

Register No : \_\_\_\_\_

**THE KAVERY ENGINEERING COLLEGE**  
(An Autonomous Institution)

**B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024**

*Third Semester*

*Electrical and Electronics Engineering*

**EC3301 – Electron Devices and Circuits**

*Regulations – 2021*

*Duration : 3 Hrs*

*Maximum: 100 Marks*

**PART – A (ANSWER ALL QUESTIONS) (Marks 10\*2=20)**

| <i>Q.No</i> | <i>Questions</i>                                                          | <i>BLT</i> | <i>CO</i> | <i>Marks</i> |
|-------------|---------------------------------------------------------------------------|------------|-----------|--------------|
| 1.          | Is silicon preferred over germanium in Diodes? Justify.                   | UN         | 1         | 2            |
| 2.          | Identify the primary purpose of clamping circuits.                        | RE         | 1         | 2            |
| 3.          | State the purpose of MOSFET in electronic circuits.                       | RE         | 2         | 2            |
| 4.          | List the characteristics that define a UJT.                               | RE         | 2         | 2            |
| 5.          | State the differences between CE, CB, and CC amplifiers.                  | RE         | 3         | 2            |
| 6.          | List the factors that influence frequency response in a CE amplifier.     | RE         | 3         | 2            |
| 7.          | Indicate the primary purpose of a power amplifier in electronic circuits. | UN         | 4         | 2            |
| 8.          | List two primary applications of differential amplifiers in electronics.  | RE         | 4         | 2            |
| 9.          | Define negative feedback and its main advantage in amplifiers.            | RE         | 5         | 2            |
| 10.         | State the key components of a Wien bridge oscillator.                     | RE         | 5         | 2            |

**PART – B (ANSWER ALL QUESTIONS) (Marks 5\*13 = 65)**

| <i>Q.No</i> | <i>Questions</i>                                                                                                                                           | <i>BLT</i> | <i>CO</i> | <i>Marks</i> |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|--------------|
| 11.         | a Explain the working principles behind half-wave and full-wave rectifiers, including differences in output.                                               | UN         | 1         | 13           |
|             | Or                                                                                                                                                         |            |           |              |
|             | b Illustrate how a Zener diode is used as a voltage regulator and explain its significance in power supply circuits.                                       | UN         | 1         | 13           |
| 12.         | a Explain the working principles of a BJT under active, saturation, and cutoff modes with necessary diagrams.                                              | UN         | 2         | 13           |
|             | Or                                                                                                                                                         |            |           |              |
|             | b Describe the structure and functioning of a JFET and explain the importance of the gate-source voltage.                                                  | UN         | 2         | 13           |
| 13.         | a Apply the BJT small-signal model to analyze the gain and frequency response of a CE amplifier circuit. Explain each parameter involved in your analysis. | AP         | 3         | 13           |

Or

|     |   |                                                                                                                                                  |    |   |    |
|-----|---|--------------------------------------------------------------------------------------------------------------------------------------------------|----|---|----|
|     | b | Design a CC amplifier using a BJT. Illustrate how varying the emitter resistor impacts gain and stability.                                       | AP | 3 | 13 |
| 14. | a | Analyze the gain and frequency response of single-tuned amplifiers and assess their suitability for signal processing applications.              | AN | 4 | 13 |
|     |   | Or                                                                                                                                               |    |   |    |
|     | b | Compare the common-mode and difference-mode operation of a differential amplifier and discuss their applications include their circuit diagrams. | AN | 4 | 13 |
| 15. | a | Apply the concept of negative feedback to design a voltage amplifier with increased stability. Describe the feedback network used.               | AP | 5 | 13 |
|     |   | Or                                                                                                                                               |    |   |    |
|     | b | Use Hartley oscillator principles to design an oscillator circuit. Explain each component's role in detail.                                      | AP | 5 | 13 |

*PART – C (Marks 1\*15 = 15)*

| <i>Q.No</i> |   | <i>Questions</i>                                                                                                                                    | <i>BLT</i> | <i>CO</i> | <i>Marks</i> |
|-------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|--------------|
| 16.         | a | Construct a power control circuit using a thyristor for a motor control application. Explain its advantages in modern control applications.         | CR         | 2         | 15           |
|             |   | Or                                                                                                                                                  |            |           |              |
|             | b | Design a multi-stage amplifier using CE, CB, and CC configurations to achieve a balanced gain and frequency response. Describe your design choices. | CR         | 3         | 15           |