Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

FIFTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION
DECEMBER 2021-JANUARY 2022
SUBJECT: MICROWAVE ENGINEERING (ECE - 3154)

TIME: 75 MINUTES **MAX. MARKS: 20**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

Q. No.	Questions	M*	C*	A*	B*
1A.	Explain E-plane Tee and find the S-parameter matrix of it. Model the electrical equivalent circuit of E plane Tee.	5	CO1	C1	L2
1B.	If the radiation pattern of an antenna is $U=\sin\theta \mathrm{Sin}^2\varphi$, Calculate HPBW in Elevation and Azimuthal planes.	3	CO2	C2	L2
1C.	An isotropic antenna is radiating in free space at a distance of 100 meters from the antenna, the rms value of electric field is 3V/calculate (i) Power density (ii) Total Power Radiated	2	CO3	C1	L4
2A.	Design a broadside Dolph-Tschebyscheff array of 6 elements with spacing "d" between the elements and with major-to-minor lobe ratio of 20 dB. Find the excitation coefficients, nulls at d= $\lambda/4$, and form the array factor	5	CO4	C3	L6
2B.	Design the microstrip rectangular patch antennas with substrate height h=1.6mm, dielectric constant $\varepsilon_r = 4.7$ and resonate at 1 GHz frequency.	3	CO5	C2	L3
2C.	List the type of feeding methods in microstrip antenna and also Describe the fringing effect with diagram	2	CO6	C2	L1

M*--Marks, C*--CLO, A*--AHEP LO, B* Blooms Taxonomy Level