Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50483

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023

Third Semester

Biomedical Engineering

EC 8353 – ELECTRON DEVICES AND CIRCUITS

(Common to: B.E. Computer and Communication Engineering/Electrical and Electronics and Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Robotics and Automation)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Give the expression for drift current density due to electron.
2. Define rectifier efficiency.
3. What is alpha and beta of the transistor?
4. Differentiate enhancement and depletion MOSFET.
5. Why do we choose 'Q' point at the center of the load line?
6. How does the MOSFET has high input impedance?
7. Define (a) Differential gain (b) Common mode gain
8. What is neutralization in tuned amplifiers?
9. List the advantages of negative feedback
10. Write the expression for frequency of oscillation of a Colpitts oscillator.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain the operation of PN junction under zero voltage applied bias condition and derive the expression for built in potential barrier. (6)

(ii) Illustrate the Centre – tapped full wave bridge rectifier and derive the expression for rectifier efficiency. (7)

Or

(b) (i) Calculate the diffusion capacitance for a silicon diode with a 15 mA forward current, if the charge carrier transit time is 70nsec. (5)

(ii) Discuss about simple Zener shunt voltage regulator with the help of circuit diagram. (8)

12. (a) (i) Compare Common Emitter, Common Base and Common Collector transistor configuration. (5)

(ii) Draw the structure of depletion mode MOSFET and explain its operation with characteristics. (8)

Or

(b) (i) Draw and explain the characteristics of UJT. (5)

(ii) How the 'Q' point of the fixed bias of the transistor circuit is selected and explain the stability of the operating point factor in common emitter amplifier. (8)

13. (a) Derive trans conductance of MOSFET using small signal equivalent model. Discuss the variation in drain current I_D with respect to V_{GS}

Or

(b) Explain the analysis of low frequency response of RC coupled amplifier.

14. (a) Explain working about differential amplifier and derive expression for CMRR.

Or

(b) Draw a neat circuit diagram and explain working of cascade amplifier and derive the expression for gain and frequency.

15. (a) With neat diagram, explain the working of Wein bridge oscillator and derive the expression for frequency of Oscillations.

Or

(b) Explain voltage series and shunt feedback amplifier with an example.

PART C — (1 × 15 = 15 marks)

16. (a) Draw the h parameter equivalent circuit for NPN transistor CE circuit. Define and derive for all components.

Or

(b) Make complete analysis of single tuned amplifier and derive the necessary expressions.