PHYSICS

BOOKS - PUNJAB BOARD PREVIOUS YEAR PAPERS

Semiconductor Devices

Exercise

1. A transistor, connected in common-emitter configuration, has input resistance $R_{\in} = 3k\Omega$

and load resistance of $6k\Omega$.If $\beta = 40$ and an input signal of 20m V is applied, calculate the voltage gain, output voltage and power gain.

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2. A transistor, is connected in common-emitter configuration, has input resistance $R_{\in} = 1k\Omega$ and load resistance of $4k\Omega$. if $\beta = 50$ and an input signal of 10m V is applied, calculate the voltage gain, output voltage and power gain.

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3. A transistor, is connected in common-emitter configuration, has input resistance $R_{\in} = 2k\Omega$ and load resistance of $5k\Omega$.if $\beta = 60$ and an input signal of 12m V is applied, calculate the voltage gain, output

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4. The base current is $100\mu A$ and collector-current is 3mA. calculate the values of β, l_e

and α.

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5. A change of $20\mu A$ in the base current produces a change of 0.5mA in the collector current. Calculate β_{ac}

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6. The input resistance of a silicon transistor is 665Ω when base current is changed by $15\mu A$,

the collector current changes by 2mA. In a common emitter amplifier load resistance is $5k\Omega$. Calculate current gain β_{ac}

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7. The input resistance of a silicon transistor is 665Ω when base current is changed by $15\mu A$, the collector current changes by 2mA. In a common emitter amplifier load resistance is $5k\Omega$. Calculate transconductance (g_m) & voltage gain (A_v) of the amplifier.

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8. For a common emitter amplifier current gain = 50 if the emitter current is 6.6 mA. Calculate the collector and base current.

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9. For a common emitter amplifier current gain is 70 if the emitter current is 8.8 milliampere (mA). Calculate the collector and base current.

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10. For a common emitter transistor as amplifier current gain is 72.Calculate the base current for which emitter current is 8.9 milliampere and also find collector current.

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11. A common emitter circuit has an input resistance of 570Ω and output resistance of

$59k\Omega$.If the current gain is 60, find the voltage gain andpower gain.

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12. A transistor connected in cdmmon emitter configuration has input resistance $Ri = 2k\Omega$ (kilo ohm) and load resistance $6k\Omega$ (kilo ohm). If current gain $\beta = 60$ and input signal 10 mV (millivolt) is applied, calculate resistance gain

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13. A transistor connected in common emitter configuration has input resistance $Ri = 2k\Omega$ (kilo ohm) and load resistance $6k\Omega$ (kilo ohm). If current gain $\beta = 60$ and input signal 10 mV (millivolt) is applied, calculate voltage gain


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14. A transistor connected in common emitter configuration has input resistance $Ri = 2k\Omega$ (kilo ohm) and load resistance $6k\Omega$ (kilo ohm).

If current gain $\beta = 60$ and input signal 10 mV (millivolt) is applied, calculate power gain.

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15. A transistor is usedin common emitter mode in an amplifier circuit. It is found that when a signal of 20 mV (millivolt) is added to base-emitter voltage the basecurrent changes by $20\mu A$ (micro ampere) nd collector current changes by 1.5 mA (milli ampere). Determine the current gain b, Input resistance Ri,

transcondutance and voltage gain. Give load resistance $R_l = 6kW$ (kilo ohm).

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16. A transistor is used in common emitter mode in an amplifier circuit.When a signal of 24 mV (millivolt) is added to base emitter voltage, the base current changes by $32\mu A$ (micro ampere) and collector current by 3.6 mA (milli ampere) and the load resistance is $4.8k\Omega$ (kilo ohm). Calculate current gain

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17. A transistor is used in common emitter mode in an amplifier circuit.When a signal of 24 mV (millivolt) is added to base emitter voltage, the base current changes by $32\mu A$ (micro ampere) and collector current by 3.6 mA (milli ampere) and the load resistance is $4.8k\Omega$ (kilo ohm). Calculate the input resistance R_be

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18. A transistor is used in common emitter mode in an amplifier circuit.When a signal of 24 mV (millivolt) is added to base emitter voltage, the base current changes by $32\mu A$ (micro ampere) and collector current by 3.6 mA (milli ampere) and the load resistance is $4.8k\Omega$ (kilo ohm). Calculate trans conductance g_m

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19. A transistor is used in common emitter mode in an amplifier circuit.When a signal of 24 mV (millivolt) is added to base emitter voltage, the base current changes by $32\mu A$ (micro ampere) and collector current by 3.6 mA (milli ampere) and the load resistance is $4.8k\Omega$ (kilo ohm). Calculate voltage gain.

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20. For a common emitter amplifier, dc (direct current) current gain is 100. If the base current is $20\mu A$, calculate the collector and emitter current.

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21. For a common emitter amplifier, dc (direct current) current gain is 60. If the emitter current is 6.6mA, calculate the collector and base current.

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22. For a common emitter amplifier, dc (direct current) current gain is 20. If the emitter current is 7mA, calculate the base and collector current.

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23. A common emitter (CE) transistor has a current gain of 100. If emitter current is 8.08 mA, find the base and collector current.

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24. A common emittertransistor has current gain of 96. If base current is $8\mu A$. Find the collector and emitter current.

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25. A semiconductor has electron mobility as $2.2 \times 10^4 cm^2 V^{-1} S^{-1}$ andhole mobility as $1.5 \times 10^2 cm^2 V^{-1} S^{-1}$. If the electron

concentration in this semiconductor is $40 \times 10^{12} cm^{-3}$ and hole concentration as $7 \times 10^{14} cm^{-3}$. Find the type of semiconductor and its conductivity.

