R25 Regulation *Subject code:5ES1AM*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech I Semester Supplementary Examinations, June 2026

ELECTRONIC DEVICES AND CIRCUITS

(Common to CSE & CSE(AI&ML))

Maximum Marks: 60 Date:27.06.2026 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (5X2M=10Marks)		Marks	CO	BTL
1.a	What is the function of a capacitor filter in a rectifier circuit?	2M	1	L1
b	Define transistor action and state the condition required for a BJT to operate in the active region.	2M	2	L1
c	What is thermal runaway? State its effect on transistor operation.	2M	3	L1
d	Define voltage gain and current gain of a transistor.	2M	4	L1
e	Analyze the negative resistance region of a tunnel diode and state one practical implication	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	A full-wave bridge rectifier supplies a load resistance of 1 Kohm. Calculate the DC output voltage and ripple factor when a capacitor filter is connected at the output. Assume suitable diode and supply parameters	10M	1	L2
	OR			
3	Explain the construction and I–V characteristics of a Zener diode. Describe its operation as a voltage regulator with necessary equations.	10M	1	L2
4	Compare CB, CE, and CC configurations in terms of input resistance, output resistance, current gain, voltage gain, and applications.	10M	2	L2
	OR			
5	Explain the input and output characteristics of CB configuration with neat diagram.	10M	2	L2
6	Explain the need for biasing and stabilization in BJT amplifiers. Discuss the factors that affect the operating point.	10M	3	L2
	OR			
7	Compare fixed bias, collector-to-base bias, and voltage divider bias techniques in terms of stability, simplicity, and applications.	10M	3	L2

8	Draw the h-parameter equivalent circuit of a CE transistor. Derive expressions for input resistance, current gain, and voltage gain of a CE amplifier.	10M	4	L2
	OR			
9	Explain the approximate CE amplifier model without emitter bypass capacitor. Compare the voltage gain with that of a bypassed emitter amplifier.	10M	4	L2
10	Explain the working principle of the following special purpose diodes: (a) Tunnel diode (b) Varactor diode Discuss their V–I characteristics and applications.	5M 5M	5	L2
	OR			
11	Explain the structure and operation of MOSFETs in: (a) Enhancement mode (b) Depletion mode Draw and explain their characteristics.	5M 5M	5	L2