



PHYSICS

BOOKS - CHETANA PUBLICATION

Semiconductor

Example

1. What is P-N junction diode?



Watch Video Solution

2. What is a forward and reverse biased diode?



[Watch Video Solution](#)

3. What is breakdown voltage and knee voltage?



[Watch Video Solution](#)

4. When does a diode behave as a closed switch?



Watch Video Solution

5. When does a diode behaves as an open switch?



Watch Video Solution

6. State the use of the switching action of a diode?



Watch Video Solution

7. State the frequency of AC voltage used in India?



[Watch Video Solution](#)

8. Explain the working of simple rectifier circuit with block diagram and output wave-form



[Watch Video Solution](#)

9. Draw a block diagram of simple rectifier circuit with respective output wave-forms.



Watch Video Solution

10. What is rectification? What is a rectifier?
How does a p-n junction diode act as a rectifier?



Watch Video Solution

11. What is rectifier? State its types?



Watch Video Solution

12. Draw the circuit diagram of a half-wave rectifier. Explain its working. What is the frequency of ripple in its output?



Watch Video Solution

13. With the help of neat circuit diagram,
Explain working of p-n junction diode as a half-
wave rectifier



Watch Video Solution

14. Draw a neat diagram of a full wave rectifier
and explain its working



Watch Video Solution

15. With a neat circuit diagram, explain the use of two junction diodes as a full-wave rectifier. Draw the input and output voltage waveforms. What is the frequency of ripple in its output.



Watch Video Solution

16. What are the advantages of a full wave rectifier?



Watch Video Solution

17. The circuit shown in the fig. contains two diodes each with forward resistance of 50Ω and infinite backward resistance. If the battery voltage is $6V$, find the current through the 120Ω resistance.



[Watch Video Solution](#)

18. What is ripple factor?



[Watch Video Solution](#)

19. How does ripple factor decides the effectiveness of a rectifier?



[Watch Video Solution](#)

20. Define Ripple factor



[Watch Video Solution](#)

21. Explain filter circuit



[Watch Video Solution](#)

22. State the types of filter circuits?



Watch Video Solution

23. Explain capacitor filter?



Watch Video Solution

24. State the advantage of capacitor filter circuit?



Watch Video Solution

25. State the uses of capacitor filter circuit?



Watch Video Solution

26. Why do we need filters in a power supply?



Watch Video Solution

27. What is the regulated and unregulated power supply?



[Watch Video Solution](#)

28. What do you mean by special purpose junction diodes? State some common special purpose junction diodes



[Watch Video Solution](#)

29. What is breakdown voltage?



[Watch Video Solution](#)

30. Name the phenomena in which electrical breakdown occurs?



Watch Video Solution

31. Explain Zener Breakdown?



Watch Video Solution

32. How is a zener diode different than an ordinary diode?





[Watch Video Solution](#)

33. Why is a resistance connected in series with a zener diode when used in a circuit?



[Watch Video Solution](#)

34. What are the limitations of zener regulator? State the uses of zener regulator?



[Watch Video Solution](#)

35. Explain how a zener diode maintains constant voltage across a load?



Watch Video Solution

36. With the help of diagram explain the working of zener diode as a voltage regulator.



Watch Video Solution

37. Explain the forward and the reverse characteristics of a zener diode



[Watch Video Solution](#)

38. What is zener diode? Draw the I-V characteristics graph of zener diode and explain it.



[Watch Video Solution](#)

39. A 5.0 V stabilized power supply is required to be designed using a 12V DC power supply as an input source. The maximum

power rating P_z of the Zener diode is 2.0 W.

Using the Zener regulator circuit, calculate

:The maximum current flowing through the

Zener diode



[Watch Video Solution](#)

40. A 5.0 V stabilized power supply is required to be designed using a 12V DC power supply as an input source. The maximum power rating P_z of the Zener diode is 2.0 W. Using the Zener

regulator circuit, calculate The minimum value of the series resistor, R_s



[Watch Video Solution](#)

41. A 5.0 V stabilized power supply is required to be designed using a 12V DC power supply as an input source. The maximum power rating P_z of the Zener diode is 2.0 W. Using the Zener regulator circuit, calculate: The load current I_L , if a load resistor of $1k\Omega$ is connected across the Zener diode



[Watch Video Solution](#)

42. A 5.0 V stabilized power supply is required to be designed using a 12V DC power supply as an input source. The maximum power rating P_z of the Zener diode is 2.0 W. Using the Zener regulator circuit, calculate: The Zener current I_z at full load.



