A

Reg. No. :

Question Paper Code:53305

B.E./B.Tech. DEGREE EXAMINATION, DEC 2021

Third Semester

Electrical and Electronics Engineering

15UEE305-SEMICONTUCTOR DEVICES AND CIRCUITS

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. During reverse bias of PN junction diode, a small current develops   CO1- R
   known as_____

   (a) Forward current   (b) Reverse current

   (c) Reverse saturation current   (d) Active current

2. Zener diode can be primarily classified as   CO1- R

   (a) Forward and reverse biased   (b) Voltage regulation and voltage reference

   (c) Rectifying   (d) Voltage biased

3. The number of depletion layers in a transistor is _____   CO2- R

   (a) four   (b)Three   (c)One   (d)Two

4. It is the current gain for the CE configuration   CO2- R

   (a) α (b) β (c) τ (d) ω

5. The common-source JFET amplifier has_____   CO3- R

   (a) a very high input impedance and a relatively low voltage gain

   (b) a high input impedance and a very high voltage gain

   (c) a high input impedance and a voltage gain less than 1

   (d) no voltage gain

6. Which of the following has the highest input impedance   CO3- R

    (a) FET   (b) MOSFET   (c) BJT   (d) Crystal diode

7. Power amplifiers generally use transformer coupling because   CO4- R
   transformer permits_____

    (a) Cooling of the circuit   (b) Impedance matching

    (c) Distortion less output   (d) Good frequency response

8. In a phase shift oscillator, the frequency determining elements   CO4- R
   are_____

    (a) L and C   (b) R, L and C

    (c) R and C   (d) L and R

9. Which of the choice below does not describe a clipper circuit?   CO5- R

    (a) Limiter   (b) Amplitude selector

    (c) Slicer   (d) Baseline stabilizer

10. A circuit that adds positive or negative dc voltage to an input sine wave   CO5- R
    is called _____

    (a) clipper   (b) clamper   (c) diode clamp   (d) limiter

<center>PART – B (5 x 2= 10 Marks)</center>

11. Differentiate drift and diffusion current.   CO1- R

12. Mention the significance of h-parameters.   CO2- R

13. List the applications of MOSFET.   CO3- R

14. State the Bharkausen's criterion for oscillation.   CO4- R

15. How a monostable multivibrator circuit can be obtained from an astable   CO5- R
    multivibrator circuit?

<center>PART – C (5 x 16= 80Marks)</center>

16. (a) Elucidate the construction and working of PN junction diode with   CO1- App   (16)
          a neat sketch.

<center>Or</center>

   (b) Elaborate the working of center tapped full wave rectifier with   CO1- App   (16)
          neat diagrams and derive the necessary equations.

17. (a) Describe the characteristics of a transistor in common base   CO2- App   (16)
          configuration. Also explain the current relations in common base
          configuration.

<center>Or</center>

53305

(b) Discuss about Common Emitter amplifier and derive the expression for gain, input impedance and output impedance. CO2- Ana (16)

18. (a) With neat circuit diagram,dicuss about CS amplifier and derive the expression for gain, input impedance and output impedance and also draw its small signal equivalent circuit.. CO3- Ana (16)

Or

(b) Discuss in detail about the Enhancement biasing and characteristics of MOSFET with suitable diagram. CO3- Ana (16)

19. (a) Elaborate the working of Differential Amplifier and derive expressions for differential gain, common mode gain and CMRR. CO4- U (16)

Or

(b) A Hartley oscillator is designed with L1 = 2mH, L2 = 20µH and a variable capacitance. Determine the range of capacitance value if the frequency of oscillation is varied between 950 to 2050 KHZ. CO4- Ana (16)

20. (a) Analyze the operation of a Schmitt Trigger with a neat circuit diagram showing revelant input and output waveforms CO5- U (16)

Or

(b) (i) With a neat diagram explain the operation of parallel clippers and draw the output waveform. CO5- U (8)

(ii) Illustrate about the operation of collector coupled Astable multivibrator and derive the expression for frequency. CO5- U (8)

53305