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**B.E/B.Tech (Part Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2014**  
**ELECTRONICS AND COMMUNICATION ENGINEERING (1<sup>st</sup> SEMESTER)**  
**(REGULATION 2009)**  
**PTEC 9151 – ELECTRON DEVICES**

Time : 3 Hrs

Max. Marks :100

Answer **ALL** Questions

**PART-A**

**(10 x 2 = 20 Marks)**

1. Define Knee voltage of a diode.
2. The transition capacitance of an abrupt junction diode is 20 pF at 5 V. Compute the value of decrease in capacitance for a 1 V increase in the bias.
3. Calculate the  $\beta$  of a transistor when  $\alpha$  is 0.98.
4. Draw the h-parameter equivalent circuit of a CE BJT configuration.
5. What is "pinch-off" voltage?
6. Bring out the difference between EMOSFET and DMOSFET.
7. Differentiate between ohmic contact and rectifying contact in metal semiconductor.
8. Mention few practical applications of LDR.
9. Draw the circuit symbol for a TRIAC.
10. What is the need for having a multiemitter transistor?

**PART-B**

**(5 x 16 = 80 Marks)**

- 11 (i) Derive the expression for drift and diffusion current densities. (8)  
(ii) With neat sketches, explain in detail about the switching time characteristics of a diode. (8)
- 12.a)(i) Describe the static input and output characteristics of a CB transistor with neat circuit diagram. (10)  
(ii) Draw the hybrid- $\pi$  model of a BJT and express the notations used in the model (6)  
**(OR)**
- 12.b)(i) Draw the Ebers Moll model of transistor and starting from the basic principles, derive the expression for collector emitter saturation voltage. (12)  
(ii) Calculate the collector-emitter saturation voltage of a BJT at  $T = 300^\circ \text{K}$  assuming  $\alpha_F = 0.99$  ;  $\alpha_R = 0.20$ ; the collector and the base currents given as 1mA and 50 $\mu\text{A}$  respectively. (4)
- 13.a)(i) Describe the construction , operation, and characteristics of N-channel JFET. (8)  
(ii) Write a brief note on power MOSFET with relevant diagrams. (8)  
**(OR)**
- 13.b)(i) Draw the structure of N-channel depletion type MOSFET and explain its operation and characteristics. (8)  
(ii) With neat diagrams and necessary equations, briefly explain the concept of channel length modulation. (8)
- 14.a)(i) With neat sketches, briefly explain the working principle of a Schottky diode. (8)  
(ii) With neat diagram, explain in detail about the LASER diode. (8)  
**(OR)**
- 14.b)(i) With energy band diagram , explain the theory and characteristics of tunnel diode. (10)  
(ii) With a neat diagram, explain how zener diode can be used as a voltage regulator. (6)

**(P.T.O)**

15.a)(i) Explain the working of SCR in two transistor model. (8)

(ii) Discuss the operation and characteristics of phototransistor. Mention the applications of phototransistors. (8)

(OR)

15.b) Write short notes on:

(i) FINFET

(ii) Dualgate MOSFET

(iii) Charge Coupled Devices

(iv) Solar Cell

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