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Engineers Academy Publications

100-102, Ram Nagar, Bambala Puliya, Toll Tax,
Tonk Road, Pratap Nagar, Jaipur (Rajasthan)-302033
E-Mail : engineers.academy.india@gmail.com

ISBN : 978-93-93531-64-3

First Edition : 2025

Price : ₹ 600.00

DIRECTOR'S *Message*

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This book has been organized and executed with a lot of care, dedication and passion for lucidity. A conscious attempt has been made to simplify the concepts to facilitate better understanding of the subject.

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We would feel satisfied if the book meets the needs of the students for whom it is meant.

Lastly, we are thankful to all the engineers, authors whose work has been the source of enlightenment, inspiration and guidance in presenting this book.

It is hoped that the book in its new form will enjoy its ever increasing popularity.

Regards

Dr. Pankaj Goyal

Preface

This book has been written to meet the growing requirements of candidates appearing for BSNL, DRDO, ISRO, BARC, ECIL, TTA, RRB-JE, State and Public Sector Engineering Examinations. Though every candidate has ability to succeed but competitive environment, in-depth knowledge, quality guidance, time management and good source of study is required to achieve goals.

This book includes Multiple Choice Questions (MCQ) which works as a mock exam practice for the reader. Questions of all the subject have been organized in systematic, concepts oriented and error less manner so that it become easy and interesting for even a beginner to understand. It is a very convenient book and must be solved by candidate aiming for competitive exams.

After solving this booklet students can feel encouraged and develop confidence to attempt each and every type of numerical as well as theoretical problems. Each problems explains solving approach so that at the end, so the reader is well equipped to be able to apply any type of problem solving requirement and distinctly choose one strategy or type from the other.

We hope this book will be proved an important tool to succeed in BSNL, DRDO, ISRO, BARC, ECIL, TTA, RRB-JE, State and Public Sector Engineering Examinations.

It is earnestly hoped that with the extensive additions and revisions, the present edition will facilitate the students not only in preparing themselves for competitive examinations but also in preparing for their regular examinations and prove more useful to the students than the earlier editions.

Even though, enough readings were given for correcting the error and printing mistakes, due to human tendency there could be some minor types in the book. If any such types found, they will be highly appreciated and in corporated in the next edition. Also, please provide your valuable suggestions at : engineers.academy.india@gmail.com

Wish you all the best. Have a nice reading.

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CONTENTS

UNIT-I

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CHAPTER 1

SEMICONDUCTOR BASICS & DIODES

OBJECTIVE QUESTIONS

1. The values of voltage (V_D) across a tunnel-diode corresponding to peak and valley currents are V_p and V_v respectively. The range of tunnel-diode voltage V_D for which the slope of its $I - V_D$ characteristics is negative would be

(a) $V_D < 0$ (b) $0 \le V_D < V_P$

(c) $V_P \le V_D \le V_V$ (d) $V_D \ge V_V$

2. In a p^+n junction diode under reverse bias, the magnitude of electric field is maximum at

(a) The edge of the depletion region on the p-side

(b) The edge of the depletion region on the n-side

(c) The p^+n junction.

(d) The centre of the depletion region on the n-side

3. In a bridge rectifier the input and output connections are interchanged. What will happen if supply is switched on :

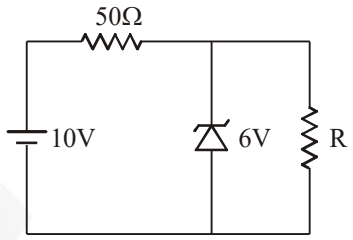
(a) DC output will be very low

(b) DC output reduced to half the rated values DC

(c) All the diodes will get over heated

(d) Causes short circuit

4. The 6 V zener diode shown in figure has zero zener resistance and a knee current of 5 mA. The minimum value of R so that the voltage across it does not fall below 6 V is



(a) 1.2 kΩ (b) 80 Ω

(c) 50 Ω (d) 0 Ω

5. Consider a p-n junction diode made of silicon , In this case, which of the following statements is true?

(a) The value of current depends exponentially on the voltage applied

(b) The value of voltage depends exponentially on the current through the diode

(c) The value of current depends linearly on the voltage applied

(d) The value of voltage depends linearly on the current through the diode

6. C_d and C_s represent depletion and diffusion capacitance of a diode, respectively, which one of the following statements is not correct?

(a) C_d varies inversely with depletion width

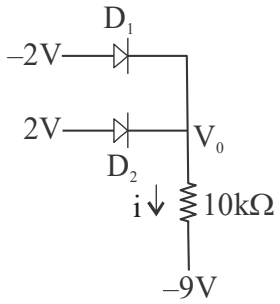
(b) C_s varies directly with the rate of change of diode current with respect to diode voltage

(c) C_d varies directly with the transit time.

