VFSTR - VADLAMUDI	Regd. No.										
	Year		Semester		Branch			Section			
Staff Name: Dr. P. Srinivasa Rao	I		1		Non-Bio			26 to 46			
Faculty Dept : Physics	Course: EP			Code: 25PY101				Set-3			
Program Name: B. Tech.	Date: 31.10.25			Time: 9.00 to 10.30 AM				T1			

Time: 90 Minutes   Max. Marks: 30

Part-A

Answer all questions

1.   Apply your knowledge of Lorentz force and electric field force to build an equation for the Hall voltage (V_H) produced in an extrinsic semiconductor.   **(5M)**

2.   An electron is confined to move in a one dimensional potential well of length 5 Å. Determine the quantized energy values of the first three lowest energy states. Mass of electron m= 9.11×10^{-31} kg.   **(5M)**

Part-B

Answer all questions

3.   a) Describe the physical significance of the wavefunction ψ and it's probabilistic interpretation.   **(4M)**

b) The wavefunction in a one-dimensional potential well is given by $\psi = A\sin(\dfrac{n\pi x}{L})$, using the normalization condition estimate the value of A.   **(6M)**

4.   a) Starting from applying the Newton's law F=ma, to the free electrons in a metal, obtain the relationship between the current density and conductivity of a metal.   **(5M)**

b)   A uniform silver wire has 5.8×10^{28} conduction electrons/m^3 with a resistivity of 1.54×10^{-8} $(\Omega m)^{-1}$. For an electric field of 1 V/cm, calculate the relaxation time, drift velocity and mobility.   **(5M)**