

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

Subject Code: BE01000111/BE01R00111

Date: 24/06/2026

Subject Name: Basic Electronics Engineering

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) Describe the characteristics of Zener diode. 03
(b) Differentiate Avalanche breakdown and Zener breakdown. 04
(c) Describe forward and reverse bias operation of a P-N junction diode. 07
- Q.2** (a) Explain Voltage Doubler circuit. 03
(b) Explain zener diode as a Voltage regulator. 04
(c) Describe operation of full-wave rectifier with necessary figures. 07
- OR
- Q.2** (c) A transformer having a secondary voltage of 100 V(rms) is used in a full-wave bridge rectifier. The diode has a resistance of $10\ \Omega$ and the load resistance is $90\ \Omega$. Calculate 07
(i) I_m , (ii) I_{dc} , (iii) I_{dc} through each diode, (iv) P_{dc} , (v) γ , (vi) % regulation, and (vii) PIV of each diode.
- Q.3** (a) Draw the symbol of NPN & PNP transistor, write its different operating regions and explain why it is called “Bipolar Transistor”. 03
(b) Show application of transistor as a switch. 04
(c) Describe CE configuration with input and output characteristics in detail. 07
- OR
- Q.3** (a) For a bipolar junction transistor, α_{dc} is 0.98 and base current is $50\ \mu A$, then find β_{dc} , I_C & I_E . 03
(b) What do you understand by transistor biasing and why it is required? 04
(c) Describe the operation of voltage divider bias circuit using an NPN transistor and write its voltage and current equation. 07
- Q.4** (a) Define saturation current, pinch-off voltage and transconductance in JFET. 03
(b) Give the comparison of FET and BJT. 04
(c) Describe operation of N-Channel JFET with drain characteristics and transfer characteristics. 07
- OR
- Q.4** (a) What is Self Bias in JFET? Draw the circuit. 03
(b) Draw DC load line and indicate the Q-point for a given JFET circuit. 04
(c) Describe the construction and operation of Enhancement type N-channel MOSFET. 07
- Q.5** (a) Describe RC filter with its limitations 03

(b) Describe LED with its applications. **04**

(c) Discuss the construction and working of a solar cell. Highlight its applications. **07**

OR

Q.5 (a) Explain the working of Emitter follower. **03**

(b) Give the differences between CB, CE, and CC configurations in BJTs. **04**

(c) Explain the construction and applications of a varactor diode. **07**
