FIGURE CAPTIONS

CHAPTER - 1 AN INTRODUCTION TO AMORPHOUS/GLASSY SEMICONDUCTORS AND SELECTION OF PROBLEM.

Figure No.

1.1 Various models for amorphous semiconductor (a) CFO Model (b) Davis - Mott model (c) MDS Model.

1.2 Schematic representation of the origin of valence and conduction band states for a tetrahedrally bonded semiconductor. (i) atomic s- and p-states (ii) sp$^3$- hybrid states (iii) bonding ($\sigma$) and anti-bonding ($\sigma^*$) states, (iv) broadening of $\sigma$- and $\sigma^*$-states into valence band (VB) and conduction band (CB).

1.3 Illustration of the formation of three fold coordinated D$^+(C_3^+)$ and singly coordinated D$^-(C_1^-)$ defect centres by the exchange of an electron between two D$^0(C_0^0)$ centres.

1.4 Formation of charged defect of a D$^+$- D$^-$ pair. Exchange of an electron between two D$^0$ centres to give a D$^+$ - D$^-$ pair at the same configuration costs the Hubbard energy U. The D$^+$ - D$^-$ centres subsequently relax to a different configuration and the overall energy is lowered by the effective correlation energy $U_{eff}$.
1.5 The contact between a metal and semiconductor, with a potential barrier $\phi$ for emission of electrons from the Fermi level $E_F$ in the metal into the conduction band of the semiconductor (a) semiconductor with a high density of ionizable centres, the screening length is short and the width of any barrier present is insignificant. Tunnelling directly into the localized levels may occur (b) semiconductor with very few ionizable centres. The screening length is much larger than the sample thickness.

1.6 Various electronic transitions occurring in a system of donors (square symbols) and traps (round symbols) distributed in space and in energy. Filled contours denote occupation by electron (i) Donor-donor hopping (ii) Excitation between donor and conduction band (iii) Donor-trap hopping (iv) Trap-trap hopping (v) Trap-donor hopping.

1.7 The potential of a Coulombic centre in the presence of an electric field $E$. $x$ is the distance measured in the direction of $E$. $\phi_1$ is the ground state.

1.8 Electronic transitions in a high electric field between full and empty traps, involving a slight gain of energy from photons (A), conservation of energy (B) and a slight loss of energy to the lattice (C).
1.9 The modified model of Poole-Frenkel conduction involving emission of an electron from a Coulombic centre via localized traps, $E_{av}$ is the average energy required for escape when the electron has reached the critical radius $r_0$.

CHAPTER 2 ELECTRICAL CONDUCTION IN Se-Te-Sb, Se-Te-Ge and Se-Te-Cd GLASSES AT LOW FIELDS.

2.1 The endothermic peak at glass transition ($T_g$) and an exothermic peak at crystallization temperature ($T_c$) of the $\text{Se}_{80}\text{Te}_{20}$ alloy.

2.2 The endothermic peak at glass transition ($T_g$) and an exothermic peak at crystallization temperature ($T_c$) of the $\text{Se}_{75}\text{Te}_{20}\text{Sb}_{5}$ alloy.

2.3 The endothermic peak at glass transition ($T_g$) and an exothermic peak at crystallization temperature ($T_c$) of the $\text{Se}_{70}\text{Te}_{20}\text{Sb}_{10}$ alloy.

2.4 The endothermic peak at glass transition ($T_g$) and an exothermic peak at crystallization temperature ($T_c$) of $\text{Se}_{65}\text{Te}_{20}\text{Sb}_{15}$ alloy.

2.5 The endothermic peak at glass transition ($T_g$) and an exothermic peak at crystallization temperature ($T_c$) of $\text{Se}_{70}\text{Te}_{28}\text{Cd}_2$ and $\text{Se}_{70}\text{Te}_{26}\text{Cd}_4$ of glassy alloys.
2.6 The endothermic peaks at glass transition ($T_g$) and an exothermic peak at crystallization temperature ($T_c$) of $\text{Se}_{70}\text{Te}_{24}\text{Cd}_6$ and $\text{a-Se}_{70}\text{Te}_{22}\text{Cd}_8$ of glassy alloys.