[Watch Video Solution](#)

43. How does a cell phone charger produce a voltage of 5V from the line voltage of 230V?



Watch Video Solution

44. What is photo diode? Draw the symbol and state uses.



Watch Video Solution

45. Explain the principal of operation of a photodiode.



Watch Video Solution

46. Explain the construction and working of photodiode



Watch Video Solution

47. Explain the I-V characteristics of photodiode?



Watch Video Solution

48. State any two advantages and disadvantages of photodiode?



Watch Video Solution

49. State any four applications of photodiode?



[Watch Video Solution](#)

50. Define Dark current and Dark resistance of photodiode?



[Watch Video Solution](#)

51. Why should a photodiode be operated in reverse biased mode?



[Watch Video Solution](#)

52. What are the requirements for materials used in solar cell.



Watch Video Solution

53. State any two disadvantage of solar cells



Watch Video Solution

54. State any two advantage of solar cells



Watch Video Solution

55. State the criteria for selection of material for solar cell.



Watch Video Solution

56. When the intensity of light incident on a photodiode increases, how is the reverse current affected?



Watch Video Solution

57. What is solar cell ? State the principle and uses of a solar cell.



Watch Video Solution

58. Explain the construction and working of solar cell?



Watch Video Solution

59. Explain the I-V characteristic of solar cell.



Watch Video Solution

60. What is LED? With neat diagram, explain the construction of a LED.



Watch Video Solution

61. Explain the construction and working of Aled.



Watch Video Solution

62. Explain I-V characteristics of LED



Watch Video Solution

63. State and explain any four advantages of LED



Watch Video Solution

64. State any two disadvantage of LED.



Watch Video Solution

65. State any four applications of LED



Watch Video Solution

66. On which factor does the wavelength of light emitted by a LED depend?



Watch Video Solution

67. State the factor which controls intensity of light emitted by a LED.



Watch Video Solution

68. Write the full form of transistor



Watch Video Solution

69. Why is the base of a transistor made thin and is lightly doped?



[Watch Video Solution](#)

70. Which is the most common method of biasing a transistor



[Watch Video Solution](#)

71. Which region in a transistor has a low and high resistance?



[Watch Video Solution](#)

72. Define Junction transistor and Bipolar junction transistor



Watch Video Solution

73. What is transistor? State different types of transistor.



Watch Video Solution

74. Draw the circuit symbols of: a pnp transistor



Watch Video Solution

75. Draw the circuit symbols of: a npn transistor.



Watch Video Solution

76. Explain the structure of p-n-p and p-n-p transistor.



Watch Video Solution

77. Explain the different region of a Bipolar Junction Transistor?



Watch Video Solution

78. Explain the working of an n-p-n transistor?



[Watch Video Solution](#)

79. What would happen if both junctions of a BJT are forward biased or reverse biased



[Watch Video Solution](#)

80. What are the three different configurations of transistors? Draw circuit symbols of different configuration?



[Watch Video Solution](#)

81. Define α and β . Derive the relation between them.



Watch Video Solution

82. Define current ratios $\alpha =$ and β for transistor. Obtain the relation between them.



Watch Video Solution

83. Why is the emitter, the base and the collector of a BJT doped differently?



Watch Video Solution

84. With the help of a neat labelled circuit diagram and graph, explain the input and output characteristics of a n-p-n transistor in common emitter configuration.



Watch Video Solution

85. What is an amplifier? Explain the use of a transistor as an amplifier.



Watch Video Solution

86. Draw a neat circuit diagram of a transistor CE -amplifier and explain its working



Watch Video Solution

87. Which method of biasing is used for operating transistor as an amplifier?



Watch Video Solution

88. If a transistor amplifies power, explain why it is not used to generate power



Watch Video Solution

89. The common-base DC current gain of a transistor is 0.967. If the emitter current is 10 mA, what is the value of base current?



Watch Video Solution

90. In a common-base connection, a certain transistor has an emitter's current of 10 mA and a collector's current of 9.8 mA. Calculate the value of the base current.



Watch Video Solution

91. In a common-base connection, the emitter current is 6.28 mA and collector current is 6.20 mA. Determine the common-base DC current gain.



Watch Video Solution

92. For a common emitter amplifiers, current gain is 70. If the emitter current is 8.8 mA, calculate the collector and base current. Also

calculate current gain, when transistor is working as common base amplifier.



