

Printed Pages : 3



EEC013

(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 131653**

Roll No.

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**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:  $2.5 \times 4 = 10$   
 (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 4<sup>th</sup> quadrant of V, I GRAPH.

- 2 Answer any two parts of the following:  $5 \times 2 = 10$
- (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:  $5 \times 2 = 10$
- (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:  $5 \times 2 = 10$
- (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 :  $5 \times 2 = 10$

- (1) IMPATT
- (2) FERMI LEVEL
- (3) AVALANCHE DIODE
- (4) Semiconductor laser.

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