1002

Code : 15EC-21T

Register Number | | | | | | | |

II Semester Diploma Examination, Nov./Dec. 2016

BASICS OF SEMICONDUCTOR DEVICES

Time : 3 Hours] **[Max. Marks : 100**

Note : (i) Answer any **six** questions from Part – A. (**6 × 5 = 30** Marks)
(ii) Answer any **seven** full questions from Part – B. (**7 × 10 = 70** Marks)

PART – A

1. Define Doping. Explain energy band diagram of p-type semiconductor. **5**

2. Explain the formation of PNP transistor. **5**

3. Outline different regions in output characteristics of BJT in CE mode. **5**

4. Explain the principle of operation of JFET briefly. **5**

5. Write applications of CMOS. **5**

6. List the features of GUNN diode. **5**

7. Define SSI, MSI, LSI, VLSI and ULSI. **5**

8. List the applications and advantages of LED. **5**

9. Write a short note on opto-coupler. **5**

PART – B

10. (a) Distinguish between n-type and p-type semiconductors. **5**
    (b) Explain the behaviour of zener diode under reverse biasing with the help of characteristic plot. **5**

11. (a) Define : **5**
    (i) Valence electron
    (ii) Intrinsic semiconductor
    (iii) Cut-in voltage
    (iv) Dopant
    (v) Reverse saturation current
    (b) Describe the effect of temperature on Diode Current. **5**

12. (a) Calculate emitter current if the base current is 10 μA and current gain is 100 for CE mode transistor. 5

(b) Justify the need of heat sink. 5

13. (a) Write a note on CE mode of operation of BJT. 5

(b) Define α and β and deduce the relation between them. 5

14. (a) Define g_m, μ and r_d of JFET. Justify $\mu = g_m \times r_d$. 5

(b) Explain the working principle of CMOS inverter. 5

15. (a) Justify why JFET is called as voltage controlled device. Also, list disadvantages of JFET over MOSFET. 5

(b) Compare the enhancement and depletion modes of MOSFET. 5

16. (a) Outline symbols of UJT, SCR, diac, diode and Schottky diode. 5

(b) Identify at least one application for each of SCR, tunnel diode, diac, triac and UJT. 5

17. (a) Write a short note on varactor diode. 5

(b) List the features of tunnel diode. 5

18. (a) Explain the fabrication process of monolithic ICs. 5

(b) List the advantages and disadvantages of ICs. 5

19. (a) List the applications of photodiode and phototransistor. 5

(b) List the features of MASER. 5