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26. Draw a circuit diagram with a p-n junction in forward bias.

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27. Draw a circuit diagram with a p-n junction atreverse bias.

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28. State the factors, which controls intensity of light, emitted by a LED.

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29. Draw a circuit diagram to show how a photodiode is biased.

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30. State the factors, which controls wavelength of light, emitted by a LED.

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31. What do you mean by depletion region in a p-n junction ?

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32. Draw a PN-Junction with reverse bias.

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33. Write briefly, how a Zener diode acts as voltage regulator.

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34. Write in brief about Photo-diodes.

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35. Explain the terms depletion layer

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36. Explain the terms potential barrier for a junction diode.

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37. In a transistor, base is made very thin.Explain.

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38. Why a transistor cannot be used as a rectifier ?

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39. The resistance of a p-n junction is low, when forward biased and is high, when reverse is biased. Explain.

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40. What is photo cell ? State its three applications.

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41. Write briefly, how a Zener diode acts as voltage regulator.

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42. Why does the thickness of depletion layer of pn-junction increases in reverse biasing ? Draw the circuit diagram of reverse biasing.

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43. What is a solar cell ? How does it work ? Write its one use.

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44. Explain how the depletion layer and barrier potential are formed in pn junction diode ?

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45. Explain forward bias and reverse bias of the junction diode.

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46. With the help of circuit diagram explain working of junction diode as full wave rectifier.

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47. With the help of labelled circuit diagram, explainthe working of transistor as a switch.

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48. With the help of circuit diagram, explain the working of transistor as a oscillator.

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49. With the help of circuit diagram, explain the working of transistor as a common emitter amplifier.

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50. With the help of suitable diagrams, explain the function of p-n junction diode as full wave rectifier.

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51. Define Rectification. With the help a circuit diagram explain the working of p-n junction diode as a half wave rectifier.

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52. What is junction diode ? How is depletion layer formed ? Draw its forward and reverse bias characteristics by showing biasing of diodes ?

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53. What is transistor ? Give the symbols of n-p-n and p-n-p transistor.

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54. Explain with diagram, the working of a transistor as a common-emitter amplifier.

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55. What is rectifier ? Explain the working of junction diode as a full wave rectifier, with diagram.

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56. Discuss the variation of current with voltage in a P-N Junction diode when it is forward biased.

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57. With the help of circuit diagram, explain theV-I characteristics of p-n junction diode in forward biasing.

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58. With the help of circuit diagram, explain theV-I characteristics of p-n junction diode in reverse biasing.

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59. With the help of circuit diagram explain working of junction diode as full wave rectifier.

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60. With the help of circuit diagram, explaintheV-I characteristics of p-n junction diode in forward biasing.

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61. With the help of circuit diagram, explain the working of transistor as a common emitter amplifier.

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62. What is rectifier ? Explain the working of junction diode as a full wave rectifier, with diagram.

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63. Discuss the working of n-p-n transistor as an amplifier in common base mode.

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64. Discuss the working of p-n-p transistor as an amplifier in common emitter mode.

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65. Discuss the construction and working of diode as full wave rectifier

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66. Why does the thickness of depletion layer of pn-junction increases in reverse biasing ? Draw the circuit diagram of reverse biasing.

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67. With the help of circuit diagram explain working of junction diode as full wave rectifier.

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68. Why does the depletion layer of pn-junction diode decreases in forwardbiasing ? Draw the circuit diagram of forwardbiasing.

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69. With the help of circuit diagram explain working of junction diode as full wave rectifier.

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70. Explain with the help of circuit diagram, how V-I characteristics of pn junction diode are obtained in forward biasing.

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71. What is an amplifier ? Draw a circuit diagram for an amplifier withPNP transistor in common emitter configuration. Also define current gain, voltage gain and power gain for it.

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72. What is an amplifier ? Draw a circuit diagram for an amplifier withPNP transistor in common emitter configuration. Also define current gain, voltage gain and power gain for it.

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73. What is an oscillator ? Draw a labelled circuit diagram for an oscillator using PNP

transistor.What is the function of feed back coil in it ? Write an expression for the frequency of waves produced by it.What is the use of waves produced by it ?

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74. With the help of circuit diagram explain working of junction diode as full wave rectifier.

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75. With the help of circuit diagram explain working of junction diode as full wave rectifier.

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76. With the help of circuit diagram, explain the working of transistor as a common emitter amplifier.

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77. With the help of lebelled circuit diagram, discuss the working of transistor as a common emitter amplifier.Find the phase relationship between input and output signals. Also define its voltage gain.

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78. What is junction diode ? How is depletion layer formed ? Draw its forward and reverse

bias characteristics by showing biasing of diodes ?

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79. What is an electric oscillator ? With the help of labelled diagram, explain the use of junction transistor as.an oscillator.

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80. With the help of circuit diagram, explain the working of transistor as a common emitter amplifier.

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81. What is p-n junction diode ? Explain the principle and of various components of full wave rectifier using circuit diagrams as well as input and output waveforms.

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82. What is an oscillator ? With the help of circuit diagram explain theprinciple and working of transistor as an oscillatoris common emitter configuration, showing how feedback is accomplished by inductive

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83. What is transistor ? How is it formed ? Show with the help of diagram action of npn transistor

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84. What is transistor ? How is it formed ? Show with the help of diagram action of pnp transistor.

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