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BIELE-013

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

00733

Term-End Examination

June, 2018

BIELE-013 : DEVICE MODELLING FOR CIRCUIT SIMULATION

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Missing data, if any may be suitably assumed. Use of scientific calculator is permitted.*

1. Explain the principle of circuit simulation. List their advantages and disadvantages. *5+5=10*

2. Explain the various models of diodes. *10*

3. Write the SPICE code for a full-wave bridge rectifier circuit and simulate for its input-output characteristics. *10*

4. Derive the diode current equation and mention the various SPICE parameters involved in the equation. *10*

5. Explain the following models of a bipolar junction transistor : *5+5=10*

   (a) Small signal

   (b) High frequency

6. What is device scaling ? Explain short and narrow channel MOSFETs. *2+4+4=10*

7. What are HBTs and HEMTs ? Briefly explain their operation. *4+6=10*

8. Explain the high frequency model of a MOSFET. *10*

9. Write the SPICE code for a common-source amplifier and perform its AC and Transient analysis. *10*

10. Write short notes on any ***two*** of the following : *2×5=10*

    (a) LEVEL-1 MOSFET Model

    (b) MOS Capacitor

    (c) Extraction of BJT model parameters