



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code: BEEE(19EE0240)

Course & Branch: B.Tech - CSE

Year & Sem: I B.Tech & II Sem

Regulation: R19

UNIT – I
SEMICONDUCTOR DEVICES

Essay Answer (10 mark) Questions

1. A. Distinguish between conductors, semiconductors and insulators. [L2][CO5][5M]
B. Draw the atomic structure of a semiconductor and explain why an intrinsic semiconductor is relatively a poor conductor of electricity. [L3][CO5][5M]
2. Discuss the conduction properties of semiconductors and explain the process of electron hole pair generation and recombination. [L3][CO5][10M]
3. Distinguish between intrinsic and extrinsic semiconductors and explain the process of conduction in each of them. [L2][CO5][10M]
4. A. What is Doping? Describe P-and N-type semiconductors? [L2][CO5][5M]
B. Explain the behavior of PN junction diode. [L2][CO5][5M]
5. Describe the working of a PN junction diode when it is connected in forward bias and reverse bias. Draw VI Characteristics of PN Junction Diode. [L3][CO5][10M]
6. A. Write notes on Diode Specifications and Diode Applications. [L1][CO5][6M]
B. Explain Drift and Diffusion currents in a PN Junction Diode. [L2][CO5][4M]
7. A. With neat diagram, explain the working principle of Half Wave Rectifier. Draw its input and Output waveforms. [L3][CO5][5M]
B. Derive the expression for Ripple factor and Efficiency of Half Wave Rectifier. [L2][CO5][5M]
8. A. With neat diagram, explain the working principle of Full Wave Rectifier. Draw its input and Output waveforms. [L3][CO5][5M]
B. Derive the expression for Ripple factor and Efficiency of Full Wave Rectifier [L2][CO5][5M]
9. A. Draw the circuit diagram of a Bridge Rectifier and explain its operation with input and output waveforms. [L3][CO5][5M]
B. Discuss the operation of full wave rectifier with capacitor filter. [L2][CO5][5M]
10. Discuss Zener Diode breakdown mechanism. Draw the Zener diode in its reverse bias and explain its Volt-Ampere characteristics. [L3][CO5][5M]

UNIT – II

BJT

Essay Answer (10 mark) Questions

1. A. Describe in detail the working of an NPN bipolar junction transistor. Why is it called Bipolar? [L2][C06][4M]
B. Explain with the help of diagrams various types of circuit configurations, which can be obtained from a bipolar junction transistor. [L3][C06][6M]
- 2.A. Discuss the operation of PNP transistor with diagram [L2][C06][5M]
B. If the base current in a transistor is $20\mu\text{A}$ when the emitter current is 6.4mA , what

- are the values of α and β ? Also calculate the collector current. [L3][C06][5M]
3. Draw the circuit diagram for a common base circuit arrangement and plot its input and Output characteristics. Show the different regions of the output characteristics and explain their occurrence. [L3][C06][10M]
4. A. Discuss with neat diagrams, the Common Emitter Configuration and its characteristics. [L2][C06] [5M]
 B. Explain the characteristics of CE configuration [L2][C06] [5M]
5. Draw the circuit diagram for a common Collector circuit arrangement and plot its input and Output characteristics. Show the different regions of the output characteristics and explain their occurrence. [L3][C06][10M]
6. A. Explain the functioning of Common Collector Configuration of BJT. State why this arrangement is also called an emitter follower circuit. [L3][C06][5M]
 B. Compare the characteristics of BJT CB, CE and CC transistor configurations. [L2][C06][5M]
7. A. Derive the relationship between I_C, I_B, I_E of BJT configurations. [L2][C06][5M]
 B. A transistor operating in CB configuration has $I_C = 2.98\text{mA}$, $I_E = 3.00\text{mA}$ and $I_{CO} = 0.01\text{mA}$.
 What current will flow in the collector circuit for this transistor when connected in CE configuration with a base current of $30\mu\text{A}$? [L3][C06][5M]
8. A. Write notes on early effect of a BJT? [L1][C06][5M]
 B. Describe the region of BJT when its operating? [L3][C06][5M]
9. With neat circuit diagram and equations, explain Fixed Bias circuit of BJT. [L2][C06][10M]
10. A. write the application of a transistor and explain the transistor acts a switch. [L2][C06][5M]
 B. Explain in detail the transistor working as a amplifier [L2][C06][5M]

