LPCET LIBRARY BANGALORE-49

CBCS SCHEME

USN | | | | | | | | | | |

21EC62

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2026
Microwave Theory and Antennas

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain Gunn effect with a neat schematic diagram. **(10 Marks)**

b. Write a note on Microwave System. **(10 Marks)**

OR

2 a. Derive an expression for transmission coefficient of microwave transmission line. **(10 Marks)**

b. A transmission line has the following parameters R = 2Ω/m, G = 0.5 m mho/m, F = 1GHz L = 8 nH/m, C = 0.23 PF. Calculate :
i) The characteristics impedance
ii) The propagation constant **(10 Marks)**

Module-2

3 a. Write a various losses of S parameters. **(10 Marks)**

b. What are Waveguide Tees? Explain its basic types with diagram. **(10 Marks)**

OR

4 a. Explain the Scattering representation of the multiport network with suitable diagram and matrix. **(10 Marks)**

b. Write a note on coaxial connectors and adapters. **(10 Marks)**

Module-3

5 a. Briefly explain the following terms as a related to antenna system.
i) Directivity and gain
ii) Beam efficiency
iii) Radiation intensity
iv) Beam Area **(10 Marks)**

b. A lossless parallel strip line has conducting strip width W. The substrate dielectric separating the two conducting strips has a relative dielectric constant ϵ_{rd} of 6 and a thickness d of 4 mm. Calculate :
i) The required width W of the conducting strip in order to have a characteristic impedance to 50Ω
ii) The strip-line capacitance
iii) The strip-line insurance
iv) The phase velocity of the wave in the Parallel strip line **(10 Marks)**

OR

6 a. Explain parallel stripline and coplanar strip line with relevant diagrams. **(10 Marks)**

b. Explain Radio communication link with the relevant diagram. **(10 Marks)**

Module-4

7 a. Derive the expression for radiation resistance of a short-dipole with uniform current. **(10 Marks)**

b. State and explain power theorem. **(10 Marks)**

OR

8 a. Explain the principles of pattern multiplication with example. **(10 Marks)**

b. Derive an expression and draw the field pattern for an array of 2 isotropic point sources with same amplitude and phase speed $\lambda/2$ apart. **(10 Marks)**

Module-5

9 a. Explain Helical antenna with its helical geometry. **(10 Marks)**

b. Derive the expression for radiation resistance of small loop antenna. **(10 Marks)**

OR

10 a. Explain the following antenna :
i) Yagi – Uda Array
ii) Parabolic reflector **(10 Marks)**

b. Explain the types of operating principle of Horn antenna and Rectangular horn antenna. **(10 Marks)**

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