Code No: R201103 **R20** SET - 1

I B. Tech I Semester Regular Examinations, July/August- 2021

ENGINEERING PHYSICS

(Com. to CE, ME , Agri E & Pharma Engg**)**

Time: 3 hours Max. Marks: 70

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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1.	a)	With the help of a neat diagram, describe the experimental arrangement to produce Newton's rings by reflected light. Prove that the diameter of dark rings is proportional to the square root of the natural numbers.	(10M)
	b)	If the diameter of the nth dark ring in an arrangement giving Newton's rings changes from 3 mm to 2.5 mm as a liquid is introduced between the lenses and plate, what is the value of the refractive index of the liquid?	(4M)

Or

2.	a)	Explain qualitatively Fraunhofer diffraction due to a double slit. How does its intensity distribution curve differ from that obtained due to a single slit?	(10M)
	b)	If a single slit diffracts 550 nm light so that the central maximum of the diffraction pattern is 8 cm wide on a screen 2.50 m away, what will be the width of the central diffraction maximum for light with a wavelength of 400 nm?	(4M)
3.	a)	For atomic transitions, derive Einstein's relations and deduce the expression for stimulated emission rate to the spontaneous emission rate of radiation.	(10M)
	b)	Obtain the ratio of stimulated emission rage to stimulated absorption rate and discuss population inversion.	(4M)

Or

4.	a)	Derive an expression for acceptance angle and numerical aperture of an optical fibre.	(10M)
	b)	Define the relative refractive index difference of an optical fibre. Show how it is related to numerical aperture.	(4M)
5.	a)	Distinguish between Ferro, anti-Ferro and ferrimagnetic materials in terms of susceptibility and its dependence on temperature.	(10M)
	b)	Why diamagnetic materials have negative magnetic susceptibility? Explain.	(4M)

Or

6.	a)	Define the terms polariz ability and polarization vector in dielectrics. Derive an expression for ionic polarization.	(10M)
	b)	Discuss the effect of electric field and temperature on polar dielectrics.	(4M)
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7. a) What is Acoustic grating? Describe the method to determine the velocity of ultrasonic waves using Acoustic grating (10M)

   b) Draw a block diagram of the ultrasonic flaw detector for NDT. Mention its advantages and disadvantages. (4M)

Or

8. a) Derive expressions for growth and decay of energy density inside a hall and deduce Sabine's formula for the reverberation time of the hall. (10M)

   b) The reverberation time is found to be 1.5 sec for an empty hall, and it is found to be 1 sec when a curtain cloth of 20 m^2 is suspended at the centre of the hall. If the dimensions of the hall are 10x8x6 m^3. Calculate the coefficient of absorption of curtain cloth. (4M)

9. a) Describe elaborately the seven crystal systems and 14 Bravais lattice with unit cell diagrams indicating atomic positions. (10M)

   b) State and explain Bragg's law of X-ray diffraction. (4M)

Or

10 a) Derive the expression for the i (10M)
nterplanar spacing or d-spacing for (hkl) planes of a cubic structure.

   b) Determine lattice constant for FCC lead crystal of radius 1.746 Å. Also find the spacing of a) (1 1 1), b) (2 0 0), c) (2 2 0) (4M)