

MALLA REDDY ENGINEERING COLLEGE(AUTONOMOUS)
B.Tech I YEAR II SEMESTER (MR15) I Mid Question bank

Subject: Electronics Devices and Circuits

(Common for ECE)

MODULE I

1. The conventional current in a PN junction diode flows: []
(a) From positive to negative (b) From negative to positive
(c) In the direction opposite to the electron flow. (d) Both (a) and (c) above
2. The cut in voltage (or knee voltage) of a silicon diode is []
(a) 0.2V (b) 0.7V (c) 0.8 V (d) 1.0V
3. When a diode is reverse biased, it is equivalent to []
(a) An OFF switch (b) an ON switch
(c) A high resistance (d) none of the above
4. The resistance of a diode is equal to []
(a) Ohmic resistance of the P- and N- semiconductors (b) Junction resistance
(c) Reverse resistance (d) Algebraic sum of (a) and (b) above
5. For a silicon diode, the value of the forward - bias voltage typically []
(a) Must be greater than 0.3V (b) Must be greater than 0.7V
(c) Depends on the width of the depletion region
(d) Depends on the concentration of majority carriers
6. When forward biased, a diode []
(a) Blocks current (b) conducts current
(c) Has a high resistance (d) drops a large voltage.
7. A PN junction diode's dynamic conductance is directly proportional to []
(a) The applied voltage (b) the temperature
(c) The current (d) the thermal voltage

8. The forward region of a semiconductor diode characteristic curve is where diode appears as []
(a) Constant current source (b) a capacitor
(c) An OFF switch (d) an ON switch
9. At room temperature of 25 °C, the barrier potential for silicon is 0.7 V. Its value at 125° C is []
(a) 0.5V (b) 0.3V (c) 0.9V (d) 0.7V
10. Junction breakdown of a PN junction occurs []
(a) With forward bias (b) with reverse bias
(c) Because of manufacturing defect (d) none of these
11. Reverse saturation current in a silicon PN junction diode nearly doubles for every []
(a) 2° C rise in temperature (b) 5° C rise in temperature
(c) 6° C rise in temperature (d) 10° C rise in temperature
12. An electron has []
(a) positive charge (b) Negative Charge (c) Neutral (d) none
13. The element that does not have three valance electrons is []
(a) Boron (b) Aluminum (c) Germanium (d) Gallium
14. The donor impurity element is []
(a) Aluminum (b) Boron (c) Phosphorous (d) Indium
15. The acceptor impurity element is []
(a) Antimony (b) Gallium (c) Arsenic (d) Phosphorous
16. The most important Application of Diode is as a []
(a) Rectifier (b) Switching Device (c) Voltage Controlled Device (d) both (a) and (b)
17. The Forbidden Energy gap for Silicon is []
(a) 1.12eV (b) 0.32 eV (c) 0.72 eV (d) 0.71 eV
18. When a diode is forward biased the []
(a) Barrier potential increases (b) Barrier potential decreases
(c) Majority current decreases (d) Minority current decreases

19. When the reverse bias is applied junction diode it []
 (a) Lowers the potential barrier (b) rises the potential barrier
 (c) Greatly decrease the minority carrier current
 (d) Greatly increase the minority carrier current
20. Zener breakdown occurs []
 (a) Due to normally generated minority carriers (b) In lightly doped junctions
 (c) Due to rupture of covalent bonds (d) Mostly in germanium junctions.
21. In Zener and Avalanche breakdown diodes the current flow is due to []
 (a) Majority Carriers (b) Minority Carriers (c) Majority and Minority Carriers
 (d) None of these
22. Which of the following is not a semiconductor []
 (a) Gallium Arsenide (b) Indium (c) Germanium (d) Silicon
23. For a Germanium PN Junction diode, the maximum value of barrier Potential is []
 (a) 0.3 V (b) 0.7 V (c) 1.3 V (d) 1.7 V
24. The depletion region in a PN Junction diode is due to []
 (a) Reverse biasing (b) Forward biasing
 (c) Area Created by Crystal doping (d) an area void of current carriers
25. 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
26. There are two semiconductor diodes A & B. One of them is Zener where as Other is Avalanche. Their ratings are 5.6V & 24V respectively then. []
 (a) A is Zener B is Avalanche (b) A is Avalanche B is Zener
 (c) both of them are Zener Diodes (d) both of them are Avalanche Diodes
27. The Breakdown that occurs in the Reverse biased condition in a narrow junction Diode is []
 (a) Zener Breakdown (b) Avalanche Breakdown (c) Both a & b (d) None of these
28. The Breakdown that occurs in the Reverse biased condition in a wider junction Diode is []
 (a) Zener Breakdown (b) Avalanche Breakdown (c) Both a & b (d) None of these

