



**KERALA AGRICULTURAL UNIVERSITY**  
**B.Tech.(Ag. Engg.) 2018 Admission**  
**I Semester Final Examination-January 2019**

Sacs.1102

**Engineering Physics (2+1)**

**Marks: 50**  
**Time:2 hours**

**I Fill in the Blanks** **(10x1=10)**

- 1 Splitting of spectral lines in the presence of an electric field is called \_\_\_\_\_
- 2 Susceptibility of a diamagnetic material is \_\_\_\_\_
- 3 In a p-type semiconductor the majority carriers are \_\_\_\_\_
- 4 When arsenic is added to silicon it changes to \_\_\_\_\_ type semiconductor.

**Answer the following**

- 5 Define transition temperature of a superconductor.
- 6 Give two examples for ferromagnetic materials.
- 7 What is the expansion of SQUID?
- 8 Define population inversion.
- 9 What is meant by Fermi level?
- 10 Name two fields where we apply nanotechnology

**II Write Short notes on any FIVE of the following** **(5x2=10)**

- 1 What are the conditions to get a stable interference pattern?
- 2 Transverse Zeeman effect.
- 3 Distinguish between intrinsic and extrinsic semiconductors.
- 4 Isotope effect in superconductivity.
- 5 Metastable level.
- 6 Any two applications of holography.
- 7 Law of mass action.

**III Answer any FIVE of the following.** **(5x4=20)**

- 1 Principle and working of an interference filter.
- 2 Langevins theory of diamagnetism.
- 3 Josephson DC and AC effects.
- 4 Calculate the critical field of a superconductor at 2.5K if its transition temperature is 3.7K. Critical magnetic field is  $2.39 \times 10^4$  A/m at 0K.
- 5 Applications of nanotechnology in agriculture.(Any four)
- 6 With energy level diagram explain the working of He-Ne laser.
- 7 Quantum theory of Raman effect.

**IV Answer any ONE of the following** **(1x10=10)**

- 1 a) With a neat diagram explain formation of Newton's rings in reflected system.  
b) Derive an expression to find an unknown wavelength using this arrangement.
- 2 a) Obtain an expression for the Numerical aperture of an optical fibre.  
b) What are the applications of optical fibres?

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