



KERALA AGRICULTURAL UNIVERSITY
B. Tech. (Agrl. Engg.)
I Semester Final Re - Examination – February 2025
2023 & Previous Admissions

Sacs.1102

Engineering Physics (2+1)

Marks: 50
Time: 2 hours

- I Fill in the blanks (10x1=10)**
1. The resolving power of a grating if the number of lines on grating increases.
 2.diffraction is observed when both source and screen are at finite distance.
 3. He-Ne laser employs pumping technique.
 4. The magnetic susceptibility of an ideal superconductor is
 5. materials exhibits magnetization even in the absence of an external field.
- State True or False**
6. The refractive indices of air (μ_0), core (μ_1), and cladding (μ_2) in optical fibers are related as $\mu_0 > \mu_1 > \mu_2$
 7. The effective mass and mass in case of free electron is same.
 8. The metals do not have negative temperature coefficient of resistivity.
 9. The superconducting critical temperature remains the same for the various isotopes of a superconductor.
 10. The total energy is conserved during Raman scattering.
- II Write short notes on ANY FIVE of the following (5x2=10)**
1. Define the terms Bohr magneton and magnetic induction with reference to magnetisation.
 2. What are the different factors that can destroy superconductivity?
 3. What do you understand by metastable state?
 4. What is Moore's law?
 5. What is interference? Can interference be observed with two independent sources of light?
 6. Write a short note on doping in semiconductors.
 7. Give the fundamental principle behind holography.
- III Answer ANY FIVE of the following (5x4=20)**
1. A Newton's ring arrangement is used with a source emitting two wavelengths $\lambda_1 = 6000 \text{ \AA}$ and $\lambda_2 = 4500 \text{ \AA}$ and it is found that the n^{th} dark ring due to λ_1 coincides with $(n+1)^{\text{th}}$ dark ring for λ_2 . If the radius of curvature of the curved surface is 90 cm, find the diameter of the n^{th} dark ring of λ_1 .
 2. What are nano materials and how can they be synthesized? Explain.
 3. Write a note on Raman spectroscopy.
 4. The susceptibility of magnesium is 1.2×10^{-5} at 300 K. Find the susceptibility at 400 K.
 5. Explain the difference between step index fiber and graded index fiber.
 6. Derive the law of mass action for semiconductors.
 7. Discuss DC and AC Josephson's effects.
- IV Write an essay on ANY ONE of the following (1x10=10)**
1. Explain the terms: absorption, spontaneous emission and stimulated emission of radiation. Discuss Einstein's A and B coefficients and derive the relation between them.
 2. Derive an expression for the density of electrons in the conduction band of an n-type semiconductor. What happens to the Fermi level as the temperature increases?
