VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

Even Mid Semester Examination for Academic Session 2023-24

COURSE NAME:B.TECH | SEMESTER: SECOND

BRANCH NAME: Chemical Engg.,Civil Engg.,Mechanical Engg, Metallurgy & Material Engg Production Engg.

SUBJECT NAME:ENGG.PHYSICS

FULL MARKS: **30** | TIME: **90 Minutes**

Answer **All** Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

Q1.		Answer all Questions.	**[2 × 3]**
	a)	What is electrical oscillation? Why LC circuit executes oscillation?	- CO1
	b)	With a schematic diagram represents the interference through thin film and write the type of coherent sources produced in this case.	- CO2
	c)	Show that curl of position vector is always an irrotational vector.	- CO3
Q2.			**[8]**
	a) b)	Give a suitable comparison between mechanical oscillator and electrical oscillator. Set up the differential equation for a damped harmonic oscillator and write the general solution of the differential equation	[3+5] - CO1
		OR	
	a)	Set up the differential equation for forced oscillation in LCR circuit and obtain its general solution.	[2+6] - CO1
	b)	Define quality factor and obtain its expression.	
			[8]
Q3.			
	a) b)	What is coherent source and how can it be produced?. Draw a schematic diagram for experimental arrangement of Newton's ring. Show that Newton's dark ring are proportional to square root of natural number.	[2+6] - CO2
		OR	
	a) b)	With a suitable description obtain the expression for intensity due to Fraunhoffer diffraction at single slit. In a diffraction grating with 5000 rulings/cm, the first order maximum occurs at an angle 16^0. Calculate grating element and find the wavelength of light used.	[5+3] - CO2
			[8]
Q4.			
	a) b)	What do mean by solenoidal vector field? Show that the position of a point described by position vector is not solenoidal. State Gauss divergence theorem. Using this theorem calculate the volume of a spherical body described the position of point with position vector $\vec{r}$.	[5+3] - CO3
		OR	
	a) b)	Briefly mention the concept of Gradient, divergence and curl described in scalar field and vector field. A vector field is given by $\vec{A} = \hat{i}\,2xy + \hat{j}x^2y + \hat{k}xyz$. .Find divergence and the curl of the vector at the point (1,1,-1)	[5+3] - CO3