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Question Paper Code : 53305

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

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)

