JUNCTION BIPOLAR TRANSISTORS (BJT)

11.1. Vocabulary

Ex. 1. *Match the words with their Russian equivalents.*

1. биполярный	a. effect
2. транзистор	b. pair
3. база	c. diversity
4. проводимость	d. conductivity
5. величина	e. bipolar
6. полярность	f. zones
7. концентрировать	g. transistor
8. зоны	h. form
9. пара	i. magnitude
10. формировать	j. polarity
11. эффект	k. concentrate
12. разнообразие	l. base

Ex. 2. *Translate the sentences into English.*

1. Биполярный транзистор часто используется в электронных устройствах для эффективного усиления сигналов.

2. База транзистора подключается к другим компонентам схемы.

3. Одним из важных эффектов BJT является то, как ток может регулировать уровни напряжения.

4. Инженеры должны сосредоточиться на разработке, чтобы гарантировать эффективную работу BJT.

5. Существует множество типов транзисторов, доступных для различных электронных применений.

6. Проводимость является ключевым фактором при выборе материалов для изготовления транзисторов.

7. Различные зоны внутри транзистора влияют на его производительность и скорость переключения.

8. При сборке схем с биполярными транзисторами важно понимать полярность.

9. Величина тока, протекающего через транзистор, определяет его работу.

10. Транзисторы могут образовывать сложные схемы, которые позволяют выполнять множество функций в устройствах.

11. Пара транзисторов BJT может использоваться вместе для значительного улучшения усиления сигнала.

11.2. Grammar

Ex. 1. Put the words in the correct order.

1. are essentially Bipolar Junction joined pair consists of that Transistor a A PN of back-to-back Diodes

2. basic exhibited Bipolar of as diode-like. being Transistor recognizable by immediately are a some the properties

3. of sandwich forms a two placed is between one where a sort in kind others this of semiconductor

4. thin PN junctions back-to-back two like pair looks of filling 'bread' a type of P- N-type Diode between arrangement slices with a the

5. conduction the take the of place conduction in In free layers can electrons movement band N-type the by each of

11.3. Reading

Ex. 1. Read the text.

Junction bipolar transistors (JBTs) are essential components in modern electronics, serving as the building blocks for amplifying or switching electronic signals. These transistors function through the interaction of electrons and holes within a semiconductor material, typically silicon. A JBT consists of three regions: the emitter, base, and collector. The emitter injects carriers into the base, a thin, lightly doped region, which then modulates the current flowing to the collector.

The operation of a JBT relies heavily on the biasing of its junctions. In active mode, the emitter-base junction is forward-biased, while the collector-base junction is reverse-biased. This configuration allows a small input current at the base to control a larger output current between the collector and emitter. Crucial factors such as current gain, bandwidth, and thermal stability determine the performance of a JBT in various applications, ranging from audio amplification to signal modulation in radio frequency circuits.

Understanding the principles of junction bipolar transistors is fundamental for anyone delving into advanced electronics, as their versatile nature and robust characteristics make them indispensable in both analog and digital domains.

Ex. 2. Answer the questions.

Questions:

1. What are the three regions of a junction bipolar transistor (JBT)?

2. How does a JBT function in terms of electron and hole interaction?

3. What is the biasing configuration of the emitter-base and collector-base junctions in active mode?

4. What factors determine the performance of a JBT in different applications?

5. Why is it important to understand the principles of junction bipolar transistors in advanced electronics?

6. How does a small input current at the base control a larger output current between the collector and emitter in a JBT?

7. In what types of circuits are JBTs commonly used for signal modulation and amplification?