

GUJARAT TECHNOLOGICAL UNIVERSITY

DI -3 SEMESTER – OLD PAPER – S23 TO S25 – QUESTION BANK(English)

Subject Name & Code:

Fundamentals Of Electronics- 4330904

Unit I: Basics of Semiconductor and Its Applications

Repeated Questions:

1. **Explain N-type semiconductor.**
 - Appeared in: SUM 23 (Q1b, 04 marks), WIN 24 (Q2a, 03 marks), SUM 25 (Q1a, 03 marks)
2. **Explain the V-I characteristics of a PN junction diode.**
 - Appeared in: SUM 24 (Q1c, 07 marks), WIN 22 (Q1b, 04 marks), WIN 24 (Q1c, 07 marks)
3. **What is the need of a filter in a rectifier? Enlist types of filter circuits and explain any one.**
 - Appeared in: SUM 23 (Q1c(OR), 07 marks), WIN 23 (Q1c(OR), 07 marks), SUM 25 (Q1c, 07 marks)
4. **Define α and β . Derive the relationship between α and β .**
 - Appeared in: SUM 23 (Q2c, 07 marks), WIN 22 (Q2a, 03 marks), SUM 25 (Q2b, 04 marks)
5. **Explain the working of an NPN transistor.**
 - Appeared in: SUM 24 (Q2b, 04 marks), WIN 22 (Q2b, 04 marks), WIN 23 (Q2c(OR), 07 marks), SUM 25 (Q2a(OR), 03 marks)
6. **Explain Zener diode as a voltage regulator.**
 - Appeared in: SUM 24 (Q5b, 04 marks), WIN 22 (Q4a, 03 marks), WIN 23 (Q4a, 03 marks), WIN 24 (Q5a(OR), 03 marks), SUM 25 (Q4a, 03 marks)
7. **Compare Half wave rectifier and Full wave center tap rectifier.**
 - Appeared in: SUM 23 (Q1c, 07 marks), WIN 22 (Q5b(OR), 04 marks), WIN 24 (Q2b, 04 marks)

Other Important Questions:

English List:

1. Explain intrinsic and extrinsic semiconductor. (SUM 23 - Q1a, 03 marks)

2. Compare conductor, semiconductor, and insulator material drawing energy band diagram. (WIN 22 - Q1a, 03 marks), (WIN 24 - Q1a, 03 marks)
3. Explain P-type semiconductor. (SUM 24 - Q1a, 03 marks)
4. Define Majority and Minority charge carriers. (SUM 24 - Q1b, 04 marks)
5. What is a rectifier? Draw & explain a bridge rectifier. (SUM 24 - Q1c(OR), 07 marks), (SUM 25 - Q1c(OR), 07 marks)
6. What is a rectifier circuit? Draw and explain a full wave rectifier circuit with its advantage and disadvantage. (WIN 22 - Q1c, 07 marks)
7. What is a rectifier circuit? Compare Half wave, Full wave, and Bridge Rectifier Circuit. (WIN 22 - Q1c(OR), 07 marks)
8. Explain why filters are needed? and explain π filter. (SUM 24 - Q2a, 03 marks)
9. Explain forward biased PN junction diode. (WIN 23 - Q1b, 04 marks), (SUM 25 - Q1b, 04 marks)
10. Define α_{dc} and β_{dc} and find the relation between them. (WIN 24 - Q1b, 04 marks)
11. Define Knee voltage and Breakdown Voltage. Write application of PN junction diode. (WIN 24 - Q1c, 07 marks)
12. Explain the difference between Avalanche and Zener breakdown. (WIN 23 - Q2a, 03 marks), (SUM 25 - Q2a, 03 marks)
13. Explain full wave rectifier with two diodes giving necessary waveforms. (WIN 23 - Q2a(OR), 03 marks)
14. Explain filter circuits. (WIN 23 - Q2b(OR), 04 marks)
15. Explain bridge rectifier giving necessary waveforms. (WIN 23 - Q2b, 04 marks)

Unit II: Transistor and Amplifiers

Repeated Questions:

English List:

1. **Compare the three configurations of a transistor.**
 - Appeared in: WIN 22 (Q2a(OR), 03 marks), WIN 24 (Q3a, 03 marks), WIN 23 (Q1a, 03 marks), SUM 23 (Q2a, 03 marks)
2. **Explain DC load line and define Operating point.**
 - Appeared in: WIN 22 (Q2c, 07 marks), WIN 24 (Q2b(OR), 04 marks), WIN 23 (Q3a(OR), 03 marks), SUM 23 (Q2a(OR), 03 marks), SUM 25 (Q2b(OR), 04 marks)
3. **Explain Class B Push Pull amplifier.**
 - Appeared in: WIN 23 (Q3a, 03 marks), SUM 23 (Q2b, 04 marks), SUM 25 (Q3b(OR), 04 marks)
4. **What is the need of cascading in amplifiers? Draw and explain the circuit of two stages RC coupled Amplifier.**
 - Appeared in: WIN 22 (Q2b(OR), 04 marks), WIN 24 (Q2c, 07 marks), SUM 23 (Q3b, 04 marks)
5. **Give comparison of CB, CE and CC modes of transistors.**
 - Appeared in: SUM 24 (Q2c, 07 marks), SUM 25 (Q2c(OR), 07 marks)
6. **Define biasing of transistor. State requirements of biasing circuit. State different method of biasing. Explain anyone.**
 - Appeared in: SUM 23 (Q2c(OR), 07 marks), SUM 25 (Q2c, 07 marks)

