

Q.P. Code : 5064

(3 Hours)

[Total Marks : 80]

- N.B. 1) Question no.1 is compulsory and solve any three questions from remaining Questions  
2) Assume suitable data if necessary  
3) Draw neat and clean figures
- Q-1 Solve any four
- a Draw small signal model of pn junction diode, what is the main use of this model. 5
  - b What do you mean by different transistor models, explain Hybrid Pi model. 5
  - c What are the advantages of MESFET over MOSFET, explain basic principle of operation of MESFET 5
  - d What is the basic operating principle of phototransistor, draw  $V-I$  characteristics and explain its use in field of optoelectronics. 5
  - e How PUT is different than UJT, explain. 5
- Q-2a Explain structure, construction and working of IMPATT diode. 10
- b Explain working of BJT considering all possible current density components in an NPN transistor operating in Active mode. 10
- Q-3a Derive equation of Electric field for a pn junction under zero bias and hence derive equation of maximum electric field. 10
- b What is HBT, explain with the help of energy level diagram. 5
  - c Explain qualitative characteristics of Schottky diode. 5
- Q-4a Explain JFET with the help of construction and  $V-I$  characteristics, how it is different than BJT 10
- b What is the basic working principle of Solar cell, explain construction, working and  $V-I$  characteristics, also explain what is the need to connect solar cells in series or in parallel fashion. 10
- Q-5a Derive equation of threshold voltage of a N channel MOSFET, also derive threshold voltage equation in generalized form. 10
- b Explain construction, working and  $V-I$  characteristics of SCR, also explain how SCR can be switched OFF. 10
- Q-6a Explain working of MOSFET considering possible cases of VGS voltages. 10
- b Explain construction, working and  $V-I$  characteristic of TRIAC. 5
  - c Explain channel length modulation in MOSFET. 5