(d) Effective junction capacitance is the parallel combination of C_d and C_s

***Directions :* 7 & 8**

Assume D_1 and D_2 refer to the ideal diodes



7. Which one of the following statement is true?

(a) Both D_1 and D_2 are ON

(b) Both D_1 and D_2 are OFF

(c) D_1 is ON and D_2 is OFF

(d) D_2 is ON and D_1 is OFF

8. Values of V_0 and I respectively are

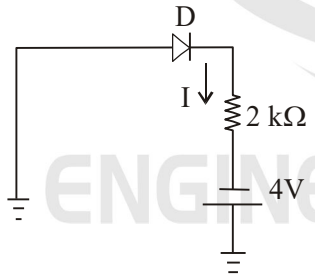
(a) 2 V and 1.1 mA

(b) 0 V and 0 mA

(c) –2 V and 0.7 mA

(d) 4 V and 1.3 mA

9. The diode 'D' is ideal in the network shown in the given figure. The current 'I' will be



(a) –1 mA (b) zero

(c) 2 mA (d) 4 mA

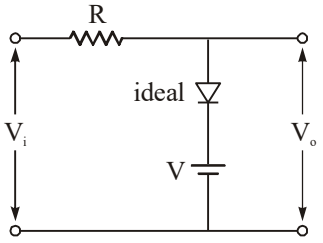
10. A Zener diode has a Zener resistance of 5Ω. If the current through the Zener diode changes from 10 mA to 20 mA, the change of voltage across the Zener diode will be

(a) 0.05 V (b) 0.075 V

(c) 0.1 V (d) 0.5 V

11. Consider the following circuits

1.



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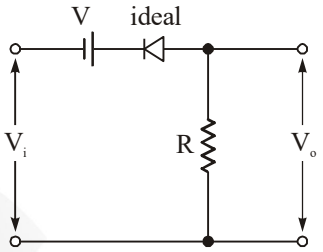

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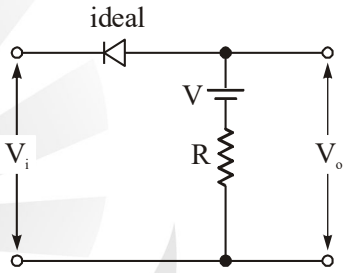


Which of the above circuits will yield the following input output characteristics for the clipper?

$$V_0 = \begin{cases} V_i \text{ for } V_i < V \\ V \text{ for } V_i \geq V \end{cases}$$

Select the correct answer using the code given below:

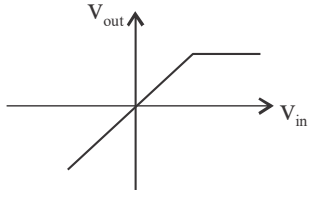
(a) 1 only (b) 2 only

(c) 1 and 3 (d) 1, 2 and 3

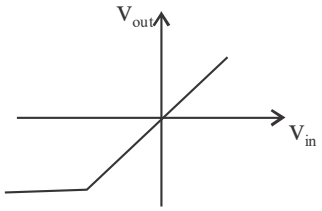
12. Match List-I (Transfer Characteristic of Clipper Circuit/Rectifier) with List -II (type of Clipper/ Rectifier) and select the correct answer using the code given below the Lists:

List-I

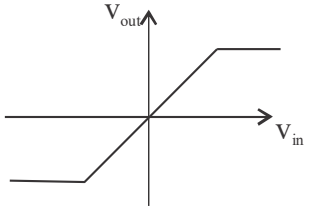
A.



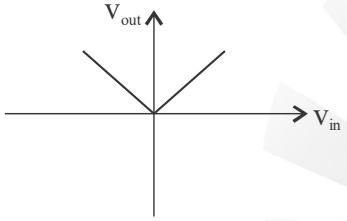
B.



C.



D.