UNIT –III

JFET & MOSFETS

Essay Answer (10 mark) Questions

1. A. Explain about the JFET and draw the construction of JFET [L3][C06][5M]
 B. Explain the operation of JFET [L3][C06][5M]
2. A. Explain the construction and principle of operation of N-channel JFET. [L3][C06][5M]
 B. Define the JFET Volt-Ampere Characteristics and determine FET parameters. [L3][C06][5M]
3. A. Explain the output characteristics of JFET [L2][C06][5M]
 B. Explain the transfer characteristics of JFET [L2][C06][5M]
4. A. Discuss the configuration of JFET [L2][C06][4M]
 B. Explain the CD configuration and draw its construction [L3][C06][6M]
5. Explain the CS configuration ? With construction and its operation [L3][C06][10M]
6. Explain the CG configuration ? With construction and its operation [L3][C06][5M]
7. A. Write the JFET applications [L1][C06][4M]
 B. Explain the working of JFET as amplifier [L2][C06][6M]
8. A. Explain how the JFET working as a switch [L2][C06][5M]
 B. Write the comparison BJT and JFET. [L1][C06][5M]
9. A. Draw the construction of EMOSFET and explain its operation [L3][C06][5M]
 B. Explain the operation DMOSFET [L3][C06][5M]
10. A. Explain the static characteristics of MOSFET and draw its characteristics [L3][C06][6M]
 B. Write the application of MOSFET [L1][C06][4M]



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QUESTION BANK (OBJECTIVE)

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UNIT – I
SEMICONDUCTOR DEVICES

1. Valence electrons are the []
 A. loosely packed electrons B. mobile electrons
 C. electrons present in the outermost orbit D. all the above
2. The element that does not have three valence electrons is []
 A. boron B. aluminium C. germanium D. gallium
3. The element having four valence electrons is []
 A. silicon B. germanium C. both (A. and (B. D. none of the above
4. The forbidden energy gap for silicon is [IES 2018] []
 A. 1.12 eV B. 0.32 eV C. 0.72eV D. 7.2eV
5. The forbidden energy gap for germanium is []
 A. 0.12 eV B.0.32eV C. 0.72eV D. 0.92eV
6. The resistivity of a semiconductor []
 A. increases as the temperature increases B. decreases as the temperature increases
 C. remains constant even when temperature varies D. none of the above
7. Semiconductor has a []
 A. zero temperature coefficient of resistance B. positive temperature coefficient of resistance
 C. negative temperature coefficient of resistance D. none of the above
8. The donor impurity element is []
 A. aluminium B. boron C. phosphorous D. indium
9. The acceptor impurity element is []
 A. antimony B. gallium C. arsenic D. phosphorous
10. The element which does not have five valence electrons is []
 A. antimony B. arsenic C. gallium D. phosphorous
11. The forbidden bandgap of the semiconductor material []
 A. increases with increase in temperature B. decreases with increase in temperature
 C. does not vary with temperature D. none of the above
12. One of the following is not a semiconductor []
 A. Gallium arsenide B. Indium C. GermaniumD. Silicon
13. When the reverse bias is applied to a junction diode, it [GATE 2015] []
 A. lowers the potential barrier B. raises the potential barrier
 C. greatly decreases the minority carrier current D. greatly increases the minority carrier current
14. Doping of semiconductor is []
 A. the process of purifying semiconductor materials
 B. the process of adding certain impurities to the semiconductor material in controlled amounts
 C. the process of converting semiconductor material into some form of active device such as FET

- D. one of the steps used in the fabrication of ICs
15. A PN junction diode [IES 2014] []
- A. has high resistance in both forward and reverse directions
 B. has low resistance in the forward direction
 C. has high resistance in the forward direction
 D. has low resistance in the reverse direction
16. In a PN junction, the region containing the uncompressed acceptor and donor ions is called [GATE 2007] []
- A. transition zone B. depletion region C. neutral region D. active region
17. When PN junction is forward biased [] []
- A. electrons in the N region are injected into the P region
 B. holes in the P region are injected into the N region
 C. both (A. and (B.
 D. None of the above
18. When we apply reverse bias to a junction diode, it [] []
- A. lowers the potential barrier B. raises the potential barrier
 C. greatly decreases the minority carrier current D. greatly increases the majority carrier current
19. When a diode is forward biased, [] []
- A. barrier potential increases B. barrier potential decreases
 C. majority current decreases D. minority current decreases
20. For a Germanium PN junction, the maximum value of barrier potential is [IES2009] [] []
- A. 0.3V B. 0.7V C. 1.3V D. 1.7V
21. For a Silicon PN junction, the maximum value of barrier potential is [GATE 2015] [] []
- A. 0.3V B. 0.7V C. 1.3V D. 1.7V
22. When holes leave the p material to fill electrons in the n material, the process is called [] []
- A. mixing B. depletion C. diffusion D. none of the above
23. In a semiconductor diode, $V - I$ relationship is such that [] []
- A. current varies linearly with voltage B. current increases exponentially with voltage
 C. current varies inversely with voltage D. none of these
- 24 The diode used in voltage regulator is [] []
- A. PN Junction diode B. Varactor Diode C. Zener Diode D. GUNN Diode
25. Zener breakdown occurs [] []
- A. due to normally generated carriers B. in lightly doped junctions
 C. due to rupture of covalent bon D. mostly in germanium junctions
26. A rectifier is used to [] []
- A. convert AC voltage to DC Voltage B. convert DC voltage to AC Voltage
 C. both (A) and (B) D. convert voltage to current
27. The ripple factor of a Half Wave Rectifier is [] []
- A. 1.21 B. 0.482 C. 0.406 D. 0.121
28. The peak inverse voltage of a Half Wave Rectifier is [] []
- A. V_m B. $2 V_m$ C. $V_m/2$ D. $3V_m$
29. The efficiency of a Half Wave Rectifier is [] []
- A. 40.6% B. 81.2% C. 1.12% D. 48.2%
30. The ripple factor of Full wave rectifier is [] []
- A. 1.21 B. 0.482 C. 0.406 D. 0.121
31. The peak inverse voltage of a full Wave Rectifier is [] []
- A. V_m B. $2 V_m$ C. $V_m/2$ D. $3V_m$
32. The efficiency of a full Wave Rectifier is [] []
- A. 40.6% B. 81.2% C. 1.12% D. 48.2%
33. The peak inverse voltage of a Bridge Rectifier is [] []
- A. V_m B. $2 V_m$ C. $V_m/2$ D. $3V_m$

