R17 Regulation *Subject Code: 1B2AF*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech I Year II Semester Supplementary Examinations, June 2024

ENGINEERING PHYSICS-II

(Common to EEE,ECE,CSE & IT)

Maximum Marks: 70 Date: 24.06.2024 Duration: 3hours

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=20 Marks

1. Explain Heisenberg uncertainty principle
2. Calculate energy of an electron which is associated with an wave of wavelength, $\lambda = 3x10^{-10}$ m given h = $6.625x10^{-34}$ J-s
3. Explain about the origin of energy bands in solids.
4. What are direct and indirect band gap semiconductors.
5. Define the dielectric constant.
6. Explain about pyro electricity.
7. Define the magnetic permeability and magnetic susceptibility.
8. Distinguish between type-I and type –II super conductors
9. What is quantum confinement effect?
10. Describe any three processes by which nanomaterials are fabricated.

Part-B

Answer all the questions 5X10M=50Marks

11. a) Derive an expression for the Schrödinger's time independent wave equation. 5M
    b) What is the lowest energy of that a neutron (mass= $1.67x\ 10^{-27}$ Kg) can have if confined to move along the edge of an 1D box of length 10^{-24} m? 5M

(OR)

12. a) Describe the origin of bands formation in solids. 5M

    b) Write the Kronig-Penny model qualitatively. 5M

13. a) Explain the Solar cell working and I-V characteristics. 7M
b) Write the Solar cell applications. 3M

(OR)

14. a) Determine the concentration of holes in the valance band of intrinsic semiconductors. 5M
b) Write the applications of Semiconductors. 5M

15. a) Derive an expression for ionic polarizability. 5M
b) Derive an expression for Internal fileds in dielectric material. 5M

(OR)

16. a) Explain the various types of polarization mechanisms. 5M
b) Derive an expression for the Clausius-Mossotti equation. 5M

17. a) Explain the origin of Magnetic moment and Bohr magneton. 5M
b) What is Meissner Effect? Give few applications of superconductivity. 5M

(OR)

18. a) What is magnetic hysteresis explain on the basis of domain theory. 5M
b) Explain about anti-ferro and ferrimagnetic materials and their applications. 5M

19. a) Explain the importance of surface to volume ratio on nano scale. 5M
b) What are nanomaterials. How are they classified? 5M

(OR)

20. a) Explain how nano particles play an important role over bulk materials. 5M
b) Write in detail the SEM and TEM characterization techniques. 5M