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Code No. : 11026 S (B)

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CBCS) I-Semester Supplementary Examinations, June/July-2019

Waves and Optics

(EEE & ECE)

Time: 3 hours

Max. Marks: 60

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. What is the relation between time of oscillation and frequency? Explain.
2. Explain Resonance as a special type of forced vibrations.
3. When Newton's rings are observed in the transmitted light what happens to central maxima?
4. Compare Resolving Power and Dispersive power.
5. Identify the role of Helium gas and Neon gas in He-Ne laser.
6. Write four important applications of laser in engineering.
7. Mention typical diameters of core and cladding in an optical fiber.
8. What are the two important conditions required for total internal reflection?
9. Write four Maxwell's equations in differential form
10. Define Poynting vector.

Part-B (5 × 8 = 40 Marks)

11. a) Deduce an expression for logarithmic decrement. [5]
b) The amplitude of an oscillator of frequency 200Hz falls to 1/10 of its initial value. [3]
Calculate its relaxation time and Quality factor.
12. a) State and explain the law of Malus. [3]
b) Distinguish between refraction of light and double refraction. [2]
c) Discuss about interference by thin films. [3]
13. a) Explain the production of Ruby laser. [5]
b) Distinguish between spontaneous emission and stimulated emission. [3]
14. a) Discuss about step index, graded index mode fibers based on their refractive index profile. [4]
b) The numerical aperture of an optical fiber is 0.39. If the difference in the refractive [2]
indices of the core and cladding is 0.05 calculate refractive index of core.
c) Mention few important signal losses in an optical fiber. [2]
15. a) Define displacement current. [3]
b) Derive an equation for the electromagnetic wave propagation in non-conducting medium. [5]
16. a) Explain the phenomenon of double refraction. [3]
b) Describe damped oscillator and derive an expression for its amplitude. [5]
17. Answer any *two* of the following:
a) Define the terms "Population Inversion" and "Meta Stable State" [4]
b) Explain optical communication system with the help of block diagram [4]
c) Show that electromagnetic waves are transverse in nature. [4]