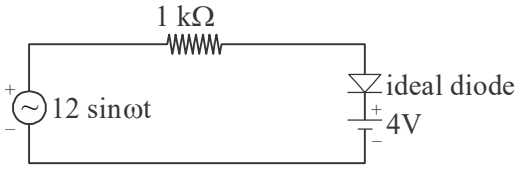


List-II

1. Doubled ended clipper
2. Positive Clipper
3. Negative Clipper
4. Full-wave positive rectifier and not a clipper

Codes:	A	B	C	D
(a)	1	2	3	4
(b)	2	3	4	1
(c)	1	2	4	3
(d)	2	3	1	4

13. The peak current through the resistance in the circuit shown is



(a) 18 mA (b) 12 mA

(c) 8 mA (d) 4 mA

14. In a full wave rectifier circuit with centre tap transformer, if voltage between one end of secondary winding and centre is 300 V peak, then PIV (peak inverse voltage) is

(a) 300 V (b) 150V

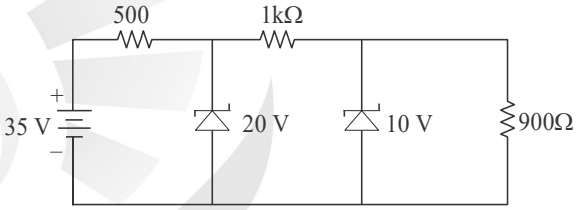
(c) 600V (d) 900 V

15. A PN junction in series with a 100 ohm resistor is forward biased so that a current of 100 mA flows. If voltage across the combination is instantaneously reversed to 10 V at time t = 0, the reverse current that flows through the junction at t = 0 is approximately given by

(a) 0 mA (b) 200 mA

(c) 50 mA (d) 100 mA

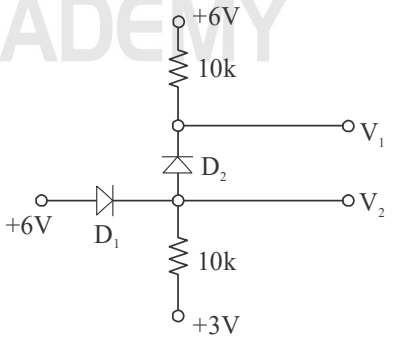
16. What is the output voltage across the 900 ohm load in the circuit given below?



(a) 10 V (b) 14.67 V

(c) 20 V (d) 9.47 V

17. The voltages at V_1 and V_2 of the arrangement shown in the figure will be respectively



(a) 6 V and 5.4 V (b) 6 V and 6 V

(c) 3 V and 5.4 V (d) 6 V and 3 V

18. How much dynamic resistance does a Ge diode have at room temperature for forward current of 26 mA?

(a) 0.1 ohm (b) 1 ohm

(c) 10 ohm (d) 1000 ohm

19. When operating as a voltage regulator the breakdown in a Zener diode occurs due to the

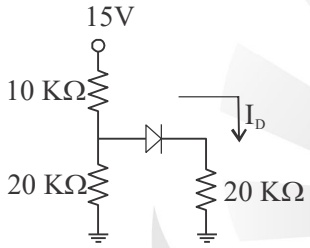
(a) Tunneling effect

(b) Avalanche breakdown

(c) Impact ionization

(d) Excess heating of the junction

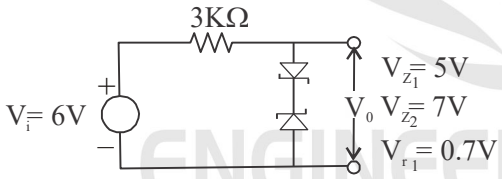
20. If the forward biased voltage V_D = 0.7V. Find the diode current I_D



(a) 0.349 mA (b) 0.465 mA

(c) 0.476 mA (d) 0.486 mA

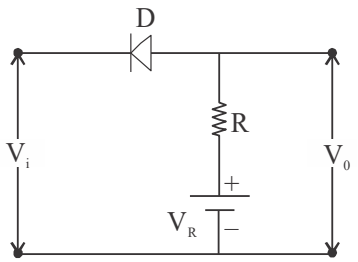
21. The output voltage for the circuit shown in figure is



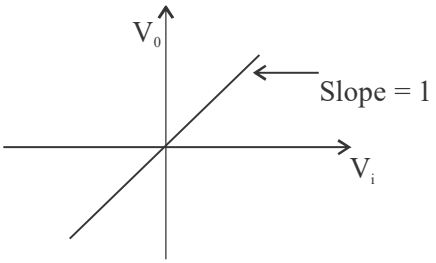
(a) 5.7 V (b) 7.7 V

(c) 6.3 V (d) 6 V

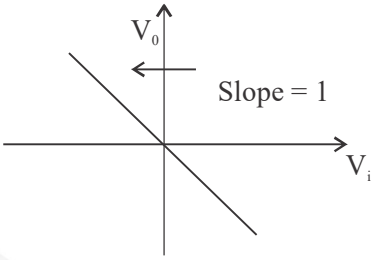
22. The transfer characteristic of the network shown in the given figure is represented as



