VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, **HYDERABAD**
B.E. (CBCS) I-Semester Backlog (Old) Examinations, Dec.-2018/Jan.-2019

Engineering Physics

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. The pendulum oscillates 100 times in a second. The Q-factor of the pendulum is 1000. Calculate the time in which the amplitude of the pendulum decays to $(\frac{1}{e^4})$ of its initial value.

2. Distinguish Free, Damped and Forced oscillations.

3. Consider an N – slit diffraction grating with slit spacing 0.05 mm and wavelength of the light is 5000 A°. Calculate the number of principal maxima.

4. Define optical activity. How many types of optically active materials are available, distinguish between them.

5. Distinguish between single mode and multi-mode fibers.

6. The refractive indices of the core and cladding of an optical fiber are 1.563 and 1.498 respectively. Calculate the fractional refractive index change.

7. Explain the characteristics of laser.

8. What is the importance of active medium in a gas laser?

9. What are Ferro electro materials?

10. What is hystersis curve of Ferro magnetic materials?

Part-B (5 × 8 = 40 Marks)

11. a) Discuss the solution of a forced harmonic motion for resonance frequency ($w \approx w_o$).   [4]

    b) Explain the super position of two mutually perpendicular simple harmonic vibrations of same frequency.   [4]

12. a) Explain the steps in determining the specific rotation of sugar solution by using Laurent's half Shade polarimeter.   [5]

    b) Calculate the least thickness of the Quartz quarter wave plate for which the $\mu_e = 1.5533$ and $\mu_o = 1.5442$ and $\lambda = 5.4 \times 10^{-5}$ cm.   [3]

13. a) Write a short notes on various types of optical fibers.   [4]

    b) The numerical aperture of an optical fiber is 0.2 and the refractive index of its cladding is 1.59. If the fiber is in water, calculate the acceptance angle. The refractive index of water is 1.33.   [4]

14. a) Describe the principle, construction and working of Ruby laser.   [4]

    b) Explain the laser applications for drilling, wielding and CD writing.   [4]

15. a) What is Ionic polarization and derive the expression for Ionic polarizability?   [3]

    b) Explain the Weiss molecular field theory of Ferro magnetism.   [5]

16. a) Find the driving frequency for which the velocity of a forced damped oscillator is exactly in phase with the driving force.   [4]

b) Explain how the wavelength of light can be measured using Newton's ring experiment.   [4]

17. Answer any *two* of the following

a) Write a short notes on bending losses in optical fibers and explain how they can be minimized.   [4]

b) Explain the basic principle of holography.   [4]

c) What are Ferrites and its applications?   [4]

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