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Question Paper Code : 53305

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Third Semester

Electrical and Electronics Engineering

15UEE305-SEMICONDUCTOR DEVICES AND CIRCUITS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. Since diodes are destroyed by excessive current, circuits must have CO1- R
(a) Higher voltage sources (b) Current limiting resistors
(c) More dopants (d) Higher current sources
2. When a diode is forward biased, the voltage across it CO1- R
(a) is inversely proportional to the current (b) remains approximately the same
(c) is directly proportional to the source voltage (d) is directly proportional to the current
3. A current ratio of I_C/I_E is usually less than one and is called CO2- R
(a) Beta (b) Theta (c) Alpha (d) Omega
4. A transistor may be used as a switching device or as a CO2-R
(a) Fixed resistor (b) Turning device (c) Rectifier (d) Variable resistor
5. A JFET has _____ power gain CO3- R
(a) Small (b) Very High (c) Very Small (d) High
6. The input impedance of a MOSFET is of the order of _____ CO3- R
(a) Ohms (b) A few hundred ohms
(c) Kilo ohms (d) Several Mega ohms

7. An oscillator employs _____ feedback. CO4- R
- (a) Positive (b) Negative
- (c) Neither positive nor negative (d) Unity
8. An oscillator differs from an amplifier because it _____. CO4- R
- (a) Has more gain (b) Requires no input signal
- (c) Requires no d.c. supply (d) Always has the same input
9. In pulse width modulation, CO5- R
- (a) Synchronization is not required between transmitter and receiver
- (b) Amplitude of the carrier pulse is varied
- (c) Instantaneous power at the transmitter is constant
- (d) None of the above
10. The sampling technique having the minimum noise interference is CO5- R
- (a) Instantaneous sampling (b) Natural sampling
- (c) Flat top sampling (d) All of the above

PART – B (5 x 2= 10Marks)

11. Sketch the V-I characteristics of Zener diode. CO1- R
12. State the significance of optocouplers. CO2-R
13. Give the significance of Darlington connection. CO3- R
14. List out the various conditions satisfied for oscillation in electronic circuits. CO4- R
15. What are the merits of Schmitt trigger circuits? CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) Analyze the various switching characteristics for HWR and FWR and comment on each. CO1- App (16)
- Or
- (b) Obtain the PN junction diode VI characteristics and also derive the following factors of it: R_d , temperature effects, Drift and diffusion currents. CO1- App (16)

17. (a) Apply the relationship between α , β and γ - hybrid model and also derive its analytical expressions. CO2- App (16)
- Or
- (b) Analyze the Input and Output characteristics for CC BJT configuration with suitable waveforms. CO2- App (16)
18. (a) Derive the JFET Characteristics and parameters with necessary assumptions. CO3- Ana (16)
- Or
- (b) Analyze the construction of MOSFET enhancement and depletion mode and also plot its various characteristics. CO3- Ana (16)
19. (a) Elaborately give the points regarding the construction and working of Colpitts oscillator. CO4- U (16)
- Or
- (b) Explain common mode and differential mode amplifiers. CO4- U (16)
20. (a) Discuss the various clipper and clamper circuits construction and working along with its characteristics. CO5-U (16)
- Or
- (b) Illustrate the construction and working of UJT based saw tooth oscillators. CO5- U (16)

