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**Question Paper Code: 53305**

B.E./B.Tech. DEGREE EXAMINATION, MAY 2018

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)

Answer All Questions

1. As the temperature is increased, the voltage across a diode carrying a constant current CO1- R  
(a) Increases      (b) Decreases      (c) Remains constant      (d) May increase or decrease
2. Zener diode is operated in CO1- R  
(a) Reverse breakdown region      (b) Forward biased region  
(c) cut-off region      (d) Reverse bias region
3. For normal operation of a pnp BJT, the base must be \_\_\_\_\_ with respect to the emitter and \_\_\_\_\_ with respect to the collector. CO2- R  
(a) positive, negative      (b) positive, positive  
(c) negative, positive      (d) negative, negative
4. In a transistor the highly doped part is \_\_\_\_\_. CO2- R  
(a) Emitter      (b) Collector      (c) Base      (d) None of the above

5. Which of the following controls the level of  $I_D$ ? CO3- R  
 (a)  $V_{GS}$  (b)  $V_{DS}$  (c)  $I_G$  (d)  $V_{DG}$
6. FET can be used as a variable \_\_\_\_\_. CO3- R  
 (a) inductor (b) capacitor (c) resistor (d) voltage source
7. Only the condition  $\beta A = \underline{\hspace{2cm}}$  must be satisfied for self-sustained oscillations to result. CO4- R  
 (a) 0 (b) -1 (c) 1 (d) none of the above
8. Weinbridge uses \_\_\_\_\_ feedback CO4- R  
 (a) negative (b) positive (c) both (d) none
9. The output of a Schmitt trigger is a \_\_\_\_\_. CO5- R  
 (a) pulse waveform (b) sawtooth waveform  
 (c) sinusoidal waveform (d) triangle waveform
10. A Schmitt trigger is basically CO5- R  
 (a) an astable multivibrator (b) a monostable multivibrator  
 (c) abistable multivibrator (d) an oscillator

PART – B (5 x 2= 10Marks)

11. Define knee voltage or cut-in voltage of a diode. CO1- Ana
12. What is stability factor? CO2- U
13. Define Trans-conductance of FET. CO3- U
14. Define CMRR. CO4- U

15. What is meant by hysteresis in Schmitt trigger? CO5- U

PART – C (5 x 16= 80Marks)

16. (a) Explain the working of a PN Junction diode and Zener diode and explain the V-I characteristics. CO1-U (16)

Or

(b) Explain the operation of full wave rectifier with center tap transformer with neat circuit diagram. Also derive the following for this rectifier: i) dc output voltage, ii) dc output current, iii) RMS output voltage, iv) Ripple factor and v) Peak inverse voltage. CO1 -App (16)

17. (a) Sketch and explain the input and output characteristics of transistor in CB mode. CO2 -App (16)

Or

(b) (i) Compare CE, CB and CC configurations of BJT. CO2 -U (8)

(ii) Discuss the operation and characteristics of optocoupler. CO2 -App (8)

18. (a) Explain the construction of N channel JFET. Also explain the drain and transfer characteristics of the same. CO3- U (16)

Or

(b) Explain the construction and working of enhancement MOSFET and depletion MOSFET. Draw the characteristics. CO3- U (16)

19. (a) Explain the Hartley Oscillator with neat diagram. CO4-U (16)

Or

(b) With a neat diagram, explain the construction and working of BJT RC phase shift oscillator. CO4 -U (16)

20. (a) What is a clipper circuits? Which are the two types of clipper circuits? Explain in detail about series negative clipper. CO5- App (16)

Or

(b) With the neat circuit diagram explain the sine wave to square wave converter. CO5- App (16)