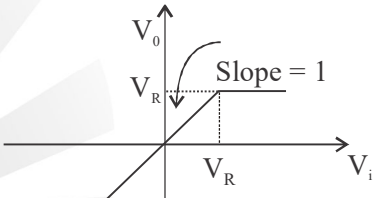
(a)



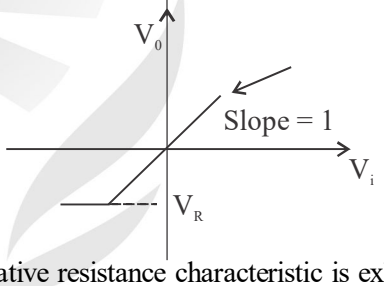
(b)



(c)



(d)



23. Negative resistance characteristic is exhibited by a

(a) Zener diode (b) Schottky diode

(c) Photo diode (d) Tunnel diode

24. The correct match between the following two columns is

	List-I	List-II
A.	Tunnel diode	1. Microwave amplification
B.	Zener diode	2. Voltage regulation
C.	PIN diode	3. Photo detection
D.	Schottky diode	4. High speed switching

Codes:	A	B	C	D
(a)	1	4	2	3
(b)	1	3	2	4
(c)	4	2	1	3
(d)	1	2	3	4

25. A special purpose diode which uses metals like gold, silver or platinum on one side of the junction, n-type doped silicon on another side and has almost no charge storage in the junction, is a

(a) Schotky diode

(b) Tunnel diode

(c) Varactor diode

(d) Zener diode

26. In LED, light is emitted because

(a) Recombination of charge carries takes place

(b) Diode gets heated up

(c) Light falling on the diode gets amplified

(d) Light gets reflected due to lens action

27. Consider the following semiconductor diodes;

1. Germanium diode
2. Silicon diode
3. Tunnel diode
4. Photo diode

The correct increasing order of forward voltage drop of these diodes is

(a) 1, 2, 3, 4 (b) 3, 4, 1, 2

(c) 3, 1, 4, 2 (d) 1, 3, 2, 4

28. Match List-I (Device) with List-II (Biasing mode) and select the correct answer using the codes given below the lists:

List-I	**List-II**
A. LED	1. Forward Bias
B. Zener	2. Reverse Bias
C. Varactor	
D. SCR	

Codes:	**A**	**B**	**C**	**D**
(a)	1	1	2	2
(b)	1	2	1	2
(c)	1	2	2	1
(d)	2	2	1	1

29. Silicon is not suitable for fabrication of light emitting diodes because it is:

(a) An indirect band gap semiconductor

(b) A direct band gap semiconductor

(c) A wide band gap semiconductor

(d) A narrow band gap semiconductor

30. _____ current is the leakage current that flows through a photo diode with no input used in as light detectors

(a) Leakage (b) Dark

(c) Saturation (d) Detection

31. Which of the following parameters of a silicon schottky diodes is higher than that of a corresponding PN junction diode?

(a) Forward voltage drop

(b) Reverse recovery current

(c) Reverse recovery time

(d) Reverse leakage current

32. Which of the following statements is true for silicon pn junction solar cell?

(a) It can store optical energy

(b) It can store electrical energy

(c) It converts electrical energy into optical energy

(d) It converts optical energy into electrical energy

33. The semiconductor used for LED emitting in the visible range is

(a) GaAs (b) GaA*l*As

(c) GaInAs (d) GaAsP

34. In order to generate electron-hole pairs, the maximum wavelength of radiation for silicon (Band gap = 1.1eV) is

(a) 1.88 μm (b) 1.68 μm

(c) 1.13 μm (d) 1.54 μm

35. The phenomenon of injection electroluminescence is the basic of working of

(a) Photodiodes

(b) light emitting diodes

(c) photo transistor

(d) solar cell

36. In a junction diode

(a) The depletion capacitance increases with increases in reverse bias

(b) The depletion capacitance decrease with increases in reverse bias.

(c) The diffusion capacitance decreases with increases in the forward bias.

(d) The diffusion capacitance is much lower than the depletion capacitance when it is forward biased.