29. The capacitance appearing across a reverse biased semiconductor junction []
- a) increases with increase in bias voltage
 - b) decreases with increase in bias voltage
 - c) is independent of bias voltage
 - d) none of these
30. A breakdown which is caused by cumulative multiplication of carriers through field induced impact ionization occurs in []
- a) Zener diode
 - b) Tunnel diode
 - c) Varactor diode
 - d) avalanche diode
31. For a highly doped diode []
- a) Zener breakdown is likely to take place
 - b) avalanche breakdown is likely to take place
 - c) either a) or b) will take place
 - d) neither a) or b) will take place
32. Forward bias resistance of ideal diode is []
- a) 10 ohms
 - b) 1M ohms
 - c) Infinity
 - d) zero
33. In a semiconductor diode, V-I relationship is such that []
- a) current varies linearly with voltage
 - b) current varies exponentially with voltage
 - c) current varies inversely with voltage
 - d) none of these
34. Reverse bias resistance of ideal diode is []
- a) 10 ohms
 - b) 1M ohms
 - c) Infinity
 - d) zero
35. Emission coefficient of silicon (η) is []
- a) 0
 - b) 1
 - c) 2
 - d) None
36. Under normal operating Voltage, Reverse current in a Silicon diode is about []
- a) 10mA
 - b) 1 μ A

c) $1000\mu\text{A}$

d) None

37. A PN junction Diode []

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

38. Emission coefficient of Germanium (η) is []

a) 0 b) 1 c) 2 d) None

39. The static resistance of a Diode is []

a) it opposes the D.C current flow

b) it opposes the A.C current flow

c) resistance of the diode when forward bias

d) none

40. In a PN junction, the potential barrier is due to the charges on either side of the junction, which consists of []

a) fixed Donor and Acceptor ions

b) majority carriers only

c) minority carriers only

d) both majority & minority carriers

41. To compensate increase in diode current with temperature, the diode voltage []

a) Decreases by 2.5mV per 1°C

b) Increases by 2.5mV per 1°C

c) Decreases by 2.5mV per 10°C

d) Increases by 2.5mV per 10°C

42. The diode current equation is []

a) $I = I_o \left(e^{\frac{V}{\eta V_T}} - 1 \right)$

b) $I = I_o \left(e^{\frac{\eta V}{V_T}} - 1 \right)$

c) $I = I_o \left(e^{\frac{V}{V_T}} - 1 \right)$

d) $I_o = I \left(e^{\frac{V}{\eta V_T}} - 1 \right)$

43. If a PN junction diode is not biased, junction current at equilibrium is []

- a) zero as no charges cross the junction
- b) zero as equal no. of carriers cross the barrier
- c) mainly due to diffusion of majority carriers
- d) mainly due to diffusion of minority carriers

44. The capacitance that exists in a forward biased junction is called []

- a) Diffusion capacitance
- b) Transition capacitance
- c) Space charge capacitance
- d) Depletion region capacitance

45. Diffusion capacitance is given by []

- a) $\tau I / \eta V_T$
- b) $\tau V_T / \eta I$
- c) $\tau \eta I / V_T$
- d) $\tau V_T I / \eta$

46. Reverse Saturation current increases by _____ every 1°C rise in temperature []

- a) 6%
- b) 7%
- c) 8%
- d) 9%

47. A silicon diode has saturation current of 7.5μA at 300K. The saturation current at 400K is []

- a) 7.68mA
- b) 7.86mA

c) $7.68\mu\text{A}$

d) $7.86\mu\text{A}$

48. The value of forward current incase of a silicon PN diode with $I_0 = 10\mu\text{A}$ and $V_F = 0.8\text{V}$ at

$T = 300\text{K}$ is []

a) 48.02A

b) 48.20A

c) 48.02mA

d) 48.20mA

49. The forward resistance of a Silicon PN diode when the forward current is 5mA at $T = 300\text{K}$ is []

a) 10.34Ohm

b) 10.43Ohm

c) 10.50Ohm

d) 10.15Ohm

50. Applying an external D.C supply to an Electronic component is called []

a) Biasing

b) Aliasing

c) Diffusion

d) none

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
A	B	A	D	B	B	C	D	A	B	D	B	C	C	B	D	A	B	B	C	B	B	A	D	C
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
A	A	B	B	D	A	D	B	C	C	B	B	B	A	A	A	A	B	A	A	B	A	A	A	A

