VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (ECE) II Year I-Semester Old Examinations, May/June-2018

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. Define drift and diffusion currents in a semiconductor.
2. Explain the effect of rise in temperature on Voltage and current of a diode.
3. Calculate the value of capacitance to be used in a capacitor filter connected to a full wave rectifier operating at a frequency of 50Hz, if the ripple factor is 10% for a load of 500Ω.
4. State the principle of operation of a Tunnel diode.
5. Define α, β and γ for a BJT.
6. List the advantages of self-bias circuit.
7. Draw the h-parameter model for CE BJT amplifier.
8. What is intrinsic standoff ratio in a UJT?
9. Explain why FET is called a unipolar device.
10. A JFET has a drain current of 15mA. If I_{DSS} and V_p are 5mA and 5V respectively, find V_{GS}.

Part-B *(5 × 10 = 50 Marks)*

11. a) Define and derive an expression for diffusion capacitance of a diode. [6]
    b) The reverse saturation current of a Silicon PN diode is 1μA at room temperature. Determine its ac resistance at 150mV forward bias. [4]

12. a) Draw and analyze a full wave rectifier with centre tapped transformer and find its PIV, ripple factor, TUF and efficiency. [5]
    b) Explain with energy band diagrams the operation and the V-I characteristics of a Tunnel Diode. [5]

13. a) Draw and explain the output characteristics of BJT in CB configuration. What are the three regions of operation? How can they be demarcated in the output characteristics? [6]
    b) Explain the current components of BJT and derive a relation between α and β. [4]

14. a) Derive voltage gain and current gain for CE BJT amplifier using h-parameter model. [5]
    b) Explain the working of a DIAC and compare it with a TRIAC. [5]

15. a) Draw and explain the characteristics of a JFET. [5]
    b) Draw and explain the construction and operation of a depletion MOSFET. [5]

16. a) Write a short note on Zener voltage regulator and its limitations. [5]
    b) Write a short note on Light Emitting diode and state its applications. [5]

17. Answer any *two* of the following:
    a) Stability factor of BJT. [5]
    b) Write short notes on SCR. [5]
    c) List and explain FET applications. [5]

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