Hall Ticket Number:

Code No. : 13406 O

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (ECE) II Year I-Semester Backlog Examinations, December-2017

Electronic Materials & Devices

Time: **3** hours Max. Marks: **70**

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

Part-A (10 × 2 = 20 Marks)

1. The reverse saturation current of a silicon PN junction diode is 10μA. Calculate the diode current for forward bias voltage of 0.6V at 25°C.
2. Distinguish between a PN junction and a schottky junction.
3. Define Ripple factor and PIV.
4. State the principle of operation of a Light Emitting Diode.
5. Determine I_E and α for a transistor circuit having I_B=15μA and β=150.
6. What is early effect in a BJT?
7. Write a short comparison of CE,CC and CB configurations.
8. What is holding and latching current of SCR?
9. Prove that the Transconductance $g_m=-(2/V_p)(I_D.I_{DSS})^{1/2}$.
10. Compare enhancement and depletion MOSFET.

Part-B (5 × 10 = 50 Marks)

11. a) Derive an expression for transition capacitance of a diode. [5]
    b) Draw and explain the V-I characteristics of Zener diode. [5]
12. a) Analyze the bridge rectifier for its ripple factor, efficiency and PIV. [6]
    b) Explain the working principle of photo diode and list its applications. [4]
13. a) Draw and explain the output characteristics of BJT in CE configuration. What are the three regions of operation? How can they be demarcated in the output characteristics? [6]
    b) What is thermal runaway and how can it be prevented? [4]
14. a) Analyze Emitter follower circuit for its current gain and voltage gain. [5]
    b) Draw and explain the working of a UJT with the help of its characteristics. [5]
15. a) Draw the structure of JFET and explain the drain and transfer characteristics. [5]
    b) Draw and explain the construction and operation of an enhancement MOSFET. [5]
16. a) Write a short note on PN junction formation techniques and list diode applications. [5]
    b) Write a short note on Varactor diode and state its applications. [5]
17. Answer any ***two*** of the following:
    a) Thermal stabilization of BJT. [5]
    b) Write short notes on DIAC and TRIAC. [5]
    c) Compare BJT with FET. [5]