MODULE II

1. A Zener diode []
 - (a) has a high forward-voltage rating
 - (b) has a sharp breakdown at low reverse voltage
 - (c) is useful as an amplifier
 - (d) has a negative resistance
2. The most important Application of Tunnel Diode is as a []
 - (a) Rectifier (b) Switching Device (c) Voltage Controlled Device (d) none
3. A tunnel- diode is []
 - (a) a very heavily-doped PN junction diode
 - (b) a high resistivity PN junction diode
 - (c) a slow switching device
 - (d) used with reverse bias
4. The light-emitting diode (LED) []
 - (a) is usually made from silicon
 - (b) uses a reverse-biased junction
 - (c) gives a light output which increases with the increase in temperature
 - (d) depends on the recombination of holes and electrons
5. LED's do not require []
 - (a) heating (b) warm-up time
 - (b) Both (a) and (b) above (d) non of above
6. The sensitivity of a photodiode depends upon []
 - (a) light intensity and depletion region width
 - (b) depletion region width and excess carrier life time
 - (c) Excess carrier life time and forward bias current.
 - (d) Forward bias current and light intensity.
7. LEDs are commonly fabricated from gallium compounds like gallium arsenide and gallium phosphide because they []
 - (a) Are cheap (b) are easily available
 - (c) Emit more heat (d) emit more light.

8. A LED is basically a _____ P-N junction. []
(a) forward-biased (b) reverse-biased
(c) lightly-doped (d) heavily-doped
9. As compared to a LED display, the distinct advantage of an LCD display is that it requires []
(a) No illumination (b) extremely-bias
(c) No forward-bias (d) a solid crystal
10. Before illuminating a P-N junction photodiode, it has to be []
(a) Reverse-biased (b) forward-biased
(c) Switched ON (d) switched OFF.
11. A LED emits visible light when its _____ []
(a) P-N junction is reverse-biased (b) depletion region widens
(c) Holes and electrons recombine (d) P-N junction becomes hot.
12. In LED, light is emitted because []
(a) Recombination of charge carriers takes place
(b) Diode gets heated up
(c) Light falling on the diode gets amplified
(d) Light gets reflected due to lens action.
13. GaAs, LEDs emit radiation in the []
(a) Ultraviolet region (b) violet - blue green range of the visible region
(c) Visible region (d) infra-red region
14. In a half - wave rectifier, the load current flows for []
(a) Complete cycle of the input signal
(b) Less than half-cycle of the input signal,
(c) More than half-cycle but less than complete cycle of the input signal.
(d) Only for the positive half-cycle of the input signal.
15. In a full-wave rectifier, the current in each of the diodes flows for []
(a) Complete cycle of the input signal. (b) Half cycle of the input signal.
(c) Less than half of the input signal. (d) None of the above.
16. The ripple factor of a bridge rectifier is []
(a) 0.482 (b) 0.812 (c) 1.11 (d) 1.21
17. The ripple factor of a Half Wave rectifier is []
(a) 0.482 (b) 0.812 (c) 1.11 (d) 1.21
18. A bridge rectifier is preferable to an ordinary two-diode full-wave rectifier because []
(a) It needs much smaller transformer for the same output.
(b) It uses four diodes.

