Printed Pages : 3

EEC013

B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15
ADVANCE SEMICONDUCTOR DEVICES

Time : **2** Hours]   [Total Marks : **50**

NOTE :   ATTEMPT ALL PROBLEMS.

1   Justify the validity of following statements with proof : 2.5×4=10

(ANY FOUR)

(1)   Gold is used as recombination agent.

(2)   Esaki diode is used in reverse bias.

(3)   GaAs is having lesser mobility than Si.

(4)   Mobility is proportional to $T^{-1.5 \, and \, +1.5}$.

(5)   Current becomes fluctuating function of time in bulk devices.

(6)   IMPATT is noisy.

(7)   Solar cell must be operated in 4th quadrant of V, I GRAPH.

2   Answer any two parts of the following: 5×2=10

   (A) Find the maximum and normal conductivity of Si sample doped with N_A & N_D impurities after assuming necessary and sufficient notations in accordance with yourself.

   (B) Prove that per degree Centigrade increase in temperature increases the conductivity of Si by 8%.

   (C) Calculate the capacitance of graded junction after assuming necessary and sufficient notations in accordance with yourself.

3   Answer any two parts of the following: 5×2=10

   (A) Discuss : (1) diffusion length (2) carrier life time (3) recombination (4) electron hole pair.

   (B) Discuss the phenomenon of photoconductivity in detail with its examples and applications.

   (C) Discuss the operation of N channel JFET with the condition of pinch-off. Deduce the result of transconductance of this amplifier.

4   Answer any two parts of the following: 5×2=10

   (A) Discuss the operation of SCR with latching and holding current in detail.

   (B) Discuss the operation, applications and symbol of tunnel and zener diode in detail.

   (C) Discuss construction, operation and use of solar cell. Design a solar panel which can provide 1 Mega watt to University.

5   Write short notes on any two of the following :   5×2=10

    (1)   IMPATT

    (2)   FERMI LEVEL

    (3)   AVALANCHE DIODE

    (4)   Semiconductor laser.

———————