12.is the region of transistor which has highest conductivity []
 A.Base B.Emitter C.Collector D.Any of the above
13. Transistor works as an closed switch when emitter junction is.....biased and collector junction is.....biased []
 A.Forward, reverse B.Reverse, reverse C.Reverse, forward D.Forward, forward
14. Current base part of a transistor behaves like []
 A.Constant current source B.Forward biased diode C.A resistance D.None of the above
15. Bipolar transistor is a []
 A.Three terminal semiconductor B.Three layer semiconductor device
 C.Three junction semiconductor device D. None
16. In P-N-P transistor, base will be of []
 A.P material B.N material C.Either of the above D.None of the above
17. A P-N-P transistor has []
 A.Only acceptor ions B.Only donor ions
 C.Two P-regions and one N-region D.Three P-N junction
18. Which of the following is valid for both P-N-P as well as N-P-N transistor []
 A.The emitter injects holes into the base region [Gate 2015]
 B.The electrons are the minority carriers in the base region
 C.The EB junction is forward biased for active operation
 D.When a biased in the active region, current flows into their emitter terminal
19. ... is the device which acts like an N-P-N and a P-N-P transistor connected base-to-base and emitter-to-collector []
 A.SCR B.UJT C.Dia D.Triac
20. In the symbols of P-N-P transistors and N-P-N transistor the arrow on the emitter shows the direction of flow of []
 A.Electrons, electrons B.Holes, hole C.Holes, electrons D.Electrons, holes
21. In the symbols of PNP transistor and NPN transistor the arrow on the emitter shows the direction of flow of []
 A.Electrons, holes B.Holes, holes C.Holes, electrons D.Electrons, electrons
22. When Si NPN transistor in inactive, the base to emitter voltage is equal to []
 A.0.6 B.0.4 C.1.4 D.0.88
23. The majority carriers in the base of an NPN germanium transistor are []
 A.Impurity ions B.Hole C.Electron D.Electron-hole pairs
24. Most of the holes in the base of a PNP transistor flow []
 A.Into the collector B.Into the emitter C.Into the supply D.Out of base into the base least
25. The majority carriers in case of NPN silicon transistor are [RRB JE 2012] []
 A.Electrons B.Electron-hole pairs C.Hole D.Impurity ions
26. In a BJT []
 A.The base region is sandwiched between emitter and collector
 B.The collector is sandwiched between base and emitter
 C.The emitter region is sandwiched between base and collector
 D.None of the above
27. Amplifiers and oscillators using BJT, operate in region []
 A.Inverted mode B.Active C.Cut off D.Saturation
28. In a BJT as collector to base voltage increases the emitter current []
 A.Remains same B.Increases slightly
 C.Decreases slightly D.Depends upon doping of the emitter region
29. The BJT was invented by []
 A.W.H Brattin B.Bardeen C.William Shockley D.All of the above
30. The power rating of a BJT is determined by which of the following []
 A.Collector base area B.Base width C.Heat sink D.Emitter base junction area



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ASSIGNMENT QUESTIONS

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2. A. With neat diagram, explain the working principle of Full Wave Rectifier. Draw its input and Output waveforms.
B. Derive the expression for Ripple factor and Efficiency of Full Wave Rectifier.
3. Discuss the operation of full wave rectifier with π -section filter and derive the ripple factor
4. Discuss Zener Diode breakdown mechanism. Draw the Zener diode in its reverse bias and explain its Volt-Ampere characteristics.
5. Draw the circuit diagram for a common Collector circuit arrangement and plot its input and Output characteristics. Show the different regions of the output characteristics and explain their occurrence.
6. A. Draw the construction of EMOSFET and explain its operation
B. Explain the operation DMOSFET