



PHYSICS

BOOKS - R G PUBLICATION

ELECTRONIC DEVICES

Exercise

1. β of a given transistor is 99. What is the value of α ?



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2. Write down the truth table on NAND gate.



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3. Give one use of solar cell.



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4. What is reserve Saturation Current?



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5. Ics can be grouped in two categories.What are they?



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6. Draw the circuit diagram of a common emitter n-p-n transistor as an amplifier. Would you prefer to use a transistor as a common base or a common emitter amplifier and why?



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7. Draw a circuit diagram of a full rectifier and explain its working.



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8. What is LED ? State two advantages of LED over incandescent lamps.



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9. What is energy band gap of a semiconductor? What range of energy band gap of semiconductors is suitable for using in solar cells.



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10. Draw a labelled block diagram of a radio transmitter.



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11. What is NOT gate. Give its truth table.



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12. β of a transistor is 120A. What is the change in collector current for $100\mu A$ change in base current?



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13. What is breakdown voltage of a Zener diode? Explain its use as a voltage regulator.



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



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15. Explain, how a transistor can be used as a switch with the help of a circuit diagram.



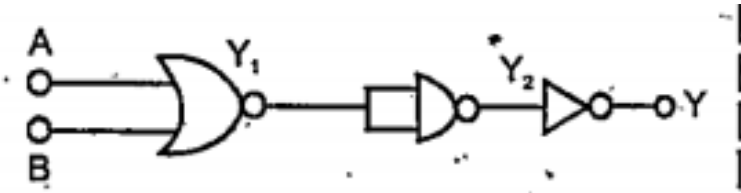
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16. For a Common emitter amplifier the voltage across collector resistance $2k\Omega$ is 2V. If the current amplification factor is 200 and base resistance is 1.5Ω , what is the input voltage?



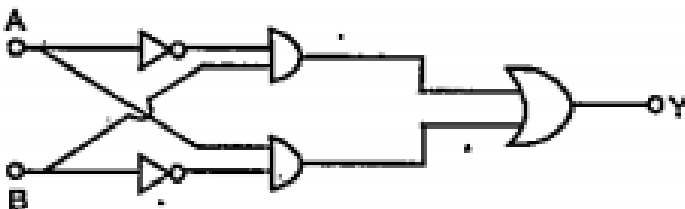
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17. What is the equivalent circuit of the combination given below? Answer with proper truth table.



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18. Give the truth table for the following logic circuit.





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19. What is a Zener diode? How is it biased in normal operation?



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20. Give two operational differences between light emitting diode (LED) and photodiode.



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21. How will you dope a pure Silicon Crystal to obtain a p-type and an n-type Semiconductor?



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22. Give a comparative discussion on majority and minority carriers in n-type and p-type semiconductors.



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23. Draw a circuit diagram of a full rectifier and explain its working.



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24. Sketch inputs A,B and output Y from a NAND gate from the table given below.

<i>Time</i> (समय)	<i>Input A</i> (इनपुट A)	<i>Input B</i> (इनपुट B)
$t < t_1$	1	1
t_1 to t_2	0	0
t_2 to t_3	0	1
t_3 to t_4	1	0
t_4 to t_5	1	1
t_5 to t_6	0	0



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25. Explain, how a transistor can be used as a switch with the help of a circuit diagram.



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26. For a Common emitter amplifier the output voltage across collector resistance $2k\Omega$ is 2V. If the current amplification factor is $\beta=100$ find the input signal voltage. The base resistance is $1k\Omega$.

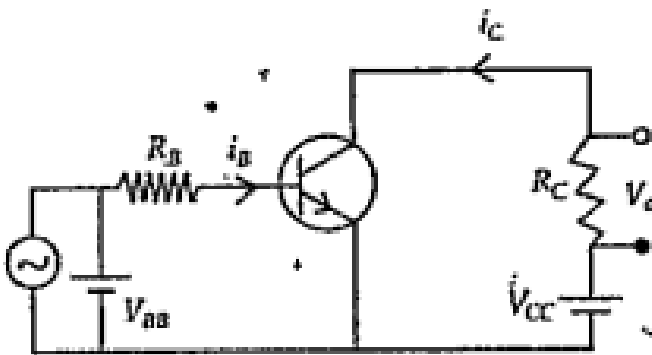


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27. How can you realise an OR gate using three NAND gates? Explain with circuit diagram.



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28.

In the above circuit diagram $V_{CC}=8V$, $V_{out}=0.5V$,

$R_L = 800\Omega$ and $\alpha = 0.96$.

Determine collector emitter voltage and the base current.



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29. Draw diagrams to show how a p-n junction is forward biased Draw V-I characteristics of the diode in both conditions and show in it break down voltage. Mention one important use of Zener diode.



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30. Draw diagrams to show how a p-n junction is forward biased Draw V-I characteristics of the diode in both conditions and show in it break down voltage. Mention one important use of Zener diode.



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31. Draw a circuit diagram of a transistor amplifier in CE configuration. Find an expression for its a.c. current gain.



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32. Draw a circuit diagram of a transistor amplifier in CE configuration. Find an expression for its a.c. current gain.



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33. Difference between intrinsic and extrinsic semiconductor?



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34. What is doping?



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35. What is intrinsic carrier concentration?



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36. C, Si and Ge have the same lattice structure.

Why is C insulator while Si and Ge intrinsic semiconductor.



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37. Difference between Donor impurities and

Acceptor impurities ?



