PAPER ID-310264

Roll No: | | | | | | | | | | | |

BTECH
(SEM VII) THEORY EXAMINATION 2024-25
MICROWAVE & RADAR ENGINEERING

TIME: 3 HRS   **M.MARKS: 100**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1.   Attempt _all_ questions in brief.   **2 x 10 = 20**

Q no.	Question	CO	Level
a.	Differentiate standing wave and standing wave ratio in a waveguide.	CO1	K1
b.	Define microstrip transmission line.	CO1	K1
c.	Explain how an isolator and a circulator vary from one another.	CO2	K2
d.	Give definitions for the terms directivity and coupling factor in directional couplers.	CO2	K2
e.	What are the limitations of convectional active devices at microwave frequency.	CO3	K1
f.	Write down the characteristics for Backward Wave Oscillators.	CO3	K1
g.	Define the term VSWR and Return Loss.	CO4	K2
h.	What is dielectric constant.	CO4	K2
i.	What is delay line cancellers in MTI radar.	CO5	K2
j.	Explain the doppler effect in CW radar.	CO5	K2

SECTION B

2.   Attempt any _three_ of the following: **10 x 3 = 30**

Q no.	Question	CO	Level
a.	Derive the field distribution of dominant mode in rectangular waveguide.	CO1	K3
b.	What is directional coupler? Explain the working principle of 2-hole directional coupler and determine its S-matrix.	CO2	K2
c.	Explain the operation of a Faraday rotation isolator with the help of neat sketch. List the applications of ferrite isolator.	CO3	K2
d.	What are various methods for measuring frequency? Discuss in detail.	CO4	K2
e.	Draw the block diagram of the CW Radar and explain it's working.	CO5	K2

SECTION C

3.   Attempt any _one_ part of the following: **10 x 1 = 10**

Q no.	Question	CO	Level
a.	Derive the expression for field components in TE mode for circular waveguide.	CO1	K3
b.	Give the derivation for the transmission line equation and its solution.	CO1	K3

4.   Attempt any _one_ part of the following: **10 x 1 = 10**

Q no.	Question	CO	Level

a.	Write short note on:
	    i. Phase Shifters
	    ii.Attenuators
		CO2	K2

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	iii. Isolators		
b.	Explain microwave hybrid circuits along with its scattering matrix	CO2	K2

5.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

Q no.	Question	CO	Level
a.	With support of figures, explain the working of TWT. Also write its limitations.	CO3	K2
b.	Explain the schematic diagram, operating principle and performance characteristics of Backward Wave Oscillators (BWO).	CO3	K2

6.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

Q no.	Question	CO	Level
a.	Discuss the salient features of microwave measurements. Describe a voltage standing wave ratio (VSWR) meter.	CO4	K2
b.	Write short note on: i. Impedance measurement ii.Noise factor measurement	CO4	K2

7.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

Q no.	Question	CO	Level
a.	Draw Block diagram and explain the operation of MTI radar.	CO5	K2
b.	Derive the radar range equation.	CO5	K3