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Question Paper Code: R2306

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Second Semester

Electrical and Electronics Engineering

R21UEE206 PRINCIPLES OF ELECTRONICS

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. In forward bias, which terminal of the diode is connected to the positive voltage? CO1- U
 - (a) P-region
 - (b) N-region
 - (c) Both regions
 - (d) Neither region
2. What's the abrupt increase in reverse current due to minority carrier multiplication? CO1- U
 - (a) Zener breakdown
 - (b) Avalanche breakdown
 - (c) Tunneling breakdown
 - (d) Schottky breakdown
3. What do switching characteristics of a transistor involve? CO1- U
 - (a) Transition between cutoff, saturation, and active regions
 - (b) Analysis of voltage amplification in RF applications
 - (c) Calculation of power dissipation in power transistors.
 - (d) Evaluation of current gain in optocouplers.
4. Which application utilizes power transistors extensively? CO1- U
 - (a) RF amplifiers.
 - (b) Low-power electronic devices.
 - (c) Audio amplifiers.
 - (d) High-current circuits like motor drivers.
5. What defines the operation of a JFET? CO1- U
 - (a) Voltage-controlled resistance.
 - (b) Current-controlled resistance.
 - (c) Voltage-controlled capacitance
 - (d) Current-controlled capacitance.

6. Which MOSFET configuration offers high voltage gain? CO1- U
 (a) Common-drain (b) Common-source (c) Common-gate (d) Common-emitter
7. Single-tuned amplifiers are mainly used for: CO1- U
 (a) Audio amplification (b) RF amplification
 (c) Digital signal processing (d) Power amplification
8. What enhances CMRR in a differential amplifier? CO1- U
 (a) Capacitor (b) Resistor (c) Inductor (d) Current source
9. What is the primary function of a crystal oscillator in electronic circuits? CO1-U
 (a) Voltage amplification (b) Frequency generation
 (c) Phase shifting (d) Current regulation
10. Which multivibrator configuration produces a continuous square wave output? CO1-U
 (a) Astable (b) Monostable
 (c) Bistable (d) None of the above

PART – B (5 x 2= 10Marks)

11. Explain the concept of drift and diffusion carriers in semiconductors. CO1- U
12. Compare and contrast the input and output characteristics of a bipolar junction transistor in the common-emitter configuration CO1-U
13. Explain the concept of Pinch-off voltage in JFETs. CO1-U
14. Explain the significance of the voltage gain in a CE amplifier. CO1- U
15. Why is an RC phase shift oscillator called so? CO4-App

PART – C (5 x 16= 80Marks)

16. (a) Apply your knowledge to define "Zener breakdown" and discuss its significance in electronic circuits. CO2-App (16)

Or

- (b) Apply your understanding to differentiate between forward and reverse biased P-N junctions, emphasizing their V-I characteristics. CO2-App (16)

17. (a) Analyze the relationship between α , β , and γ in a BJT. Discuss how changes in these parameters affect the transistor's behavior in different configurations. **CO3 - Ana** (16)
- Or
- (b) How a hybrid model for a BJT, incorporating essential parameters. Illustrate how this model combines the characteristics of CE, CB, and CC configurations. **CO3 - Ana** (16)
18. (a) Compare and contrast the different types of gate isolation techniques used in integrated circuits. Discuss their advantages and disadvantages. **CO4 - App** (16)
- Or
- (b) Describe the structure and operation principles of Complementary Metal-Oxide-Semiconductor (CMOS) technology. **CO4- App** (16)
19. (a) Explain in detail about the different feedback topologies. **CO1- U** (16)
- Or
- (b) Explain the concept of common-mode and differential-mode signals in amplifier circuits. **CO1- U** (16)
20. (a) Explain the working of Clapp's oscillator with neat sketch. **CO1 - U** (16)
- Or
- (b) With a neat sketch, explain the working of an wein bridge oscillator. **CO1 - U** (16)