[Watch Video Solution](#)

93. The input resistance of a transistor is 1000Ω . On changing its base current by $10 \mu A$, the collector current increases by 2 mA . If a load resistance of $5 \text{ k}\Omega$ is used in the circuit, calculate : the current gain.



[Watch Video Solution](#)

94. The input resistance of a transistor is $1000\ \Omega$. On changing its base current by $10\ \mu A$, the collector current increases by $2\ \text{mA}$. If a load resistance of $5\ \text{k}\Omega$ is used in the circuit, calculate :voltage gain of the amplifier.



Watch Video Solution

95. In a p-n-p transistor circuit the collector current is $10\ \text{mA}$. If 90% of the holes reach the collector, find emitter and base currents?



Watch Video Solution

96. What is a analog signal?



Watch Video Solution

97. What is a digital signal?



Watch Video Solution

98. What do you mean by a logic gate, a truth table and a Boolean expression?



[Watch Video Solution](#)

99. Draw the schematic symbol for AND,OR, NOT,NAND, NOR and Exclusive OR/ χ - OR Gate.Explain its working with the help of its truth table.



[Watch Video Solution](#)

100. What are the uses of logic gates? Why is a NOTgate known as an inverter?



[Watch Video Solution](#)

101. What is a logic gate? Write down the truth table and Boolean expression for 'AND' gate?



[Watch Video Solution](#)

102. Write the Boolean expression for: OR gate



[Watch Video Solution](#)

103. Write the Boolean expression for:AND gate



Watch Video Solution

104. Write the Boolean expression for:NAND gate.



Watch Video Solution

105. How will a NAND gate work when all its input terminals are shorted?



Watch Video Solution

106. A gate generates a HIGH output when at least one of its inputs is HIGH, which is this gate?



Watch Video Solution

107. How many rows are there in a 3- input gate truth table?



Watch Video Solution

108. Why are NAND gate and NORgate called universel gates?



Watch Video Solution

109. What is a digital circuit?



Watch Video Solution

110. What is digital electronics?



Watch Video Solution

111. Distinguish between a half-wave rectifier and full-wave rectifier



Watch Video Solution

112. What is the difference between a photodiode and a solar cell?



Watch Video Solution

Exercise

1. Select and write the most appropriate answer from all the given alternatives for each sub-question: Zener diode is always.

A. Forward biased

B. Reverse biased

C. Unbiased

D. (a) and (b) both

Answer:



Watch Video Solution

2. A photo diode is used in

A. Regulated power supply

B. An indicator

C. An opto coupler

D. An opto coupler

Answer:



Watch Video Solution

3. When P-N-P junction transistor is used as amplifier in C-B mode, then

A. The central N-type is common to both
input and output

B. The emitter terminal is common to both
input and output

C. The collector terminal is common to
both input and output

D. Nothing is common to both terminals

Answer:



Watch Video Solution

4. A transistor act as an open switch when it is in:

- A. The cut off region
- B. The active region
- C. The breakdown region
- D. The saturation region

Answer:



Watch Video Solution

5. The transistor provide good power amplification when they are used in:

- A. Common collector configuration
- B. Common emitter configuration
- C. Common base configuration
- D. All of the above

Answer:



Watch Video Solution

6. Avalanche breakdown in a zener diode takes place due to:

A. Thermal energy

B. Light energy

C. Magnetic energy

D. Accelerated minority charge carrier

Answer:



Watch Video Solution

7. A series resistance is connected in the zener diode circuit to:

- A. Properly reverse bias the zener
- B. Protect the zener
- C. Properly forward bias the zener
- D. Protect the load resistance

Answer:



Watch Video Solution

8. Full wave rectifier requires:

A. one diode

B. three diode

C. two diode

D. four diode

Answer:



Watch Video Solution

9. Colour of the radiation emitted by LED containing silicon carbide and zinc selenide is

A. red

B. blue

C. orange

D. yellow

Answer:



Watch Video Solution

10. In any type of transistor one part of the transistor which supplies majority charge carrier is:

A. Emitter

B. Base

C. Collector

D. Base and collector

Answer:



Watch Video Solution

11. A LED emits visible light when its

- A. Junction is reverse biased
- B. depletion region widens
- C. holes and electrons recombine
- D. junction becomes hot

Answer:



Watch Video Solution

12. A Solar cell is operated on the principle of

A. Diffusion

B. Recombination

C. Photo voltaic action

D. Carrier flow

Answer:



