

Assignment II (Guiding Structures)

- Tick the most appropriate answer.
 - All symbols have their usual meaning.
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1. Which wave guiding structure offers lowest attenuation?
(a) microstrip line, (b) ridged waveguide, (c) rectangular waveguide, (d) coaxial line.
Ans: (c) rectangular waveguide
2. If the width of a microstrip line increases, its characteristic impedance
a. increases b. decreases c. remains same d. can't determine
Ans: (b) decreases
3. What is the relation between E-field and H-field for radiation? They are
a. in phase b. out of phase c. in phase quadrature d. makes an angle of 45°
Ans: (a) in phase
4. A perfect magnetic wall can be placed between a coupled microstrip line when they are excited in
a. even mode b. odd mode c. both mode d. TEM mode
Ans: (a) even mode
5. The cut-off frequency is zero for the following type of electromagnetic wave.
a. TE b. TEM c. TM d. all of these
Ans: (b) TEM
6. Which one is in the correct order for the loss in parallel plate guide for different modes?
a. $TE_1 > TEM > TM_1$ b. $TEM > TM > TE_1$ c. $TM_1 > TE_1 > TEM$ d. $TM_1 > TEM > TE_1$
Ans: (d) $TM_1 > TEM > TE_1$
7. Among the following guiding structures, which one has the highest power handling capability?
a. Microstrip line b. Rectangular waveguide c. Coaxial line d. Ground Backed CPW
Ans: (b) Rectangular waveguide
8. The fundamental and the next higher order mode in a coaxial cable are
a. TEM & TM_{21} respectively b. TEM & TM_{11} respectively
c. TEM & TE_{11} respectively d. TEM & TE_{21} respectively
Ans: (c) TEM & TE_{11} respectively
9. Among the following connectors, the sexless connector is
a. APC-7 b. SMA c. BNC d. TNC
Ans: (a) APC-7
10. Fundamental mode of rectangular waveguide is
a. TM_{10} b. TE_{00} c. TE_{10} d. TEM
Ans: c. TE_{10}
11. In which plane strength of E-field is maximum for the fundamental mode in a rectangular waveguide?

- a. on the broad walls of the waveguide b. on the side walls of the waveguide
c. on the mid-plane parallel to side walls. d. on the mid-plane parallel to broad walls.

Ans: c. on the mid-plane parallel to side walls.

12. If f_c is the cut off frequency of the fundamental mode of a rectangular waveguide, the frequency at which attenuation is minimum is approximately
a. $f_c/2$ b. f_c c. $1.5f_c$ d. $2f_c$

Ans: (c) $1.5f_c$

13. What is the dielectric loss of an air filled rectangular waveguide?
a. infinity, b) 0 dB, c) 1 dB, d) can't be determined.

Ans: b) 0 dB

14. Cut off frequency of air filled rectangular waveguide when air is filled by a dielectric ($\epsilon_r > 1$) material
a. increases, b. decreases, c. remain same, d. increase or decrease that depends on ϵ_r .

Ans: b) decreases

15. The mode among the given modes that suffers lowest conductor loss in an air filled rectangular waveguide is
a. TE_{10} , b. TE_{20} , c. TE_{30} , d. TE_{40}

Ans: d. TE_{40}

16. What is the fundamental mode of circular waveguide?
a. TM_{01} , b. TE_{01} , c. TE_{11} , d. TM_{11} .

Ans: c. TE_{11}

17. Microstrip line supports
a. TE mode b. TM mode c. quasi-TEM mode d. all of these

Ans: (d) all of these

18. Tick the correct statement.
At millimeter-wave frequencies loss increases due to
a. increased relative surface roughness of any guiding structure.
b. higher surface wave generation
c. increased surface resistance
d. all of these.

Ans: d. all of these.

19. Surface wave or substrate mode increase
a. losses b. radiation, c. leakage, d. all of these.

Ans: d) all of these

20. For surface wave or substrate modes, usually
a. phase velocity is greater than the velocity of light in free space,
b. phase velocity is less than the velocity of light in free space,
c. phase velocity is zero,
d. group velocity is greater than the velocity of light in free space.

Ans: b) phase velocity is less than the velocity of light in free space.