37. In a forward biased photo diode with increase in incident light intensity, the diode current

(a) Increases

(b) Remains constant

(c) Decreases

(d) Remaining constant, the voltage drop across the diode increases

38. A tunnel diode is

(a) High resistivity p-n junction diode

(b) A slow switching device

(c) An amplifying device

(d) A very heavily doped p-n junction diode

39. The static characteristic of an adequately forward biased p-n junction is a straight line, if the plot is of

(a) log I Vs log V (b) log I Vs V

(c) I Vs log V (d) I Vs V

40. The junction capacitance of a p-n junction depends on

(a) Doping concentration only

(b) Applied voltage only

(c) Both doping concentration and applied voltage

(d) Barrier potential only

41. The reverse current of a silicon diode is

(a) Highly bias voltage sensitive

(b) Highly temperature sensitive

(c) Both bias voltage and temperature sensitive

(d) Independent of bias voltage and temperature

42. The depletion capacitance C_J of an abrupt p-n junction with constant doping on either side varies with reverse bias V_R as

(a) $C_J \propto V_R$ (b) $C_J \propto V_R^{-1}$

(c) $C_J \propto V_R^{-\frac{1}{2}}$ (d) $C_J \propto V_R^{-\frac{1}{3}}$

43. Silicon diode is less suited for low voltage rectifier operation because

(a) It can withstand high temperatures

(b) Its reverse saturation current is low

(c) Its cut-in voltage is high

(d) Its breakdown voltage is high

44. As compared to full wave rectifier using two diodes, the four diode bridge rectifier has the dominant advantage of

(a) Higher current carrying capacity

(b) Lower peak inverse voltage requirement

(c) Lower ripple factor

(d) Higher efficiency

45. Reverse recovery current in a diode depends upon

(a) Forward field current

(b) Storage charge

(c) Temperature

(d) PIV

46. Choose proper substitutes for X and Y to make the following statement correct. Tunnel diode and Avalanche photodiode are operated in X bias and Y bias respectively.

(a) X: reverse, Y: reverse

(b) X: reverse, Y: forward

(c) X: forward, Y: reverse

(d) X: forward, Y: forward

47. A p-n junction diode dynamic conductance is directly proportional to

(a) The applied voltage

(b) The temperature

(c) Its current

(d) The thermal voltage

48. The probability that an electron in a metal occupies the fermi level at any temperature (> 0^oK)

(a) 0 (b) 1

(c) 0.5 (d) 0.1

49. In a PN diode, with the increase of reverse bias voltage, what happens to the reverse current?

(a) Increases

(b) Decreases

(c) Remains constant

(d) May increase or decrease depending on doping

50. The diffusion potential across a p-n junction

(a) Decreases with increasing doping concentration

(b) Increases with decreasing doping concentration

(c) Does not depend on doping concentration

(d) Increase with increasing in doping concentration

51. A long specimen of p-type semiconductor material

(a) Is positively charged

(b) Is electrically neutral

(c) Has an electrical field directed along its length

(d) Acts as a dipole

52. If an intrinsic semiconductor is doped with a very small amount of boron, then in the extrinsic semiconductor set formed, the number of electrons and holes will

(a) Decrease

(b) Increase and decrease respectively

(c) Increase

(d) Decrease and increase respectively

53. The transition region in an open circuited p-n junction contains

(a) Free electrons only

(b) Holes only

(c) Both free electrons and holes

(d) Uncovered immobile impurity ions

54. In a p-n diode, hole diffuse from p-region to n-region because

(a) There is higher concentration of holes in p-region

(b) Holes are positively charged

(c) Holes are urged to move by the barrier potential

(d) The free electrons in the n-region attract the holes

55. In an unbiased p-n junction, the junction current at equilibrium is

(a) Due to diffusion of majority carrier

(b) Due to diffusion of minority carrier

(c) Zero due to equal and opposite currents crossing the junction

(d) Zero because no charges cross the junction

56. In an unbiased p-n junction, zero current implies that

(a) The potential barrier has disappeared.

(b) Number of holes diffusing from n-side equals the number of electrons diffusing from n-side to p-side.

(c) No carrier across the junction.

(d) Total current crossing the junction from p-side to n-side equals the total current crossing the junction from n-side to p-side.

57. The built in potential (diffusion potential) in a p-n junction

(a) Is equal to the difference in the fermi level of the two sides, expressed in volts.

(b) Increases with the increase in the doping levels of the two sides.

(c) Increases with the increase in temperature.

(d) Both (a) and (b)

58. A zener diode works on the principle of

(a) Tunneling of charge carriers across the junction

(b) Thermionic emission

(c) Diffusion of charge carriers across the junction

(d) Hopping of charge carriers across the junction

59. When used in a circuit the Zener diode is always

(a) Forward biased

(b) Determined by Zener voltage

(c) Reverse biased

(d) Connected in series

60. Consider the following statements:

An applied bias voltage in a P-N junction diode (N region positive w.r.t. P region) results in

(i) Increases in potential barrier

(ii) Reduction in space charge layer width

(iii) Increase in space charge layer width

(iv) Increase in magnitude of electric field

Which of the statements given above are correct?