Watch Video Solution

13. If a full wave rectifier is operating from 50Hz mains frequency, the fundamental frequency in the ripple would be

A. 25 Hz

B. 50 Hz

C. 100 Hz

D. 75 z

Answer:



Watch Video Solution

14. The equation of AND gate is

$$A. Y = A \cdot B$$

B. $Y=A+B$

C. $Y = \overline{A + B}$

D. $Y = \overline{A \cdot B}$

Answer:



Watch Video Solution

15. Function of limiting resistance in LED is

A. To control current through LED

B. To control intensity of light

C. To control wavelength of light

D. (a) and (b) both

Answer:



Watch Video Solution

16. An AND gate is equivalent to

A. parallel switching circuit

B. series switching circuit

C. in universal gate

D. (a) and (c) both

Answer:



Watch Video Solution

17. The relation between α_{dc} and β_{dc} and in a transistor is

A. $\beta = \frac{1 - \alpha}{\alpha}$

B. $\beta = \frac{\alpha}{1 - \alpha}$

C. $\beta = \frac{1 + \alpha}{\alpha}$

$$D. \beta = \frac{\alpha}{1 + \alpha}$$

Answer:



Watch Video Solution

18. In a transistor is an amplifier emitter base junction it is

A. Forward biased

B. Reverse biased

C. Unbiased

D. (b) and (c) both

Answer:



Watch Video Solution

19. In a BJT, the largest current flow occurs

A. In the emitter

B. In the collector

C. In the base

D. Through CB junction

Answer:



Watch Video Solution

20. A logic gate is an electric circuit which

A. Makes logical decision

B. Allows electron flow only in one direction

C. Works using binary algebra

D. Alternates between 0 and 1 value

Answer:



Watch Video Solution

21. A p-n-p transistor having AC current gain to 50 is used to make an amplifier of a voltage gain of 5. What will be the power gain of the amplifier?

A. 125

B. 250

C. 350

D. 450

Answer:



Watch Video Solution

22. For an n-p-n transistor, the collector current is 24 mA. If 80% electrons reach collector, its base current in mA is

A. 6

B. 36

C. 216

D. 425

Answer:



Watch Video Solution

23. For a base configuration of p-n-p transistor

$\frac{I_C}{I_E} = 0.96$, then maximum current gain in common I_E emitter configuration will be

A. 12

B. 24

C. 36

D. 76

Answer:



Watch Video Solution

24. What is the value of $A + \bar{A}$ in Boolean algebra?

A. 0

B. 1

C. 01

D. 2

Answer:



Watch Video Solution

25. What is the value of $A \cdot \bar{A}$ in Boolean algebra?

A. 0

B. 1

C. 1

D. 2

Answer:



Watch Video Solution

26. In the given Boolean expression

$Y = A \cdot \bar{B} + B \cdot \bar{A}$. If $A = 1$, $B = 1$, then Y will be

A. 0

B. 1

C. 3

D. 4

Answer:



Watch Video Solution

27. A solar cell converts solar energy into

A. Heat energy

B. Chemical energy

C. Electric energy

D. Light energy

Answer:



Watch Video Solution

28. GaAs is used to prepare

A. Zener diode

B. Transistor

C. LED

D. Full wave rectifier

Answer:



Watch Video Solution

29. In the breakdown region, a zener diode behaves like a _____ source.

- A. Constant voltage
- B. Constant current
- C. Constant resistance

D. All of the above

Answer:



Watch Video Solution

30. A zener diode is destroyed if it

A. Is forward biased

B. Is reverse biased

C. Carries more than rated current

D. Is forward-Reverse biased

Answer:



Watch Video Solution

31. A zener diode is used as

- A. An amplifier
- B. A voltage regulator
- C. A rectifier
- D. An autotransformer

Answer:



[Watch Video Solution](#)

32. The output of NOR gate is HIGH when

- A. All inputs are high
- B. All inputs are low
- C. Only one of its inputs is HIGH
- D. Only one of its inputs is LOW

Answer:



[Watch Video Solution](#)

33. The acronym LED stands for

A. Light energized diode

B. Light emitting diode

C. Low energy device

D. Low energy dynamo

Answer:



Watch Video Solution

34. Which logic gate corresponds to the logical equation, $Y = (\bar{A} + B)$?

A. NAND

B. NOR

C. AND

D. OR

Answer:



Watch Video Solution

35. The color of light emitted by LED depends on

A. Its forward bias

B. Its reverse bias

C. The band gap of the material of the semiconductor.

D. Its size

Answer:



