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Reg. No.

Question Paper Code

11826

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Seventh Semester

Electronics and Communication Engineering

EC8701 – ANTENNAS AND MICROWAVE ENGINEERING

(Regulation 2017)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|--|-------------------------------|
| 1. Write the antenna field zones with the boundaries of an antenna under test. | 2,K1,CO1 |
| 2. Calculate the maximum effective aperture of an antenna which is operating at a wavelength of 2m and has a directivity of 100. | 2,K2,CO1 |
| 3. Why frequency independent antennas are called so? | 2,K2,CO3 |
| 4. What are the features of pyramidal horn antenna? | 2,K1,CO3 |
| 5. Compare Broadside array and end fire array. | 2,K2,CO4 |
| 6. Define array factor. | 2,K1,CO4 |
| 7. Compare TWTA and Klystron amplifier. | 2,K2,CO5 |
| 8. What is negative resistance in Gunn diode? | 2,K1,CO5 |
| 9. What is an impedance transformation network? | 2,K1,CO6 |
| 10. List the major components used in Mixer design. | 2,K1,CO6 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) With necessary expressions discuss the following parameters of antenna. (i) Beam solid angle (ii) Radiation pattern (iii) Gain (iv) Directivity (v) Antenna Beamwidth 13,K2,CO1
- OR**
- b) List the different types of impedance matching techniques available in the microwave frequency range applications and Explain in detail. 13,K2,CO1
12. a) Explain the radiation mechanism of slot antenna with neat diagram. Also discuss in detail the method of feeding slot antenna. 13,K2,CO3
- OR**
- b) With necessary illustration explain the radiation characteristics of microstrip antenna and mention its possible applications. With suitable diagrams explain the various feeding techniques of microstrip antenna. 13,K2,CO3
13. a) With neat diagrams, explain the operation of attenuators in detail. 13,K2,CO4

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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OR

- b) Explain the principle of pattern multiplication and using this principle, determine the radiation pattern for 8 element array separated by a distance of $\lambda/2$ apart. *13.K2.CO4*

14. a) Explain the structure, operation, equation of velocity modulation and bunching of a two cavity klystron amplifier. Also derive the expression for its efficiency. *13.K2.CO5*

OR

- b) Draw the cross sectional view of Magnetron tube and explain the process of bunching. Derive the expression for Hull-Cut off voltage. *13.K2.CO5*

15. a) Derive the expression of transducer power gain of RF amplifier. Also analyze its stability considerations. *13.K2.CO6*

OR

- b) Describe the design considerations of Microwave filter in detail. *13.K2.CO6*

PART - C (1 × 15 = 15 Marks)

16. a) Discuss various feed techniques for rectangular patch antennas with neat diagrams. *15.K2.CO2*

OR

- b) Explain the radiation mechanism of microwave horn antenna with diagram. *15.K2.CO2*