Reg. No. :

Question Paper Code: 51428

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Second Semester

Electronics and Communication Engineering

15UEC208 - ELECTRONIC DEVICES

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The forbidden energy gap for silicon is

   (a) 0.12 eV   (b) 0.32 eV   (c) 1.08 eV   (d) 0.92 eV

2. The mass action law is given by n . p =

   (a) n_i (b) n_i^2 (c) n_i^3 (d) $n_i / 2$

3. The threshold voltage (Vr) for silicon is

   (a) 0.3   (b) 0.7   (c) 0.8   (d) 0.4

4. It is an electronic circuit that provides a stable DC voltage independent of load, current, temperature etc.

   (a) Voltage amplifier   (b) Current amplifier
   (c) Voltage regulator   (d) Current regulator

5. The voltage gain of the transistor amplifier is highest in

   (a) CB   (b) CC   (c) CE   (d) None of these

6. Dc to DC converters and dc to ac converters belong to the category of

    (a) SMPS   (b) UPS   (c) LPS   (d) BPS

7. FET is a

    (a) Current controlled device   (b) Power controlled device

    (c) Voltage controlled device   (d) None of these

8. The input resistance of a MOSFET is very high compare to JFET in the order of

    (a) 10^{10} to $10^{15}\,\Omega$ (b) 10^{9} to $10^{14}\,\Omega$

    (c) 10^{8} to $10^{15}\,\Omega$ (d) 10^{11} to $10^{15}\,\Omega$

9. It is a diode that has a thin junction which exhibits negative resistance under low forward bias conditions

    (a) Pin diode   (b) Varactor diode

    (c) Tunnel diode   (d) Zener diode

10. The minimum current required to latch or trigger the thyristor device from its OFF-state to its ON state?

    (a) Gate current   (b) Latching current

    (c) Holding current   (d) None of these

PART - B (5 x 2 = 10 Marks)

11. Define mass action law.

12. Draw the energy band structure of open circuited PN junction.

13. How thw transistor is acts as an amplifier?

14. When the reverse gate voltage of JFET changes from $4.0V$ to $3.9V$, the drain from 1.3 to $1.6mA$. Find the value of transconductance.

15. Give the applications of tunnel diode.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Discuss about the classification of semiconductors.   (6)

      (ii) Describe the concept of conductivity of semiconductor.   (10)

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(b) Find the conductivity of silicon a) in intrinsic condition at a room temperature of $300°K$, b) with donor impurity of 1 in 10^8, c) with acceptor impurity of 1 in 5×10^7 and d) with both the above impurities present simultaneously. Given that n_i for silicon at $300°K$ is 1.5×10^{10} cm^{-3}, $\mu_n = 1300$cm^2/V-s, $\mu_p = 500$cm^2/V-s, number of Si atoms per cm$^3 = 5 \times 10^{22}$. (16)

17. (a) (i) Explain the PN junction diode under forward bias condition. (10)

    (ii) Express the diode current equation in detail. (6)

Or

(b) (i) Explain the working of full wave rectifier. (10)

    (ii) Explain the interpret why the bleeder resistor is used at the filter output. (6)

18. (a) With the neat diagram explain the operation, input and output characteristics of CC configuration. (16)

Or

(b) Explain in detail about Switched Mode Power Supply. (16)

19. (a) Explain the construction, operation and characteristics of N-channel JFET. (16)

Or

(b) Describe the principle of operation of depletion MOSFET and draw its characteristics. (16)

20. (a) (i) Discuss about the PIN diode. (10)

    (ii) Draw two transistor equivalent of SCR and give the equation for anode current (I_A). (6)

Or

(b) Design relaxation oscillator using UJT and also derive its frequency of oscillation. (16)

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