

EE 302 PS 01 - SOLUTIONS

Chapter 1

Questions: 3, 6, 11, 14, 16, 27, 32, 34, 36

Problems: none

Critical Thinking: 2

Question 3

Types of media

- (1) Wire conductors
- (2) Fiber-optic cable
- (3) Freespace
- (4) Water
- (5) Earth

The most commonly used media are underlined.

Question 6

A transceiver is the integration of a transmitter and a receiver. Examples: Telephones, fax machines, handheld CB radios, cellular telephones, and computer modems.

Question 11

Baseband signals.

Question 14

Full duplex communication. Examples: Telephones; Naval sound powered-telephones; video-conferencing systems

Question 16

Analog signals.

Question 27

Use the equation $c = f\lambda$. Answers are tabulated in Table 1

TABLE 1. Wavelength calculations for given frequencies (Question 27). These calculations are based on 1 mile = 1609.344 m = 5280 ft; $c = 3 \times 10^8$ m/s.

| f | Wavelength | | | |
|---------|--------------------|-----------------------|--------------------|----------------------|
| | m | mi | ft | cm |
| 1.5 kHz | 2×10^5 | 124.27 | 6.56×10^5 | 2×10^7 |
| 18 MHz | 16.667 | 10.4×10^{-3} | 54.68 | 16.667×10^2 |
| 22 kHz | 13.6×10^3 | 8.47 | 44.7×10^3 | 1.36×10^6 |

Question 32

The frequency allocation chart shows AM radio between 535 kHz and 1705 kHz. The book reports (page 16) that AM radio inhabits 535-1605 kHz. The larger band is the extended AM broadcast band, available only in some parts of the world (including the Americas).

Question 34

The frequency allocation chart shows analog television channels 2-13 occupying 54.0-88.0 MHz. This falls within the 30-300 MHz range, which is classified as Very High Frequency (VHF).

Question 36

Frequencies above 1 GHz are known as [microwaves](#), and frequencies above 30 GHz are known as [millimeter waves](#).

Critical Thinking 2

Common household remote controllers are listed in Table 2.

TABLE 2. Examples of household remote controls (Critical Thinking 2).

| Remote control | Media | Frequency Range |
|-------------------------------|----------------------|-------------------------------|
| TV/Radio/DVD remote control | Freespace | Infrared |
| Garage door opener | Freespace | 390 MHz |
| Video game controller (wired) | Electrical Conductor | - |
| Nintendo Wii controller | Freespace | Bluetooth (2.4000-2.4835 GHz) |