



KERALA AGRICULTURAL UNIVERSITY  
B.Tech. (Agrl. Engg.) 2019 Admission  
I Semester Final Examination-January 2020

Sacs.1102

Engineering Physics (2+1)

Marks:50  
Time: 2 hours

**I Match the following**

(10x1=10)

- |                              |    |                        |
|------------------------------|----|------------------------|
| 1. Total Internal Reflection | -- | Interference           |
| 2. Coherence                 | -- | P-type semiconductor   |
| 3. Ga                        | -- | Super conductor        |
| 4. Free electrons            | -- | Type 1 super conductor |
| 5. Cooper pair               | -- | Type 2 super conductor |
| 6. Nb                        | -- | Optic fiber            |

**Answer the following**

7. When is the molecule said to be Raman active?
8. Write any two properties of semiconductors.
9. Name the pumping methods used in Ruby laser and He-Ne laser.
10. Define numerical aperture for an optical fiber.

**II Write Short notes on ANY FIVE of the following**

(5x2=10)

1. Interference can be observed with two independent tuning forks, but it cannot be observed with two independent bulbs. Why?
2. Distinguish between intrinsic and extrinsic semi conductors and give one example for n type and p type semi conductor.
3. What is a LASER? What are the three requisites for laser action to take place?
4. Draw the energy level diagram showing spontaneous emission and stimulated emission.
5. Define critical magnetic field in super conductors. How this is related to temperature of superconductors.
6. Write any 2 difference between holography and photography.
7. Write any 4 applications of nanotechnology in agriculture.

**III Answer ANY FIVE of the following**

(5x4=20)

1. What is Meissner effect? Prove that a superconductor act as a perfect diamagnet.
2. Write short note on interference filters
3. Explain top down approach for synthesizing Nano materials.
4. Draw the diagrams of recording and reconstruction of hologram.
5. Compare Step index & Graded index fibre.
6. What are the main applications of SQUID.
7. Explain population inversion. Name any 2 pumping methods used in LASERS.

**IV Write an essay on ANY ONE of the following**

(1x10=10)

1. a) Derive the expression for the diameter of the  $n^{\text{th}}$  dark ring in Newton's interference pattern.  
b) If the diameter of the  $n^{\text{th}}$  dark ring in an arrangement giving Newton's rings changes from 0.03 m to 0.025m as a liquid is introduced between the lens and plate what is the value of refractive index of the liquid.
2. a) Distinguish between type 1 and type 2 superconductors with relevant graphs.  
b) Calculate the critical current, which can flow through a long thin super conducting wire of Al of diameter  $10^{-3}$  m. The critical magnetic field for Al is  $7.9 \times 10^{-3}$  A/m.

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