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38. Draw the diagram to show the energy bands of a n type and p type semiconductor at $T > 0K$.



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39. Write a short note on semiconductor diode.



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40. What is a p-n junction diode?



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41. What is barrier potential?



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42. What is depletion region?



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43. What is minority carrier injection?



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44. Draw the typical V-I characteristic graph of a silicon diode.



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45. Write about the application of a diode.



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46. What is the use of transistor.



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47. Describe logic gate.



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48. What is forward and reverse biased in P.N. junction?



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49. How depletion layer varies with forward biased and reverse biased.



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50. What is a junction transistor. What are the different types of transistors? Show their schematic representation.



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51. What is the relation between α and β ?



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52. What is PIN Diode?



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53. What is doping?



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54. What is band diagram? What is the value of forbidden energy gap of semiconductor?



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55. What is knee voltage in Zener diode.



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56. What are p-type semi-conductor?



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57. In a transistor emitter is always forward biased. Why?



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58. In a transistor the value of $\alpha = .09$. What is the value of β ?



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59. Which type of biasing gives a semiconductor diode very high resistance?



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60. What is AND and OR gate.



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61. Why NAND and NOR gates considered as universal gate?



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62. Why transistor can't be used as a rectifier?



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63. On the basis of relative values of electrical conductivity write the classification of solids.



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64. What is energy band gap of a semiconductor? What range of energy band gap of semiconductors is suitable for using in solar cells.



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65. Differentiate valence band and conduction band.



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66. What is energy band gap of a semiconductor? What range of energy band gap of semiconductors is suitable for using in solar cells.



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67. What is intrinsic semiconductor? Draw the schematic two dimensional diagram of Si on Ge structure at low temperature.



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68. Draw the three dimensional diamond like crystal structure for carbon with respective lattice spacing.



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69. Write about the term "dopin". What are the pentavalent and trivalent impurity used in the process of doping? Give examples.



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70. "Doping changes the number of charge carrier of semiconductors" Describe?



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71. What is forward and reverse biased in P.N. junction?



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72. Draw the experimental circuit arrangement for studying V-I characteristics of a p-n junction diode in forward and reverse bias.



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73. Write a short note on "Diode as a rectifier".



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74. Write short notes on the following

Zener diode



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75. Write short notes on the following

Photo diode



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76. Write short notes on the following

Light emitting diode



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77. Write short notes on the following

Solar cell



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78. Write short notes on the following

Zener diode



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79. Define the term emitter, collector and base of a transistor.



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80. What is current amplification factor of a CB arrangement of a n-p-n transistor.



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81. Explain, how a transistor can be used as a switch with the help of a circuit diagram.



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82. How transistor can be used an amplifier?



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83. What is transfer characteristics. Draw the transfer characteristic graph of output voltage V_0 and input voltage V_1 to a CE configuration of a transistor.



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84. Deduce the expression for the voltage gain, A of a amplifier.





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85. What is a feedback amplifier? Draw its diagram.



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86. Write a short note on Integrated circuit.



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87. Differentiate between SSI,LSI,MSI and VLSI.



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88. Distinguish between electron and hole.



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89. Difference between intrinsic and extrinsic semiconductor?



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90. Distinguish between n type and p type semiconductor.



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91. In amplifier why signal voltage is always less than biasing voltage.



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92. Describe the working principle of a solar cell.



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93. What is a Zener diode? How is it biased in normal operation?



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94. What is half wave and full wave rectifier.



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95. Write the different energy levels of Si and Ge crystals.



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96. What is a junction transistor. What are the different types of transistors? Show their schematic representation.



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97. With a diagram, write the difference between energy bands of metals, insulators and semi conductors.



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98. What are the n type semiconductors?
Describe how it can be formed?



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99. Show the formation of a p type semiconductor with diagram.



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100. Suppose a pure Si crystal has 5×10^{28} atoms. m^{-3} . It is doped by 1ppm concentration of pentavalent As. Calculate the number of electron and holes. Given that $n_i = 1.5 \times 10^{16} m^{-3}$.



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101. Write a short note on formation of a p-n junction.



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102. What is a diode?



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103. Draw the circuit arrangement for halfwave rectifier and full wave rectifier. Draw the wave

form for each.



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104. What is n-p-n transistor.



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105. Draw the circuit arrangement for studying the input and output characteristics of n-p-n transistor in CE configuration.



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106. Draw the circuit diagram for the following:

Common emitter configuration



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107. Draw the circuit diagram for the following:

Common base configuration



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108. Draw the circuit diagram for the following:

Common collector configuration.



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109. Differentiate between analog signal and digital signal.

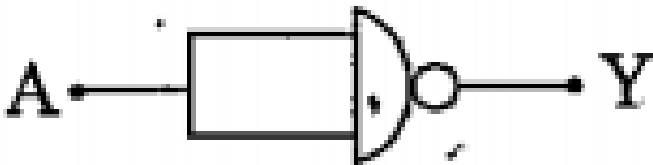


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110. What is logic gates? What are the different types of common logic gate?

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111. Write the truth for a NAND gate connected as given below.



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112. Describe P.N. junction as a half wave rectifier.



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113. Draw the input and output characteristics of transistor.



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114. How junction Diode can be used as a full wave rectifier.



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115. What is the relation between α and β ?



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116. How transistor can be used an amplifier?



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117. Derive OR gate, AND gate and NOT gate from NAND gate.



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118. How transistor can be used as an oscillator.



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119. Derive OR, AND and NOT gate from NOR gate.



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