2.7 Sample holder used for electrical measurements in films at different temperatures in vacuum.

2.8 I-V curves at room temperature for $\text{a-Se}_{80}\text{Te}_{20}$.

2.9 I-V curves at room temperature for $\text{a-Se}_{75}\text{Te}_{20}\text{Sb}_5$.

2.10 I-V curves at room temperature for $\text{a-Se}_{75}\text{Te}_{20}\text{Ge}_5$.

2.11 I-V curves at room temperature for $\text{a-Se}_{70}\text{Te}_{26}\text{Cd}_4$.

2.12 $\ln \sigma$ vs $1000/T$ for $\text{a-Se}_{70-x}\text{Te}_{20}\text{Sb}_x$.

2.13 $\ln \sigma$ vs $1000/T$ for $\text{a-Se}_{70-x}\text{Te}_{20}\text{Ge}_x$.

2.14 $\ln \sigma$ vs $1000/T$ for $\text{a-Se}_{70}\text{Te}_{30-x}\text{Cd}_x$.

2.15 $\ln \sigma$ vs $x$ for $\text{a-Se}_{80-x}\text{Te}_{20}\text{Sb}_x$.

2.16 $\Delta E$ vs $x$ for $\text{a-Se}_{80-x}\text{Te}_{20}\text{Sb}_x$.

2.17 $\ln \sigma$ vs $x$ for $\text{a-Se}_{80-x}\text{Te}_{20}\text{Ge}_x$.

2.18 $\Delta E$ vs $x$ for $\text{a-Se}_{80-x}\text{Te}_{20}\text{Ge}_x$.

2.19 $\ln \sigma$ vs $x$ for $\text{Se}_{70}\text{Te}_{30-x}\text{Cd}_x$.

2.20 $\Delta E$ vs $x$ for $\text{Se}_{70}\text{Te}_{30-x}\text{Cd}_x$.

2.21 $\ln \sigma_0$ vs $\Delta E$ for $\text{a-Se}_{80-x}\text{Te}_{20}\text{Sb}_x$.

2.22 $\ln \sigma_0$ vs $\Delta E$ for $\text{a-Se}_{80-x}\text{Te}_{20}\text{Ge}_x$.

2.23 $\ln \sigma_0$ vs $\Delta E$ for $\text{a-Se}_{70}\text{Te}_{30-x}\text{Cd}_x$. 
CHAPTER 3  HIGH FIELD CONDUCTION IN Se-Te-Sb, Se-Te-Ge AND Se-Te-Cd GLASSES.

3.1 I-V characteristics for a-Se$_{80}$Te$_{20}$ at different temperatures.

3.2 I-V characteristics for a-Se$_{75}$Te$_{20}$Sb$_{5}$ at different temperatures.

3.3 I-V characteristics for a-Se$_{70}$Te$_{20}$Sb$_{10}$ at different temperatures.

3.4 I-V characteristics for a-Se$_{65}$Te$_{20}$Sb$_{15}$ at different temperatures.

3.5 I-V characteristics for a-Se$_{75}$Te$_{20}$Ge$_{5}$ at different temperatures.

3.6 I-V characteristics for a-Se$_{70}$Te$_{20}$Ge$_{10}$ at different temperatures.

3.7 I-V characteristics for a-Se$_{65}$Te$_{20}$Ge$_{15}$ at different temperatures.

3.8 I-V characteristics for a-Se$_{70}$Te$_{28}$Cd$_{2}$ at different temperatures.

3.9 I-V characteristics for a-Se$_{70}$Te$_{26}$Cd$_{4}$ at different temperatures.

3.10 I-V characteristics for a-Se$_{70}$Te$_{24}$Cd$_{6}$ at different temperatures.

3.11 ln I vs ln V curves at different temperatures for a-Se$_{80}$Te$_{20}$. 
3.12 ln I vs ln V curves at different temperatures for a-Se$_{75}$Te$_{20}$Sb$_{5}$.

3.13 ln I vs ln V curves at different temperatures for a-Se$_{70}$Te$_{20}$Sb$_{10}$.

3.14 ln I vs ln V curves at different temperatures for a-Se$_{65}$Te$_{20}$Sb$_{15}$.

3.15 ln I vs ln V curves at different temperatures for a-Se$_{75}$Te$_{20}$Ge$_{5}$.

