BT MRE-I(R/S)-11-22-2014 Reg. No. | | | | | | | | | |

B

B.Tech. Degree I Semester Regular/Supplementary Examination in Marine Engineering November 2022

19-208-0102 ENGINEERING PHYSICS

(*2019 Scheme*)

Time: 3 Hours

Maximum Marks: 60

Course Outcome

On successful completion of the course, the students will be able to:

CO1: Understand interference of light and its applications and applications of X- rays.
CO2: Grasp the basics of diffraction and their applications.
CO3: Understand many modern devices and technologies based on lasers and sound recording.
CO4: Have a fundamental knowledge of fiber optics and their applications.
CO5: Have an understanding of different marine equipment the characteristics and applications and superconducting materials.

Bloom's Taxonomy Levels (BL): L1 – Remember, L2 – Understand, L3 – Apply, L4 –Analyze, L5 – Evaluate, L6 – Create

PO – Programme Outcome

			(5 × 15 = 75)	Marks	BL	CO	PO
I.	(a)		Describe the theory and experiment to determine the radius of a thin wire using air wedge. Also explain how flatness of a surface is tested using air wedge.	12	L4	1	1
	(b)		In Newton's rings experiment the diameter of 4^{th} and 25^{th} rings are 0.3 cm and 0.8 cm, respectively. If the radius curvature of the convex lens used is 0.98 m, find the wavelength of light.	3	L5	1	2
			OR				
II.	(a)		Explain the theory of Newton's rings method to find the wavelength of a monochromatic source of light.	12	L4	1	1
	(b)		If the potential difference applied across an X-ray tube is 15 kV and current through it is 109 mA, calculate the velocity of electrons at which they strike the target.	3	L5	1	2
III.	(a)		Explain the Rayleigh's criterion of resolution. Define resolving power of a telescope. How does it depend on the wavelength of light used?	12	L4	2	1
	(b)		White light containing wavelengths from 450 nm to 700 nm falls on a grating with 7000 lines per cm. How wide is the first order spectrum on a screen 2 m away?	3	L5	2	2
			OR				
IV.	(a)		Define specific rotation of an optically active substance. Describe an experiment to determine specific rotation using half shade polarimeter.	12	L4	2	1
	(b)		Calculate the thickness of a quarter wave plate when beam of light with wavelength 500 nm is incident on it. Given, refractive indices of plate for ordinary and extraordinary rays are 1.544 and 1.533 respectively.	3	L5	2	2

(P.T.O.)

V.	(a)	Discuss the construction and working of Helium–Neon Laser.	12	L3	3	1
	(b)	Explain the principle, recording and reconstruction of a hologram.	3	L1	3	1
		OR				
VI.	(a)	Explain the construction and working of Ruby laser.	12	L2	3	1
	(b)	How is sound recorded and reproduced inmagnetic tapes?	3	L1	3	1
VII.	(a)	Obtain the expression for numerical aperture of a step index fibre.	12	L2	4	1
	(b)	Calculate the maximum fibre acceptance angle of a step index fibre placed in air having refractive indices, $n_1 = 1.58$, $n_2 = 1.49$.	3	L5	4	2
		OR				
VIII.	(a)	Describe with block diagram, the principle of optical fibre communication system.	12	L2	4	1
	(b)	If the maximum angle of incidence is 43 degree for a fibre placed in air, calculate the numerical aperture and acceptance angle?	3	L5	4	2
IX.	(a)	Describe the production, properties and uses of ultrasonic waves.	12	L3	5	1
	(b)	Give a description of sonar.	3	L2	5	1
		OR				
X.	(a)	Differentiate between type I and type II superconductors.	12	L3	5	1
	(b)	What is a SQUID? State its applications?	3	L2	5	1

Bloom's Taxonomy Levels
L1 - 4%, L2 - 28%, L3 - 24%, L4 - 32%, L5 - 12%

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