R20 Regulation *Subject code:3P7DA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VII Semester Supplementary Examinations, October 2026

MICROWAVE ENGINEERING

(ECE)

Maximum Marks: 70 Date: 26.10.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 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 (10X2M=20 Marks)		Marks	CO	BTL
1	List the basic advantages of microwave frequencies.	2M	1	L1
2	What are degenerate modes?	2M	1	L1
3	Define Q factor of a cavity resonator.	2M	2	L1
4	Define Directivity of Directional Coupler.	2M	2	L1
5	List the types of Phase shifters.	2M	3	L1
6	What is E-Plane and H- plane Tee called?	2M	3	L1
7	List the applications of Reflex Klystron.	2M	4	L1
8	What is the need for Slow wave structure in TWT.	2M	4	L1
9	What are the applications of Magnetron.	2M	5	L1
10	What is the need for an Isolator in Microwave measurements.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Derive all the wave equations for a TM mode and obtain all the field components in a Rectangular Waveguide.	10M	1	L2
	OR			
12	An air-filled rectangular wave-guide has the dimensions 7*3.5cm. It operates in TE_{10} mode. Calculate i) the cut off frequency ii) phase velocity of wave at 3.5GHz. iii) the guide wavelength at same frequency.	10M	1	L2
13	What is an Attenuator? Discuss the working of a variable attenuator.	10M	2	L2
	OR			
14	Explain the working of Magic Tee with a neat diagram.	10M	2	L2
15	What are the limitations of conventional tubes at microwave frequency. Explain how these limitations can be overcome.	10M	3	L2
	OR			
16	Explain the operation of Reflex Klystron and explain the bunching process by means of applegate diagram.	10M	3	L2
17	Explain the PI mode operation of Magnetron. How to separate it from other modes.	10M	4	L2

	OR			
18	What is TED? Explain the V-I characteristics of GUNN diode with neat diagram.	10M	4	L2
19	Derive the S-Matrix of Magic Tee and discuss its properties.	10M	5	L2
	OR			
20	Draw a neat diagram of microwave test bench and explain about each block along with its features.	10M	5	L2