



Regulation R18

Subject code:2B1AF

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

(Autonomous, Accredited by NAAC with 'A' Grade)

**B.Tech I Semester Supplementary Examinations, March/April 2023**

**PHYSICS-I**

(Common to EEE,ECE,CSE & IT)

**Maximum Marks: 70**

Date:06.04.2023 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

† Part-A

All the following questions carry equal marks

10x2M=20Marks

1. What is coherence?
2. Derive an equation for the refractive index of a given liquid from Newton's rings experiment.
3. Write the formula for the resolving power of an optical grating.
4. State Brewster's law.
5. State Malus law.
6. What is meant by population inversion.
7. Define spontaneous emission and stimulated emission
8. What is numerical aperture and explain it
9. An electron is confined to one dimensional potential box of length  $2A^0$  Calculate the energies corresponding to 2<sup>nd</sup> & 4<sup>th</sup> quantum states in eV
10. Write a short notes on photo electric effect.

PART B

Answer all the following questions

5X10M=50Marks

11. (a) Explain the phenomenon of interference of light and derive an equation for path difference in the case of reflected light. [7]  
(b) A parallel beam of light  $\lambda = 5890A^0$  is incident on a glass plate. Show that angle of refraction into the glass plate is  $60^0$ , calculate the smallest thickness of the plate which will make it appear dark by reflection. [3]  
OR
12. (a) What are the necessary conditions for obtaining interference fringes. [5]  
(b) Explain the types of interferences. [5]
13. Explain single slit Fraunhofer diffraction. [10]  
OR
14. (a) Explain quarter wave plate & half wave plate. [5]  
(b) Explain the phenomenon of double refraction. [5]
15. Describe and explain semiconductor laser. [10]  
OR
16. Describe the construction & working of ruby laser. [10]

17. Define acceptance angle and derive an equation for acceptance angle. [10]  
OR
18. Write a short note on various losses in optical fibres. [10]
19. Explain the Max Planck's black body radiation energy distribution. [10]  
OR
20. (a) What is de Broglie's hypothesis? Derive an equation of de Broglie wave length of an electron? [7]  
(b) Calculate the velocity and kinetic energy of an electron of wavelength  $1.66 \times 10^{-10} \text{m}$ . [3]