Reg. No. :

Question Paper Code: 42407

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Second Semester

Electronics and Communication Engineering

14UEC207 - ELECTRONIC DEVICES

(Regulation 2014)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The free electron concentration is approximately equal to the density of donor atoms in the following material

    (a) n - type   (b) p - type   (c) insulator   (d) none of the above

2. The substance for which the width of the forbidden energy region is relatively ~1eV is called a

    (a) conductor   (b) semiconductor   (c) insulator   (d) none of the above

3. Which one of the following is the donor type impurity?

    (a) phosphorous   (b) boron   (c) indium   (d) silicon

4. For every $10°C$ rise in temperature the reverse saturation current approximately

    (a) doubles   (b) halves   (c) remains the same   (d) decreases

5. By providing proper bias voltage ,the transistor can be made to work as an------

    (a) amplifier   (b) regulator   (c) switch   (d) diode

6. While using a BJT as an amplifier, the collector and emitter terminals get interchanged mistakenly. Assuming that the amplifier of common emitter amplifier the biasing is suitably adjusted, the interchange of terminals will result into which one of the following?

    (a) Zero gain   (b) Infinite gain
    (c) Reduced gain   (d) No change in gain at all

7. FET is most useful in chopper circuit because it has

    (a) very high input impedance   (b) high noise

    (c) high offset voltage   (d) low noise

8. FET is a

    (a) current controlled device   (b) voltage controlled device

    (c) none of the above   (d) both (a) and (b)

9. Depends upon the illumination of falling light its conductivity varies

    (a) LCD   (b) LED   (c) LDR   (d) photo-diode

10. The number of doped regions in PIN diode is
    (a) 1   (b) 2   (c) 3   (d) 4

PART - B (5 x 2 = 10 Marks)

11. Consider intrinsic germanium at room temperature $300°K$. By what percent does the conductivity increase per degree rise in temperature?

12. Draw the circuit diagram of a positive clamper.

13. What is Avalanche breakdown?

14. List any four advantages of FET over conventional transistors.

15. Draw the energy band diagrams to show the operation of tunnel diode.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Discuss in detail about the drift and diffusion current.   (8)

        (ii) (1) State Mass-Action law.   (4)

            (2) Calculate E_G for S_i and G_e at a temperature of $35°C$.   (4)

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Or

(b) (i) Derive expression of Drift and Diffusion current. (12)

(ii) Write short Notes on Mass action law. (4)

17. (a) Discuss the operation of a PN junction diode under open circuit, forward bias and reverse bias condition. (16)

Or

(b) (i) With the help of a circuit diagram explain the working of a half-wave rectifier. Also draw the necessary waveforms. Also obtain the expression for the ripple factor and efficiency of rectification. (12)

(ii) Show that rectification efficiency for a half wave rectifier is 40.6%. (4)

18. (a) (i) Explain the construction, circuit representation and working of PNP and NPN transistors. (8)

(ii) Compare the three different configurations of BJT. (8)

Or

(b) Draw the block diagram of switched mode power supply and explain each block (16)

19. (a) Describe the depletion and enhancement mode of working of MOSFETS and compare them. (16)

Or

(b) Explain the principle, structure, operation and characteristics of D-MOSFET and E-MOSFET. (16)

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20. (a) Draw and explain the working of SCR and analyze its characteristics with necessary diagrams and waveforms. (16)

Or

(b) Write notes on

     (i) Photo diode (8)

     (ii) LED. (8)

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