



M 25933

Reg. No. : .....

Name : .....

**Third Semester B.Tech. (Reg./Sup./Imp. – Including Part Time)  
Degree Examination, November 2014  
(2007 Admn. Onwards)  
PT 2K6/2K6 EC/AEI 304 : SOLID STATE DEVICES**

Time: 3 Hours

Max. Marks: 100

- Instructions :** 1) Answer *all* questions.  
2) Part – **A** each question carries 5 marks.  
3) Part – **B** each question carries 15 marks.

PART – A

- |  |   |
|--|---|
| I. a) Differentiate between direct and indirect semi conductors. | 5 |
| b) Explain fermi dirac distribution function.                    | 5 |
| c) Explain contact potential.                                    | 5 |
| d) Draw the energy band diagrams for a PN junction :             | 5 |
| a) Equilibrium   |   |
| b) Forward bias  |   |
| c) Reverse bias.   |   |
| e) Explain Kirk effect.  | 5 |
| f) Discuss Avalonce breakdown in transistors.                    | 5 |
| g) Discuss load line concept with respect to FET.                | 5 |
| h) Define mutual trans conductance in JFET.                      | 5 |

**(8×5=40)**

P.T.O.



## PART – B

- II. a) Describe Fermi-Dirac distribution function applied to semi conductor : 15
- i) Intrinsic type material
  - ii) N type material
  - iii) P-type material.
- OR
- b) Describe temperature dependance of carrier concentration. 15
- III. a) Briefly describe Graded junction. Why graded junction approximation is preferred over abrupt junction ? 15
- OR
- b) Explain Schottky barriers. 15
- IV. a) Discuss Eber Moll model for explaining large signal behaviour of transistors. 15
- OR
- b) Explain charge control analysis of transistors. 15
- V. a) Explain in detail the structure of N channel MOSFET. 15
- OR
- b) Explain in detail the operation of N channel MOSFET with neat sketches for the following operating conditions. 15
- i) Linear region for  $V_G > V_T$  and  $V_D < V_G - V_T$
  - ii) Onset of saturation at pinch off
  - iii) Strong saturation  $V_G > V_T$  and  $V_D > V_G - V_T$ .

(15×4=60)

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