3.16 ln I vs ln V curves at different temperatures for a-Se$_{70}$Te$_{20}$Ge$_{10}$.

3.17 ln I vs ln V curves at different temperatures for a-Se$_{65}$Te$_{20}$Ge$_{15}$.

3.18 ln I vs ln V curves at different temperatures for a-Se$_{70}$Te$_{28}$Cd$_{2}$.

3.19 ln I vs ln V curves at different temperatures for a-Se$_{70}$Te$_{26}$Cd$_{4}$.

3.20 ln I vs ln V curves at different temperatures for a-Se$_{70}$Te$_{22}$Cd$_{6}$.

3.21 ln I vs V curves at different temperatures for a-Se$_{80}$Te$_{20}$.

3.22 ln I vs V curves at different temperatures for a-Se$_{75}$Te$_{20}$Sb$_{5}$.

3.23 ln I vs V curves at different temperatures for a-Se$_{70}$Te$_{20}$Sb$_{10}$.
3.24 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{65}$Te$_{20}$Sb$_{15}$.
3.25 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{75}$Te$_{20}$Ge$_{5}$.
3.26 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{70}$Te$_{20}$Ge$_{10}$.
3.27 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{65}$Te$_{20}$Ge$_{15}$.
3.28 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{70}$Te$_{28}$Cd$_{2}$.
3.29 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{70}$Te$_{26}$Cd$_{4}$.
3.30 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{70}$Te$_{22}$Cd$_{6}$.
3.31 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{80}$Te$_{20}$.
3.32 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{75}$Te$_{20}$Sb$_{5}$.
3.33 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{70}$Te$_{20}$Sb$_{10}$.
3.34 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{65}$Te$_{20}$Sb$_{15}$.
3.35 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{75}$Te$_{20}$Ge$_{5}$.
3.36 $\ln I$ vs $V$ curves at different temperatures for a-Se$_{70}$Te$_{20}$Ge$_{10}$.
3.37 $\ln I$ vs $\sqrt{V}$ curves at different temperatures for $a$-Se$_{65}$Te$_{20}$Ge$_{15}$.

3.38 $\ln I$ vs $\sqrt{V}$ curves at different temperatures for $a$-Se$_{70}$Te$_{28}$Cd$_2$.

3.39 $\ln I$ vs $\sqrt{V}$ curves at different temperatures for $a$-Se$_{70}$Te$_{26}$Cd$_4$.

3.40 $\ln I$ vs $\sqrt{V}$ curves at different temperatures for $a$-Se$_{70}$Te$_{22}$Cd$_6$.

3.41 The slope $(S)$ vs $1/T$ curves for various glassy alloys in $a$-Se$_{80-x}$Te$_{20}$Sb$_x$ system.

3.42 The slope $(S)$ vs $1/T$ curves for various glassy alloys in $a$-Se$_{80-x}$Te$_{20}$Ge$_x$ system.

3.43 The slope $(S)$ vs $1/T$ curves for various glassy alloys in $a$-Se$_{70}$Te$_{30-x}$Cd$_x$.

CHAPTER 4 HIGH FIELD CONDUCTION IN Ge$_{22}$Se$_{78-x}$Bi$_x$ GLASSES

4.1 $\ln I/V$ vs $V$ curves at different temperatures for $a$-Ge$_{22}$Se$_{78}$.

4.2 $\ln I/V$ vs $V$ curves at different temperatures for $a$-Ge$_{22}$Se$_{76}$Bi$_2$.

4.3 $\ln I/V$ vs $V$ curves at different temperatures for $a$-Ge$_{22}$Se$_{74}$Bi$_4$.

4.4 $\ln I/V$ vs $V$ curves at different temperatures for $a$-Ge$_{22}$Se$_{68}$Bi$_{10}$. 
4.5 Slope (S) vs 1000/T curves for $a\text{-Ge}_{22}\text{Se}_{78-x}\text{Bi}_x$.

4.6 Slope (S) vs $1/d^2$ curves for different electrode gaps in $a\text{-Ge}_{22}\text{Se}_{78}$.

4.7 Density of states vs (x) curve in $a\text{-Ge}_{22}\text{Se}_{78-x}\text{Bi}_x$. 