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**18EC33**

## Third Semester B.E. Degree Examination, July/August 2021 Electronic Devices

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions.**

1. a. What are the different types of Bonding Forces in solids and explain any one. (06 Marks)  
 b. Draw the typical band structures at OK for insulator, semiconductor and metal and explain it. (06 Marks)  
 c. With mathematical equations, describe the hall effect. (08 Marks)
2. a. Explain Electron-hole pair in a semiconductor with the help of the graph. (06 Marks)  
 b. Explain the effects of temperature and doping on mobility. (06 Marks)  
 c. Describe the drift of electrons and holes in a semiconductor bar. (08 Marks)
3. a. Draw the I-V characteristic of a Pn-junction with current equation under equilibrium, forward and reverse bias and explain it. (06 Marks)  
 b. Explain the concept of Zener breakdown with energy band diagram. (06 Marks)  
 c. Explain the solar cells with structures. (08 Marks)
4. a. Draw the piece wise linear approximations of junction diode characteristics for ideal diode, ideal diode with offset voltage and ideal diode with offset voltage and resistance. (06 Marks)  
 b. Draw the schematic representation of a P-i-n photodiode and explain it. (06 Marks)  
 c. Explain the Avalanche Breakdown with energy diagram. (08 Marks)
5. a. Explain the working of P-n-P device and also draw the curve of  $I_C$  versus  $V_{BC}$ . (06 Marks)  
 b. Describe the various mechanisms of a switching cycle of a PnP transistor. (06 Marks)  
 c. Write the step-by-step fabrication of a BJT with diagrams. (08 Marks)
6. a. Define the following parameters:  
 i) Emitter injection efficiency  
 ii) Current transfer ratio  
 iii) Base to collector current amplification factor. (06 Marks)  
 b. Draw the simple switching circuit of PnP transistor and explain it. (06 Marks)  
 c. Discuss Base Narrowing in PnP transistor. (08 Marks)
7. a. Explain the operation of a basic Pn JFET for different gate voltage. (10 Marks)  
 b. Draw the small signal equivalent circuit of JFET and explain it. (10 Marks)
8. a. Draw the energy band diagram of an two terminal MOS capacitor with a P-type substrate for a negative gate bias and a moderate positive gate bias and explain it. (10 Marks)  
 b. Explain the structure of n-channel enhancement mode and depletion mode MOSFET. (10 Marks)
9. a. Describe the Rapid thermal processing with the help of diagram. (10 Marks)  
 b. Explain the method of ION implementation with schematic diagram. (10 Marks)
10. a. What are the types of integrated circuits and explain it. (06 Marks)  
 b. Mention the Advantages of Integration. (06 Marks)  
 c. With input and output waveforms, explain the working of CMOS inverter. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.