

Hall Ticket Number:

|  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|

## II/IV B.Tech (Regular) DEGREE EXAMINATION

OCTOBER, 2016

Electronics &amp; Communication Engineering

Third Semester

Electronic Devices

Time: Three Hours

Maximum : 60 Marks

Answer Question No.1 compulsorily.

(1X12 = 12 Marks)

Answer ONE question from each unit.

(4X12=48 Marks)

1. Answer all questions 1X12=12M
- Write the dimensions of mobility.
  - What is Einstein Relationship?
  - Define cutin voltage of p-n diode.
  - Write the expression for the dynamic resistance of a semiconductor diode.
  - Write the expression for diffusion capacitance of a p-n diode.
  - Calculate  $\beta$  if  $\alpha=0.985$ .
  - Write the expression for  $I_C$  in CE configuration.
  - Draw the small signal model of JFET
  - Write the relation between  $V_p$  and  $V_{GS}$ .
  - List the three sources of instability of collector current.
  - Write the condition for Thermal Stability.
  - Draw V-I characteristics of TRIAC.

## UNIT-I

2. a. Derive an expression for Fermi Level in an intrinsic Semiconductor. 6M
- b. Explain about Hall Effect and its applications. 6M

## OR

3. a. Derive the continuity equation. 6M
- b. Explain why contact difference of potential must develop across an open circuited p-n junction and derive the relevant equation. 6M

## UNIT-II

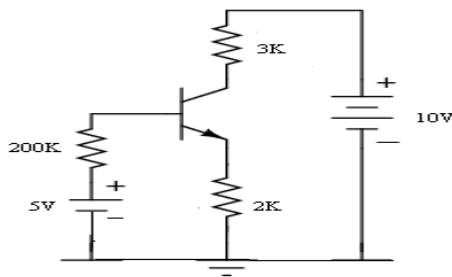
4. a. Derive volt ampere equation of p-n diode. 6M
- b. How does the reverse saturation current of a p-n diode vary with temperature? 6M

**OR**

5. a. Derive the expression for Transition Capacitance of a P-N Diode. 6M
- b. Write the working of a Tunnel diode with the help of Energy Band diagram. 6M

### UNIT-III

6. a. Sketch a family of CE output characteristics and explain qualitatively. 6M
- b. Find the transistor currents in the circuit shown in figure. A silicon transistor with  $\beta=100$  and  $I_{CO}=20$  nA is under consideration. 6M



**OR**

7. a. Sketch the basic structure of an n-channel JFET and explain its operation. 6M
- b. Explain working of MOSFET in Depletion mode and draw the Drain & Transfer characteristics. 6M

### UNIT-IV

8. a. Derive the Stability Factor  $S(V_{BE})$  for self Bias. 6M
- b. What is the condition for thermal stability? Explain. 6M

**OR**

9. a. Explain the construction and working of TRIAC. Sketch its V-I characteristics. 6M
- b. Explain the operation of an Uni Junction Transistor (UJT). 6M