Other Important Questions:

1. Explain working PNP transistor. (WIN 22 - Q3b, 04 marks)
2. Explain input and output characteristics of common base transistor configuration. (WIN 22 - Q3b(OR), 04 marks)
3. Draw and explain transistor as a switch. (WIN 22 - Q2c(OR), 07 marks)
4. Write the application of FET. (SUM 24 - Q2a(OR), 03 marks), (SUM 25 - Q4b, 04 marks)
5. Compare class A, B, AB and C amplifiers. (SUM 24 - Q2b(OR), 04 marks)
6. Define α_{dc} and β_{dc} and find relation between them. (SUM 24 - Q2c(OR), 07 marks)
7. Explain distortion in amplifiers. (SUM 23 - Q2b(OR), 04 marks)
8. Draw the input and output characteristic of transistor in CE configuration and explain. (WIN 23 - Q2c, 07 marks)
9. What is amplifier? How transistor act as an amplifier. Explain Class AB push pull power amplifier. (SUM 24 - Q3c, 07 marks)
10. Draw the circuit of two stage RC coupled Amplifier. (SUM 24 - Q3a, 03 marks)
11. Draw the input and output characteristic of transistor in CC configuration. (SUM 23 - Q3b(OR), 04 marks)

Unit III: Oscillators

Repeated Questions:

1. **Explain RC phase shift oscillator.**
 - Appeared in: WIN 22 (Q3a(OR), 03 marks), WIN 23 (Q3b(OR), 04 marks), WIN 24 (Q4b(OR), 04 marks), SUM 23 (Q3a, 03 marks), SUM 25 (Q3a, 03 marks)
2. **Explain Hartley and Colpitt oscillator.**
 - Appeared in: SUM 24 (Q3b(OR), 04 marks), WIN 23 (Q3b, 04 marks)
3. **Explain construction and working of SCR by using two transistor analogy with necessary diagrams.**
 - Appeared in: WIN 22 (Q4c, 07 marks), WIN 23 (Q3c, 07 marks), WIN 24 (Q4c, 07 marks), SUM 25 (Q3c(OR), 07 marks)
4. **Classify oscillator on different basis.**
 - Appeared in: WIN 23 (Q5a, 03 marks), SUM 23 (Q3c(OR), 07 marks)

Other Important Questions:

1. Define and classify different types of oscillators. (WIN 22 - Q3a, 03 marks)
2. Explain crystal oscillator. (WIN 22 - Q3c, 07 marks)
3. Draw and explain damped oscillator in LC tank circuit. (WIN 22 - Q3c(OR), 07 marks)
4. Explain working principle of oscillators. And list its applications. (SUM 24 - Q3c(OR), 07 marks)
5. Write a note on Wein bridge Oscillator. (SUM 23 - Q3a(OR), 03 marks)
6. Explain Wein Bridge oscillator. (WIN 23 - Q4a, 03 marks), (SUM 25 - Q3a(OR), 03 marks)
7. Explain the principle of RC Oscillator. (WIN 23 - Q4a(OR), 03 marks)
8. Explain Hartley Oscillator. (WIN 24 - Q4a, 03 marks)
9. Write applications of Oscillator. (WIN 24 - Q5a, 03 marks)
10. Discuss any one LC oscillator in detail. (SUM 23 - Q3c(OR), 07 marks)

Unit IV: Semiconductor and Opto Electronic Devices

Repeated Questions:

1. **Explain the construction and working of N-channel JFET.**
 - Appeared in: WIN 22 (Q4b, 04 marks), WIN 24 (Q4c(OR), 07 marks), WIN 23 (Q5b(OR), 04 marks)
2. **Explain the construction and working of LED.**
 - Appeared in: SUM 25 (Q5a(OR), 03 marks), WIN 24 (Q3c, 07 marks)
3. **Draw and explain seven segment display using LED.**
 - Appeared in: SUM 24 (Q4c(OR), 07 marks), SUM 25 (Q4c(OR), 07 marks)
4. **Explain Photovoltaic cell.**
 - Appeared in: WIN 22 (Q4a(OR), 03 marks), WIN 23 (Q3c(OR), 07 marks)