(a) (i) and (ii) (b) (i) and (iii)

(c) (i) and (iv) (d) (i), (iii) and (iv)

61. An HWR uses a diode with a forward resistance R_f. The voltage is $V_m \sin \omega t$ and the load resistance is R_L. The dc current is given by

(a) $\frac{V_m}{\sqrt{2}R_L}$ (b) $\frac{V_m}{\pi(R_f + R_L)}$

(c) $\frac{2V_m}{\pi}$ (d) $\frac{V_m}{R_L}$

62. For full-wave rectification, a four-diode bridge rectifier is claimed to have the following advantages over a two-diode circuit:

(i) Less expensive transformer

(ii) Smaller size transformer

(iii) Suitability for higher voltage application

(a) Only (i) and (ii) are true

(b) Only (i) and (iii) are true

(c) Only (ii) and (iii) are true

(d) (i) (ii) as well as (iii) are true

63. As compared to a full-wave rectifier using two diodes, the four-diode bridge rectifier has the dominant advantage of

(a) Higher current carrying capacity

(b) Lower PIV

(c) Lower ripple factor

(d) Higher efficiency

64. The depletion region, or space charge region, or transition region, in a semiconductor PN junction diode has

(a) Electrons and holes

(b) Positive ions and electrons

(c) Positive and negative ions

(d) Negative ions and holes

65. The peak input voltage to a full-wave bridge rectifier is 1000 V at 50 Hz. The dc output voltage and ripple respectively are

(a) 318 V and 50 Hz

(b) 318 V and 100 Hz

(c) 636 V and 50 Hz

(d) 636 V and 100 Hz

66. For high speed operation which of the following parameters may have to be minimized?

1. Junction capacitance
2. Dynamic forward resistance
3. Depletion layer thickness
4. Charge storage

Choose the correct set of parameters using the codes giving below:

(a) 1 and 2 (b) 1, 2 and 3

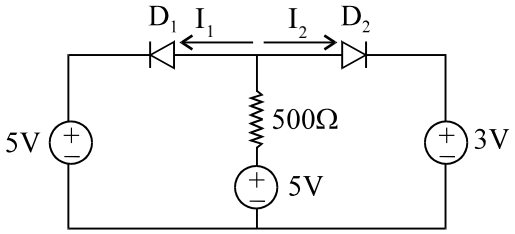
(d) 1 and 4 (d) 2, 3 and 4

67. In a junction diode, the ratio of the junction resistance under reverse bias to that under forward bias has a typical value

(a) 10^{-3} (b) 1

(c) 10^3 (d) 10^6

68. In the circuit shown below, D_1 and D_2 are ideal diodes. The current I_1 and I_2 are:



(a) Zero, 4 mA

(b) 4 mA, zero

(c) Zero, 8 mA

(d) 8mA, zero

69. In a uniformity doped abrupt p-n junction, the doping level of the p-side is ten times the doping level of the n-side. The ratio w_p/w_n of the depletion layer widths in the p- and n-region respectively is

(a) 0.1 (b) 1

(c) 2 (d) 10

70. An electronic device means the device in which the conduction of electrons takes place through

(a) A gas

(b) Vacuum

(c) A semiconductor

(d) A gas, semiconductor or vacuum

71. An atom is said to be ionized when any one of its orbiting electron

(a) Is raised to an higher orbit

(b) Jumps from one orbit to another

(c) Comes to the ground state

(d) Is completely removed

72. An electron in the conduction band

(a) Is bound to its parent atom

(b) Has no charge

(c) Is located near the top of the crystal

(d) Has a higher energy than an electron in the valence band

73. For insulators the forbidden gap is of the order of

(a) 5 eV (b) 1 eV

(c) 0.1 eV (d) zero

74. Fermi level is the

(a) Highest occupied energy level at 0 K

(b) Highest occupied energy level at 0°C

(c) Energy level at which electron emission occurs

(d) Minimum energy level in the conduction band

75. In an intrinsic semiconductor, the number of free electrons is equal to the number of holes at which temperature?

(a) 0 K (b) 0°C

(c) high temperature (d) all temperatures

76. In an intrinsic semiconductor

(a) There are no holes in the material

(b) The number of holes is too small

(c) Electrons in the material are neutralized by holes

(d) There are no electrons in the material

77. Which one of the following statements is correct?

If the Fermi level lies midway between the conduction and valance band, then the semiconductor is

(a) Intrinsic (b) Extrinsic

(c) p-type (d) n-type

78. With an increase in temperature, the Fermi level in an intrinsic semiconductor

(a) Moves closer to the conduction band edge

(b) Moves closer to the valence band edge

(c) Moves into the conduction band

(d) Remains at the centre of the forbidden gap

79. When voltage applied to a diode is more than PIV, it is likely to result in :

(a) More distortion on output side

(b) Poor regulation

(c) Conduction in both direction

(d) Breakdown at the junction

80. What is a varactor diode?

(a) It is a diode where the emitter can be changed into base.

