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Code No.: 6124 M

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
M.E. I Year (ECE) I-Semester (Make Up) Examinations, March-2016
(Embedded Systems & VLSI Design)

Physics of Semiconductor Devices

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE questions from Part-B

Part-A (10 X 2=20 Marks)

1. What do you understand by Gunn Effect?
2. State the Bloch theorem.
3. How does Depletion capacitance arise in a P-n Junction?
4. What do you mean by the term "Second Breakdown"?
5. Draw the symbols of n-type and p-type normally-on and normally-off JFET and MESFET.
6. List out the salient features of MIS diode.
7. How does thin film transistor differ from MOSFET?
8. Explain the significance of Shallow Junctions.
9. What are the applications of Gallium Arsenide Devices?
10. Explain the basic principles involved in generating Microwave Oscillations.

Part-B (5 X 10=50 Marks)

11. a) What is the need of basic equations of current or charge flow in semiconductor device operations?
Discuss in detail Maxwell, Current density and Continuity equations. (6)
b) Discuss in detail the Carrier Transport phenomenon in semi-conductor devices. (4)
12. a) Discuss in detail the effect of Generation –Recombination Processes in Bipolar devices. (6)
b) Explain Gummel Poon Model of BJTs. (4)
13. a) Explain in detail the Energy-band diagrams for ideal MIS diodes when $v \neq 0$ for the following regions of operation.
i) accumulation ii) depletion iii) inversion (6)
b) Bring out the differences between JFET and MESFET. (4)
14. a) With a neat diagram, explain the dependence of threshold voltage on channel length for a MOSFET. (6)
b) Discuss in detail the operation of Silicon on Insulator FET (SOI FET). (4)
15. a) Explain the significance of Floating Gate devices for Non-volatile memories. (5)
b) Discuss in detail the characteristics of materials suitable for realizing LEDs in the visible range. (5)
16. a) Bring out the differences between MOSFET and MISFET. (5)
b) Explain in detail the general characteristic of Buried channel devices. (5)
17. Write a short note on
a) Lasers (5)
b) Hall Effect (5)
