

B.Tech
(SEM III) THEORY EXAMINATION 2018-19
ELECTRONICS DEVICES AND CIRCUITS

Time: 3 Hours**Total Marks: 70****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 7 = 14**

- a) What type of semiconductor material is suitable for luminescence effect?
- b) What do you mean by diffusion of carriers?
- c) In the linear region operation of MOSFET drain current decreases as the temperature increases. Explain.
- d) What is meant by threshold voltage?
- e) What is a transistor? Explain its types.
- f) what do you mean by optoelectronic devices?
- g) What is negative feedback and positive feedback

SECTION B**2. Attempt any three of the following: 7 x 3 = 21**

- a) Explain the principle of indirect recombination in band gap. Discuss its mechanism
- b) What is a photodiode ? explain its construction and operation.
- c) Explain the operation and characterstics of N- channel MOSFET.
- d) Explain transistor characterstics in CE configuration. Explain the behaviour of the transistor in active and cutoff mode.
- e) What is an oscillator ? how does it differ from an amplifier

SECTION C**3. Attempt any one part of the following: 7 x 1 = 7**

- a) Explain the terms : solar cell , LED
- b) Derive the expression for the forward and reverse saturation current for P-N junction diode

4. Attempt any one part of the following: 7 x 1 = 7

- a) The energy distribution function p_E is given by the product of two factors [$p_E = N(E) \cdot f(E)$]. What is the interpretation to be given to each of these factors?
- b) B. What is Einstein relation? Develop expressions to establish relations between diffusion coefficient and mobility of carriers or obtain the relation: $D/\mu = kT/q$

5. Attempt any one part of the following: 7 x 1 = 7

- a) Show that $I_E = I_B + \alpha I_E + I_{CBO}$.in what way I_{CBO} depend on temperature?
- b) Define α and β of a transistor and derive the relationship between them.

6. Attempt any *one* part of the following: **7 x 1 = 7**

- a) Explain the terms: single stage MOS amplifier, MOSFET internal capacitances
- b) Draw a biasing circuit of MOSFET amplifier and explain it.

7. Attempt any *one* part of the following: **7 x 1 = 7**

- A. draw the circuit diagram of LC oscillators? What is the condition of oscillation.
- B. Explain the four types of feedback topologies with the help of schematic diagram.