

Enroll No

K.E.Society's
Rajarambapu Institute of Technology, Rajaramnagar
(An Empowered Autonomous Institute, affiliated to SUK)
Unit Test II (2025-26)

Q.P. Code
UT3475

F. Y. B. Tech-Civil, Electronics & Telecommunication, Mechanical, Mechatronics, Robotics and Automation

Course Code: SH1314

Course Name: Engineering Physics

Day & Date: Thursday, 27/11/2025

Time: 10.30 to 11.30 am

Max Marks- 25

- Instructions:**
- 1) All questions are compulsory.
 - 2) Figures in rounded () brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.
 - 3) CO is the index number of the Course Outcome statement.
 - 4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate and create respectively.
 - 5) Assume suitable data if necessary.
 - 6) Use of non-programmable calculators is allowed

	Marks	BT Level	COs
Q.1 A State the Heisenberg's uncertainty principle .	2	L1	CO1
B Derive the Schrodinger time independent wave equation.	6	L3	CO2
OR			
Derive the expression for the energy of a particle trapped in 1D infinite potential box of width 'L'.			
C i) Determine the de Broglie wavelength of an electron accelerated through potential difference of 150 Volts .	2	L3	CO3
(Given: Planck's constant= 6.62×10^{-34} Js, mass of electron= 9.1×10^{-31} kg, charge on electron= 1.6×10^{-19} C)			
ii) Determine the energy of an electron in 1D infinite potential box of length 0.5 nm in first excited state.	3	L3	CO3
(Given: Planck's constant= 6.62×10^{-34} Js, mass of electron= 9.1×10^{-31} kg)			
Q.2 A Explain ' n type ' and ' p type ' semiconductor using band energy diagrams. (Diagram: 1 mark each, explanation: 2 marks each)	6	L2	CO1
B Explain the process of carrier generation and recombination using neat energy diagram. (Diagram: 1 mark each, explanation: 2 marks each)	6	L2	CO1

OR

Explain the concept of **Fermi energy** using **Fermi Dirac distribution function**.

