

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 1 – EXAMINATION – SUMMER 2026

Subject Code: 3110016

Date: 14/07/2026

Subject Name: Basic Electronics

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1** (a) Sketch the characteristics of ideal diode and approximate characteristics of practical diodes. Briefly explain it. **03**
- (b) Explain Zener breakdown and avalanche breakdown in brief. Compare both the type of breakdown. **04**
- (c) Illustrate the need of clipper circuit and explain Positive clipper and negative clipper with necessary diagram and waveforms. **07**
- Q.2** (a) Describe the need of biasing the transistor. **03**
- (b) Define the DC load line. Explain with necessary diagram. **04**
- (c) Draw and Explain bridge rectifier. Explain advantage and disadvantage of bridge rectifier over full wave rectifier. **07**
- OR
- Q.2** (c) Write Short note on: 1) PIN Diode 2) Varactor Diode **07**
- Q.3** (a) Derive the relation between current gain α and β . **03**
- (b) Explain application of Transistor as a switch. **04**
- (c) Explain the operation of voltage divider bias circuit using an npn transistor and write its voltage and current equation. **07**
- OR
- Q.3** (a) Draw the symbol of NPN & PNP transistor, write its different operating regions and also explain why it is called as “Bipolar Transistor”? **03**
- (b) Write a short note on Thermal runaway. **04**
- (c) Draw the fixed-biased circuit by considering an n-p-n transistor in the CE mode. Derive the expressions for stability factors. What are the functions of the coupling capacitors? **07**
- Q.4** (a) List out the salient feature of emitter follower. **03**
- (b) Compare BJT & FET. **04**
- (c) Compare CB and CC configuration with respect to different transistor characteristics. **07**
- OR
- Q.4** (a) State advantage, disadvantage and application of FET. **03**
- (b) Discuss FET as an amplifier. **04**

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| | (c) Briefly explain the h-parameters and draw h-parameter based equivalent circuit for CE transistor and derive equation for input impedance, output impedance and voltage gain. | 07 |
| Q.5 | (a) Among TTL and CMOS digital logic family which one is better and why? | 03 |
| | (b) Explain why NAND and NOR gate are called universal gate? | 04 |
| | (c) Describe MOSFET operation and draw the structures for D-MOSFET & E-MOSFET. | 07 |
| | OR | |
| Q.5 | (a) Draw symbol and explain truth table of all basic logic gates. | 03 |
| | (b) Give comparison between different types of digital logic families. | 04 |
| | (c) Explain Drain characteristics and Transfer characteristics of JFET in detail with all related terms as Transconductance, drain resistance and amplification factor. | 07 |
