COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

B.TECH. DEGREE I&II SEMESTER SUPPLEMENTARY EXAMINATION IN MARINE ENGINEERING JUNE 2020

MRE 1103 ENGINEERING PHYSICS

(*2013 Scheme*)

Time: 30 Minutes [for Answering and Scanning/Uploading the page of the Answer Sheet] per module
Max. Marks: 14 per module

INSTRUCTIONS

1. You have to be available in Google Meet on demand by the faculty.
2. You have to share your '**live location**' to the faculty before uploading the answer sheet.
3. You have to answer only one question per module.
4. Answer may not exceed one page of an A4 size paper in a standard handwriting, as far as possible.
5. If at all an answer goes beyond one page, (due to your handwriting) another page can also be used. In such a situation, the page number should be given as 1/2, 2/2.
6. You have to put dated signature along with Register Number, Subject Code, Module/Group Number (as given in the Question Paper) in each page.
7. You have to put the Question Number correctly.
8. After answering the question, you have to scan and upload the answer page.

MODULE - I

(Answer ***ANY ONE*** question)

I(1).	(a)	Obtain the condition for a thin film to appear bright in reflected light.	(7)
	(b)	Explain the colours of thin films.	(4)
	(c)	A parallel beam of light with wavelength 5890 A is incident on a thin glass plate of refractive index 1.5 such that the angle of refraction into the plate is 60°. Calculate the smallest thickness of the glass plate which will appear dark by reflection.	(3)
		OR	
I(2).	(a)	Explain with a diagram, how X-rays are produced.	(7)
	(b)	Describe the Braggs spectrometer and explain how it is used to determine wavelength of X-rays.	(4)
	(c)	Calculate the velocity of electrons at which they strike the target, if the potential difference applied across an X-ray tube is 14 kV and current through it is 110 mA.	(3)

MODULE - II

(Answer ***ANY ONE*** question)

II(1). (a) What is a plane diffraction grating? Obtain the expression $(a+b)\ sin\theta = n\lambda$ (7)

(b) Explain the dispersive power and resolving power of a grating. (4)

(c) Light of wavelength 589.6 nm is incident normally on a grating having 6000 rulings per cm. Find the angular separation between the first and second order spectra. (3)

OR

II(2). (a) Explain the construction and propagation of light through Nicol prism. (7)

(b) Explain the phenomenon of double refraction. (4)

(c) Calculate the thickness of a double diffracting plate that converts linearly polarized light into elliptically polarized light. Given that refractive indices for ordinary and extra ordinary rays are 1.488 and 1.667 respectively and wavelength of light 589 nm. (3)

MODULE - III

(Answer ***ANY ONE*** question)

III(1). (a) Explain the construction and working of a Helium Neon laser with the help of a neat energy level diagram. (7)

(b) Distinguish between the spontaneous and stimulated emissions. (4)

(c) Explain the applications of lasers. (3)

OR

III(2). (a) Discuss with necessary diagrams, the recording and reconstruction of holograms. (7)

(b) What are the properties and applications of electronic waves? (4)

(c) How is sound recorded in cine films? (3)

MODULE - IV

(Answer ***ANY ONE*** question)

IV(1). (a) Derive an expression for the numerical aperture of a step index fibre. (7)

(b) Explain an optical fibre communication system with the aid of a block diagram. (4)

(c) A step index fibre has core of refractive index 1.35 and fractional refractive index 0.009. Determine the numerical aperture, acceptance angle and critical angle. (3)

OR

IV(2). (a) Derive an expression for Numerical aperture of an optical fibre. (7)

(b) Explain the singlemode and multimode fibres. (4)

(c) If the maximum angle of incidence is 35 degree for a fibre placed in air, calculate the numerical aperture and acceptance angle? (3)

MODULE - V

(Answer ***ANY ONE*** question)

V(1).	(a)	Describe magnetostriction method of producing ultrasonic waves.	(7)
	(b)	Explain the principle of sonar.	(4)
	(c)	Give a description of gyroscope.	(3)

OR

V(2).	(a)	Explain Josephson effect. Distinguish between ac and dc Josephson effect.	(7)
	(b)	What is Meissner effect? State its applications.	(4)
	(c)	Calculate the critical temperature for lead, if the penetration depths for lead are 39.6 nm and 173 nm at temperatures 3 K and 7.1 K respectively.	(3)

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