- (c) Its transformer does not require center-tap. (d) None of the above.
19. The basic purpose of a filter is to []
- (a) Minimize variations in a.c. input signal.
 (b) Suppress harmonics in rectified output.
 (c) Remove ripples from the rectified output.
 (d) Stabilize D.C. output voltage.
20. The use of a capacitor filter in a rectifier circuit gives satisfactory performance only when the load []
- (a) Current is high (b) current is low
 (c) Voltage is high (d) voltage is low
21. A half-wave rectifier is equivalent to a []
- (a) a clamper circuit (b) a clipper circuit
 (c) a clamper circuit with negative bias (d) a clamper circuit with positive bias
22. Bridge rectifiers are preferred because []
- (a) they require small transformer
 (b) they have less peak-inverse voltage
 (c) they need small transformer and also have less peak-inverse voltage
 (d) They have low ripple factor.
23. If V_m is the peak value of an applied voltage in a half-wave rectifier with a large capacitor across the load, then the peak-inverse voltage will be []
- (a) $\frac{V_m}{2}$ (b) V_m (c) $\sqrt{2}V_m$ (d) $2V_m$
24. The basic reason why a full-wave rectifier has a twice the efficiency of a half-wave rectifier is that []
- (a) it makes use of transformer
 (b) its ripple factor is much less
 (c) it utilizes both half-cycle of the input
 (d) its output frequency is double the line frequency.
25. The output of a half-wave rectifier is suitable only for []
- (a) Running car radios (b) running a.c. motors
 (c) Charging batteries (d) running tape recorders.
26. The ripple factor of a full wave rectifier is []
- (a) 0.48 (b) 0.812 (c) 1.21 (d) 1.11
27. The ripple factor of a power supply is given by (symbols have the usual meaning) []
- (a) $\frac{P_{dc}}{P_{ac}}$ (b) $\sqrt{\left(\frac{I_{rms}}{I_{dc}}\right)^2 - 1}$ (c) $\sqrt{\left(\frac{I_{dc}}{I_{rms}}\right)^2 - 1}$ (d) $\frac{I_{dc}}{I_{rms}}$
28. The PIV of a full-wave rectifier circuit with a shunt capacitor filter is []
- (a) $2V_m$ (b) V_m (c) $\frac{V_m}{2}$ (d) $3V_m$
29. The disadvantage of a bridge rectifier is []
- (a) Its PIV is $2V_m$

39. The ripple frequency for a full wave rectifier is []
 (a) Equal to the supply frequency (b) twice the supply frequency
 (c) Thrice the supply frequency (d) None
40. T.U.F for half wave rectifier is []
 (a) 0.963 (b) 0.693 (c) 0.287 (d) 0.278
41. T.U.F for full wave rectifier is []
 (a) 0.963 (b) 0.693 (c) 0.369 (d) 0.639
42. Form factor of the full wave rectifier is []
 (a) 1.57 (b) 1.21 (c) 1.11 (d) 2.71
43. Form factor of the half wave rectifier is []
 (a) 1.57 (b) 1.21 (c) 1.11 (d) 2.71
44. The efficiency of the bridge rectifier is []
 (a) 40.6 % (b) 81.2 % (c) 1.12 % (d) 48.2 %
45. An SCR conducts appreciable current when its -----with respect to cathode []
 (a) Anode and gate are both negative
 (b) Anode and gate are both positive
 (c) Anode is negative and gate is positive
 (d) Anode is positive and gate is negative
46. The ripple factor in a C-filter decreases with []
 (a) Decrease in C (b) Increase in C (c) Decrease in R_L (d) Decrease in f
47. The ripple factor in a L-filter increases with []
 (a) Decrease in R_L (b) Increase in L (c) Increase in R_L (d) Increase in f
48. The ripple factor for a LC-filter is given by []
 (a) $\frac{\sqrt{2}}{3} \frac{1}{4\omega^2 CL}$ (b) $\frac{\sqrt{2}}{3} \frac{1}{4\omega^3 CL}$ (c) $\frac{\sqrt{3}}{2} \frac{1}{4\omega^2 CL}$ (d) $\frac{\sqrt{3}}{2} \frac{1}{6\omega^2 CL}$
49. The ripple factor for a CLC-filter is given by []
 (a) $\sqrt{2} \frac{X_{C1} X_{C2}}{R_L X_L}$ (b) $\sqrt{3} \frac{X_{C1} X_{C2}}{R_L X_L}$ (c) $\sqrt{3} \frac{R_L X_{C2}}{X_{C1} X_L}$ (d) $\sqrt{3} \frac{R_L X_{C1}}{X_{C2} X_L}$
50. An SCR may be turned OFF by []
 (a) Interrupting its anode current (b) reversing polarity of its anode-cathode voltage

- (b) low-current dropout
- (c) all of the above

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
B	B	A	D	C	A	D	A	B	A	C	A	D	D	B	A	D	C	C	B	B	C	B	C	B
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
A	B	A	C	B	C	D	D	D	A	C	A	C	B	C	B	C	A	B	B	B	C	A	A	D

MODULE III:

