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(2 pages)

Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION

DECEMBER 2004

EC-2K-303 – SOLID STATE DEVICES

(New Scheme)

Time : Three Hours

Maximum : 100 Marks

Answer all *questions.*

I. (a) Differentiate Direct from Indirect band gap semiconductors. Give examples.

(b) Define and explain conductivity and mobility.

(c) Write diode equation. Explain the parameters of the equation.

(d) Mention and discuss the potential applications of Varactor diodes.

(e) Explain the concept of dc load line.

(f) Define : Transit time. How the transit time effect can be overcome ? Explain.

(g) Differentiate BJTs from FETs.

(h) Give an account on "GaAs MESFET".

(8 × 5 = 40 marks)

II. (a) (i) Draw the energy band diagrams of Semiconductors, Conductors and Insulators. Explain them. (8 marks)

(ii) Explain the significance of Fermi-level in Semiconductors. (7 marks)

Or

(b) (i) Explain electron and hole concentrations at equilibrium. (8 marks)

(ii) State and derive continuity equation. (7 marks)

III. (a) Explain the principle of operation of tunnel diode with a neat sketch and Energy band diagrams. Mention the advantages and applications of tunnel diode. (15 marks)

Or

(b) Explain in detail the V-I characteristics of zener diode. Mention the potential applications of zener diodes. Explain any *one.* (15 marks)

IV. (a) (i) Explain the procedure to draw a dc load line of a BJT circuit. (8 marks)

(ii) Draw the ebers-Moll model of a BJT and explain it. (7 marks)

Or

Turn over

(b) Explain the principle of operation of UJT with its neat sketch and V-I characteristics. Define the parameters of the device. (15 marks)

V. (a) (i) Define and explain the parameters of JFET. Derive the relationship among them. (8 marks)

(ii) Explain the creation of Inversion layer in JFET. (7 marks)

Or

(b) Explain in detail the construction, characteristics, principle of operation and applications of IGFET. (15 marks)