(b) It is a diode where all the holes can be replaced by electrons.

(c) It is a diode where the reverse bias can be changed thereby varying the capacitance.

(d) None of these.

81. Which of the following reduces the number of electron-hole pairs?

(a) Recombination (b) Re-energization

(c) Recastination (d) None of these

82. Which of the following statements is true?

(a) Resistivity of silicon is more than that of germanium.

(b) Resistivity of silicon is less than that of germanium.

(c) Resistivity of silicon is same as that of germanium,

(d) Resistivity of silicon is half of that of germanium.

83. Which of the following contributes to flow of current in semiconductors?

(a) Holes (b) Electrons

(c) Both (a) and (b) (d) None of these

84. What is the resistivity of a material when it becomes a superconducting material?

(a) Zero

(b) 50% of its normal value

(c) Between 50% and 100% of the normal value

(d) None of these

85. Which of the following rectifiers requires four diodes?

(a) Half-wave voltage doublers

(b) Full-wave voltage doublers

(c) Full-wave bridge circuits

(d) Voltage quadrupler

[UPPCL JE - 2014]

86. The diffusion capacitance of a forward biased P^+N^- (highly doped P-region) junction diode with a steady state current I depends on

(a) Junction area

(b) Mean life-time of the electrons

(c) Mean life time of the holes

(d) Width of the depleted region

[TNPSC AE - 2018]

87. The minority carriers in n-type semiconductors are:

(a) Electrons (b) Holes

(c) Positrons (d) Protons

[UPPCL JE - 2014]

88. A diode can be used as a frequency multiplier because of

(a) Charge carrier concentration

(b) Junction capacitance

(c) Non-linearity

(d) Avalanche voltage

[UPPCL JE - 2014]

89. What is the value of the ripple factor in a full-wave rectifier without filter?

(a) 0.482 (b) 1.21

(c) 1.79 (d) 2.05

[UPPCL JE - 2014]

90. The Fermi-level in an intrinsic semiconductor is:

(a) Closer to the valence band

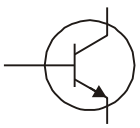
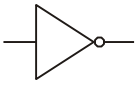
(b) Nearly midway between conduction and valence band

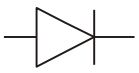
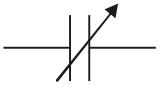
(c) Closer to the conduction band

(d) Within the valence band

[UPPCL JE - 2014]

91. The schematic symbol for a PN Junction diode is:

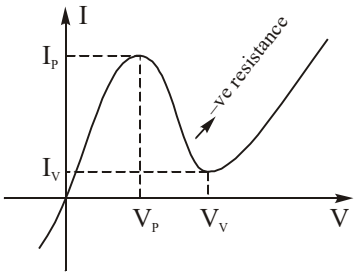
(a)  (b) 

(c)  (d) 

[NMRC JE-2017]

ANSWERS AND EXPLANATIONS

1. ***Ans. (c)***



2. ***Ans. (c)***

Electrical field is always maximum at the junction.

3. **Ans. (d)**

4. ***Ans. (b)***

$$I = \frac{10-6}{50} = 80\,mA$$

$\because \quad I_{ZK} = 5\,mA$

Then, $I_{L(max)} = 80 - 5 = 75\,mA$

So, $R = \frac{6}{75\times10^{-3}} = 80$ ohms.

