode laser?	[1]	L2
	c)	Discuss the advantages of diode laser over He-Ne laser.	[2]	L3
	d)	With the help of energy band diagram explain working of semiconductor diode laser.	[3]	L4
	e)	Explain the process of recording Hologram with the help of laser.	[3]	L5
CO4	a)	Describe the relation between hall voltage and applied magnetic field.	[1]	L1
	b)	Which type of connection is use to get maximum output from number of solar cell?	[1]	L2
	c)	Explain the Principle, Construction and Working of Light Emitting Diode.	[3]	L3
	d)	Explain the construction and working of solar cell. States any two application of solar cell.	[5]	L4
		OR		
	e)	What is Hall effect? Obtain an expression for Hall voltage and Hall coefficient. State applications of Hall effect.	[5]	L5
CO5	a)	What is the wavelength of matter wave?	[1]	L1
	b)	What are the necessary conditions of physically accepted well behaved wave function.	[1]	L2
	c)	If uncertainty in the position of a particle is equal to de Broglie wavelength, then show that uncertainty in velocity is equal to the velocity of particle	[3]	L3
	d)	State and explain Heisenberg's uncertainty principle .prove the same for pair of variables energy and time.	[5]	L4
		OR		
	e)	Starting from Schrodinger's time independent equation, show that the energy of a particle in one dimensional potential well of infinite height is quantized.	[5]	L5