Watch Video Solution

36. The logic gate which produce LOW output when any one of the input is HIGH and produce HIGH output only when all of its input are LOW is called

- A. an AND gate
- B. an OR gate
- C. a NOR gate
- D. a NAND gate

Answer:



Watch Video Solution

37. The Zener diode with breakdown voltage greater than 6V operates mainly_____.

- A. in Zener breakdown region
- B. in breakdown region
- C. in avalanche breakdown region
- D. in forward-biased

Answer:



Watch Video Solution

38. In a Zener diode, the Zener breakdown region takes place

A. above 6V

B. below 6V

C. at 6V

D. All of the above

Answer:



Watch Video Solution

39. The value of β for a transistor is generally

A. 1

B. less than 1

C. between 20 and 500

D. above 500

Answer:



Watch Video Solution

40. If the value of α = is 0.9 then value of β is

A. 9

B. 0.9

C. 900

D. 90

Answer:



Watch Video Solution

41. In a transistor, signal is transferred from a _____ circuit

- A. high resistance to low resistance
- B. low resistance to high resistance
- C. high resistance to high resistance
- D. low resistance to low resistance

Answer:



Watch Video Solution

42. The arrow in the symbol of a transistor indicates the direction of

- A. electron current in the emitter
- B. electron current in the collector
- C. hole current in the emitter
- D. donor ion current

Answer:



Watch Video Solution

43. The most commonly used semiconductor in the manufacture of a transistor is

A. Germanium

B. Silicon

C. Carbon

D. Indium

Answer:



Watch Video Solution

44. A transistor has

- A. one P-N junction
- B. two P-N junctions
- C. three P-N junctions
- D. four P-N junctions

Answer:



Watch Video Solution

45. The number of depletion layers in a transistor is

A. four

B. three

C. one

D. two

Answer:



Watch Video Solution

46. IN an NPN transistor, _____

A. $I_C = I_E + I_B$

B. $I_B = I_C + I_E$

C. $I_E = I_C - I_B$

D. $I_E = I_C + I_E$

Answer:



Watch Video Solution

47. In a transistor if $\beta = 100$ and collector current is 10 mA, then I_E is

A. 100 MA

B. 10.1mA

C. 110mA

D. 11.1mA

Answer:



Watch Video Solution

48. The value of α of a transistor is

A. more than 1

B. less than 1

C. 1

D. between 20 and 500

Answer:



Watch Video Solution

49. In a transistor, the base current is about of emitter current

A. 0.25

B. 0.2

C. 0.35

D. 0.05

Answer:



Watch Video Solution

50. Select and write the correct answer :

Photo-diode is operated with

A. No bias

B. Forward bias

C. Reverse bias

D. Partially forward and reverse

Answer:



Watch Video Solution

51. Which gate corresponds to the action of parallel switches

A. NAND gate

B. NOR gate

C. OR gate

D. AND gate

Answer:



Watch Video Solution

52. The part of a transistor, which is heavily doped to produce a large number of majority carriers is called:

A. emitter

B. base

C. collector

D. any out of emitter, base and collector

Answer:



Watch Video Solution

53. Zener diode is used for:

A. amplification

B. rectification

C. stabilisation

D. Producing oscillation in oscillator

Answer:



Watch Video Solution

54. How is the n-p-n transistor represented symbolically ?



Watch Video Solution

55. What kinds of biasing are required to the collector and base of a transistor in a common emitter amplifier?



Watch Video Solution

56. Draw the logic symbol for a NAND gate



Watch Video Solution

57. Distinguish between a half-wave rectifier and full-wave rectifier



Watch Video Solution

58. Draw block diagram of simple rectifier circuit



Watch Video Solution

59. Why do we need filters in a power supply?



Watch Video Solution

60. State any two advantages and disadvantages of photodiode?



Watch Video Solution

61. Define current ratio α and β for transistor



Watch Video Solution

62. Calculate emitter current for which $\beta = 100$ and base current $I_B = 20\mu A$.



Watch Video Solution

63. For a common-emitter, amplifier current gain is 60. If the emitter current is 7.7mA,

calculate the base current and collector current. Also calculate current gain, when the same transistor is working as common-base amplifier?



[Watch Video Solution](#)

64. Explain the construction and working of Aled.



[Watch Video Solution](#)

65. Explain through a labelled circuit diagram the working of a transistor as an amplifier (CE configuration). Obtain an expression for the current gain, voltage gain and power gain



Watch Video Solution