5. ***Ans. (a)***

6. ***Ans. (c)***

7. ***Ans. (d)***

8. ***Ans. (a)***

9. ***Ans. (c)***

10. ***Ans. (a)***

11. ***Ans. (c)***

12. ***Ans. (d)***

13. ***Ans. (c)***

14. ***Ans. (c)***

15. ***Ans. (d)***

16. ***Ans. (d)***

17. ***Ans. (b)***

18. **Ans. (b)**

19. ***Ans. (a)***

20. ***Ans. (a)***

21. ***Ans. (d)***

22. ***Ans. (c)***

23. ***Ans. (d)***

24. ***Ans. (d)***

25. ***Ans. (a)***

26. ***Ans. (a)***

27. ***Ans. (c)***

28. ***Ans. (c)***

29. ***Ans. (a)***

30. ***Ans. (b)***

31. ***Ans. (d)***

32. ***Ans. (d)***

33. ***Ans. (d)***

34. ***Ans. (c)***

35. ***Ans. (b)***

36. ***Ans. (b)***

37. ***Ans. (b)***

38. ***Ans. (d)***

39. ***Ans. (b)***

40. ***Ans. (c)***

41. ***Ans. (b)***

42. ***Ans. (c)***

43. ***Ans. (c)***

44. ***Ans. (b)***

45. ***Ans. (b)***

46. ***Ans. (c)***

47. ***Ans. (c)***

48. ***Ans. (b)***

49. ***Ans. (c)***

50. ***Ans. (d)***

51. ***Ans. (b)***

52. ***Ans. (d)***

53. ***Ans. (d)***

54. ***Ans. (a)***

55. ***Ans. (c)***

56. ***Ans. (d)***

57. ***Ans. (d)***

58. ***Ans. (a)***

59. ***Ans. (c)***

60. ***Ans. (d)***

61. ***Ans. (b)***

62. ***Ans. (d)***

63. ***Ans. (b)***

64. ***Ans. (c)***

65. ***Ans. (d)***

66. ***Ans. (d)***

67. ***Ans. (d)***

68. ***Ans. (a)***

69. ***Ans. (a)***

70. ***Ans. (d)***

71. ***Ans. (d)***

72. ***Ans. (d)***

73. ***Ans. (a)***

74. ***Ans. (a)***

75. ***Ans. (d)***

76. ***Ans. (c)***

77. ***Ans. (a)***

78. ***Ans. (d)***

79. ***Ans. (d)***

80. ***Ans. (c)***

Varactor diode is a diode with a variable capacitance which is a function of the voltage that is impressed on its terminals.

81. ***Ans. (a)***

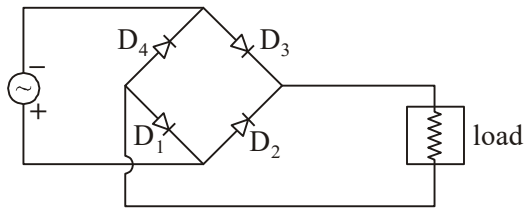
82. ***Ans. (a)***

83. ***Ans. (c)***

84. ***Ans. (a)***

85. ***Ans. (c)***

The simplest full wave bridge rectifier is given as



86. ***Ans. (b)***

Diffusion capacitance is defined as the rate of change of injected minority carrier charge with respect to forward bias voltage and for P^+ N diode, electrons are minority charge carriers.

87. ***Ans. (b)***

The n-type semiconductor has electrons as majority carriers and holes as minority carriers.

88. ***Ans. (c)***

Frequency multiplier consists of a non-linear circuit that distorts the input signal and consequently generates harmonics of the input signal.

89. ***Ans. (a)***

Ripple factor of full wave rectifier is 0.482.

90. ***Ans. (b)***

In intrinsic semiconductor number of holes is equal to number of electrons therefore fermi level exists nearly mid way between conduction and valence band.

91. ***Ans. (c)***

92. ***Ans. (d)***

93. ***Ans. (c)***

94. ***Ans. (d)***

95. ***Ans. (b)***

96. ***Ans. (a)***

PIV of diode= V_m = 3V

97. ***Ans. (a)***

98. ***Ans. (c)***

99. ***Ans. (b)***

Boron is a trivalent element.

100. ***Ans. (c)***

101. ***Ans. (b)***

102. ***Ans. (c)***

Semiconductors have negative temperature coefficient, therefore as temperature increases no of free e^- and holes increase hence conductivity increases.

103. ***Ans. (b)***

Zener diode shows regulator action in reverse bias only.

104. ***Ans. (a)***

105. ***Ans. (b)***

$$V_{rms} = \frac{V_m}{2} = \frac{10}{2} = 5A$$

106. ***Ans. (a)***

107. ***Ans. (b)***

PN junction diode is used in envelope detector.

108. ***Ans. (a)***

109. ***Ans. (b)***

Semiconductor have negative temperature coefficient that's why with increase in temperature resistance is decreases.

110. ***Ans. (d)***

$$\text{Peak Factor} = \frac{V_m}{V_{rms}}$$

rms voltage of half wave rectifier = $\frac{V_m}{2}$

So, peak factor = $\frac{V_m}{V_{rms}} = \frac{V_m}{V_m/2} = 2$

111. ***Ans. (c)***

112. ***Ans. (c)***

113. ***Ans. (b)***

114. ***Ans. (d)***