Other Important Questions:

1. Explain AC Load control using DIAC and TRIAC. (WIN 22 - Q4b(OR), 04 marks)
2. Draw and explain optocouplers in detail. (WIN 22 - Q4c(OR), 07 marks)
3. Draw the following symbols: 1) Photo Diode; 2) N – MOSFET; 3) UJT (SUM 24 - Q4a(OR), 03 marks)
4. Explain seven segment LED display. (SUM 24 - Q4b(OR), 04 marks)
5. Draw the characteristics of SCR. Explain its working with two transistor analogy. (SUM 24 - Q4c, 07 marks)
6. Explain N Channel FET. (SUM 23 - Q4a(OR), 03 marks)
7. Draw and explain LDR with its characteristics. (SUM 23 - Q4b(OR), 04 marks), (SUM 25 - Q4b(OR), 04 marks)
8. Draw and explain construction and characteristics of UJT. (SUM 23 - Q4c(OR), 07 marks)
9. Explain P channel FET. (WIN 23 - Q4b, 04 marks)
10. Write the application of FET. (WIN 23 - Q4b(OR), 04 marks)
11. Write a short note on LDR. (WIN 24 - Q4a(OR), 03 marks)
12. Compare FET and BJT. (WIN 24 - Q4b, 04 marks)
13. Write the classification of FET & Explain the construction and working of N-channel JFET. (WIN 24 - Q4c(OR), 07 marks)
14. Compare LCD and LED. (WIN 24 - Q3b(OR), 04 marks)
15. Explain the construction and working of Photo transistor. (WIN 23 - Q5b, 04 marks)
16. Explain pizzo electric effect. (WIN 23 - Q5a(OR), 03 marks), (SUM 25 - Q5a, 03 marks)
17. List various Optoelectronic devices and explain any one in detail. (SUM 24 - Q5c, 07 marks), (SUM 25 - Q5c(OR), 07 marks)
18. Explain the construction and working of Photo Voltaic cell. (WIN 24 - Q5b(OR), 04 marks)

Unit V: Regulated Power Supply

Repeated Questions:

1. **Draw and explain block diagram of regulated power supply.**
 - Appeared in: WIN 22 (Q5a, 03 marks), SUM 25 (Q5c(OR), 07 marks - part)
2. **Explain the Basic circuit of SMPS and write the advantages of SMPS.**
 - Appeared in: WIN 22 (Q5b, 04 marks), WIN 23 (Q4c(OR), 07 marks), SUM 25 (Q4c, 07 marks)
3. **Explain Uninterrupted power supply (UPS).**
 - Appeared in: WIN 22 (Q5c, 07 marks), SUM 24 (Q5b(OR), 04 marks), WIN 23 (Q5c(OR), 07 marks), WIN 24 (Q5b, 04 marks), SUM 25 (Q5a(OR), 03 marks)
4. **Explain Feedback type series voltage regulator.**
 - Appeared in: WIN 22 (Q5a(OR), 03 marks), WIN 23 (Q5c, 07 marks), WIN 24 (Q5c, 07 marks), SUM 25 (Q5b(OR), 04 marks)
5. **Explain three terminal voltage regulators IC.**
 - Appeared in: WIN 22 (Q5c(OR), 07 marks), WIN 24 (Q3b, 04 marks)

Other Important Questions:

1. Compare Half wave rectifier and full wave center tap rectifier. (WIN 22 - Q5b(OR), 04 marks)
2. Define 1) Line regulation 2) Load regulation (WIN 24 - Q3a(OR), 03 marks)
3. Explain load and source regulation of regulated power supply. (SUM 24 - Q4c(OR), 07 marks)
4. Give characteristics of ideal OPAMP. (SUM 24 - Q4a, 03 marks), (SUM 25 - Q4a(OR), 03 marks)
5. Draw and explain block diagram of IC 741. (SUM 24 - Q4b, 04 marks)
6. Explain IC-741 as comparator. (SUM 24 - Q5a, 03 marks), (SUM 25 - Q5b, 04 marks)
7. Define the following terms with respect to OP-AMP (1) C.M.M.R; (2) Input offset Voltage; (3) Slew Rate; (4) Input bias current (SUM 24 - Q3a(OR), 03 marks)
8. Draw the block diagram of three terminal IC regulators and Draw the circuit for dual power supply using IC 7812 and IC 7912. (WIN 24 - Q3b, 04 marks)
9. Draw the functional block diagram of IC 555 and its pin connection. Explain IC 555 as a monostable multivibrator. (WIN 23 - Q4c, 07 marks), (SUM 25 - Q5c, 07 marks)
10. Draw block diagram of SMPS and explain its working. (SUM 24 - Q5c(OR), 07 marks)
11. Draw the block diagram of electronic voltage regulator and explain the function of each block. (SUM 23 - Q5c(OR), 07 marks)