1. The "cut-in" voltage of a silicon small-signal transistor is []
 (a) 0V (b) 0.2V (c) 0.5V (d) 0.7V
2. When the collector junction in transistors is biased in the reverse direction and the emitter junction in the forward direction, the transistor is said to be in the []
 (a) Active region (b) cut-off region
 (c) Saturation region (d) none of them.
3. The transistor is said to be in saturation region when []
 (a) both collector and emitter junctions are forward biased
 (b) both collector and emitter junctions are reversed biased
 (c) emitter junction is forward biased, but the collector junction is reverse biased
 (d) emitter junction is reverse biased, but the collector junction is forward biased
4. In a NPN transistor, when the emitter junction is reverse biased and the collector junction is reverse biased the transistor will operate in the []
 (a) Active region (b) Saturation region (c) Cut-off region (d) Inverted region
5. A conducting bipolar transistor dissipates least power when operating in the []
 (a) Saturation region (b) Cut-off region (c) Active region (d) Reverse Active region
6. For NPN transistor the N regions are []
 (a) Emitter and Base (b) Base and Collector (c) Emitter and Collector (d) None
7. A Collector collects []

- (a) Electrons from the base in case of PNP transistors
 - (b) Electrons from the emitter in case of PNP transistors
 - (c) holes from the base in case of NPN transistors
 - (d) holes from the base in case of PNP transistors
8. In a PNP transistor with normal bias []
- (a) collector junction has negligible resistance
 - (b) only holes cross collector junction
 - (c) collector base junction is reverse biased and emitter base junction is forward biased
 - (d) only majority carriers cross the collector junction
9. A PNP transistor is made of []
- (a) Silicon
 - (b) Germanium
 - (c) either silicon or germanium
 - (d) none
10. In most transistors, collector is made physically larger than Emitter region []
- (a) for dissipating heat
 - (b) to distinguish it from other regions
 - (c) as it is sensitive to UV rays
 - (d) to reduce resistance in the path of flow of electrons
11. The three terminals of a Bipolar transistor are called []
- (a) Anode, Cathode and Gate
 - (b) Anode, Emitter and Gate
 - (c) Emitter, Base and Collector
 - (d) None
12. In an NPN transistor, the arrow indicates current flow from []
- (a) Emitter to Base

- (b) Base to Emitter
- (c) Emitter to collector
- (d) None.

13. For a operation of PNP amplifier, base of the Amplifier must be []

- (a) 0V
- (b) positive with respect to collector
- (c) negative with respect to collector
- (d) greater than collector current

14. In a transistor the region that is very lightly doped and very thin is the []

- (a) emitter
- (b) base
- (c) collector
- (d) none

15. In an NPN transistor, the Emitter []

- (a) emits or injects holes into the collector
- (b) emits or injects electrons into the collector
- (c) emits or injects electrons into the base
- (d) emits or injects holes into the base

16. In an PNP transistor, with normal bias, the Emitter junction []

- (a) is always Reverse biased
- (b) offers very high resistance
- (c) offers very low resistance
- (d) remains open

17. In a PNP transistor, electrons flow []

- (a) into the transistor at the collector only

- (b) into the transistor at the base and collector leads
 - (c) out of the transistor at the base and collector leads
 - (d) out of the transistor at the base, collector as well as emitter leads
18. The arrow head on a transistor symbol indicates []
- (a) direction of Electron current in the Emitter
 - (b) direction of hole current in the Emitter
 - (c) diffusion current in the emitter
 - (d) drift current in the emitter
19. The largest current flow of a bipolar transistor occurs []
- (a) in emitter
 - (b) in base
 - (c) in collector
 - (d) through emitter-collector
20. Conventional biasing of a bipolar transistor has []
- (a) EB forward biased and CB forward biased
 - (b) EB reversed biased and CB forward biased
 - (c) EB forward biased and CB reverse biased
 - (d) EB reversed biased and CB reverse biased
21. In an PNP transistor, the arrow indicates current flow from []
- (a) Base to Emitter
 - (b) Emitter to Base
 - (c) Emitter to collector
 - (d) None.
22. In a normally biased NPN transistor, the main current crossing the collector junction is []
- (a) a drift current
 - (b) a hole current

- (c) a diffusion current
- (d) same as base current
23. The bipolar junction transistor can be considered as []
- (a) two back to back connected diodes
- (b) two diodes connected in parallel
- (c) both a) and b)
- (d) none
24. I_{CO} in a diode and I_{CBO} in a transistor mainly consist of []
- (a) majority carriers
- (b) minority carriers
- (c) both a) and b)
- (d) none
25. The operation of transistor depends on []
- (a) interaction of both minority and majority carriers
- (b) majority carriers only
- (c) minority carriers only
- (d) none

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
D	A	A	C	A	C	D	C	C	A	C	B	B	B	B	C	B	A	A	C	B	A	A	B	A