

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

Mid Semester Examination NOV' - 2024

COURSE NAME: B.Tech.

SEMESTER: 1st

BRANCH NAME: ALL (SEC: D,E,F,G,H,I,J)

FULL MARKS: 30

TIME: 1:30 Hours

SUBJECT NAME: PHYSICS

Answer All Questions.

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

Q1. Answer all Questions. [2×3]

- What do you mean by logarithmic decrement? Write down the expression and explain the terms involved.
- In Newton's rings experiment, the diameter of the fifth ring was 0.336 cm and the diameter of the 15th ring was 0.590 cm. Find the radius of curvature of the plano-convex lens, if the wavelength of light used is 5890 Å.
- Check whether the vector field $\vec{F} = 6x\hat{i} + (2y - y^2)\hat{j} + (6z - x^3)\hat{k}$ is conservative or not.

Q2. What is damped harmonic oscillation? Obtain an expression for the general solution of a damped harmonically oscillating body. [8]

OR

Obtain an expression for the amplitude of a forced harmonically vibrating body under the application of an external periodic force $F \sin pt$.

Q3. Discuss the phenomenon of interference of light due to parallel thin film and obtain the condition for maxima and minima. [8]

OR

What are Newton's rings? Prove that in reflected light system diameter of the dark rings are proportional to the square root of natural number.

Q4. (i) If vectors A and B are irrotational, then prove that $\vec{A} \times \vec{B}$ is solenoidal. [8]
(ii) State and explain (a) Gauss Divergence theorem, (b) Stoke's theorem.

OR

- Prove that the curl of a gradient is identically zero.
- Prove that the divergence of the curl of a vector field is zero.