

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M.TECH
BRANCH: ECE

SEMESTER : III
SESSION : MO/19

SUBJECT: EC616 HIGH SPEED SEMICONDUCTOR DEVICES

TIME: 3 HOURS

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Show the relationship between frequency of the application and device technology choice and explain it in brief. [5]
- Q.1(b) Draw and explain SOI fabrication process. Also explain SOI wafer preparation in brief. [5]
- Q.2(a) Show the energy bandgap and associated lattice constants for III-V hetro-structures. [5]
- Q.2(b) Explain the difference between the cubic and hexagonal polytypes of SiC. [5]
- Q.3(a) Draw the cross section of SiC MESFET and explain it. [5]
- Q.3(b) What are the advantages of GaAs MESFET? [5]
- Q.4(a) Draw the circuit diagram of small signal equivalent circuit of HEMT and calculate f_{max} . [5]
- Q.4(b) What is the difference between vertical scaling and horizontal scaling? [5]
- Q.5(a) Draw the schematic cross-section of unpassivated HBTs and explain it. [5]
- Q.5(b) Draw and explain the HBT mask layout for high frequency application. [5]

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