1. What is a frequency-shift-keying system?
FSK is a form of FM in which the modulating wave shifts the output between two predetermined frequencies.

2. What is the PN sequence length of a PN sequence generator with 9 shift registers?
\[ \text{pn sequence length} = 512 - 1 = 511 \]

3. What is the function of a PBX?
Private Branch Exchange. Switch one telephone line to another.

4. What causes delay distortion?
Delay distortion is caused by the transmission line’s inductive and capacitive properties.

5. Describe the concept of frequency reuse.
Frequency reuse is the process of using the same carrier frequency in different cells that are physically separated.

6. What is the modulation technique being used in this transmission link?

   ![Binary Phase-Shift Keying (BPSK)]

   BPSK

7. What type of modulation is represented in this vector constellation?

   ![Quadrature Phase-Shift Keying (QPSK)]

   QPSK
8. What is the constellation shown below called?

```
+---+---+---+---+
|   |   |   |   |
+---+---+---+---+
| 011| 010| 001| 110|
+---+---+---+---+
| 011| 000| 110| 101|
+---+---+---+---+
```

16QAM

9. What type of transmission system is represented by this frequency spectrum?

```
+---+---+---+---+
|   |   |   |   |
+---+---+---+---+
| 000| 010| 100| 110|
+---+---+---+---+
| 000| 110| 010| 100|
+---+---+---+---+
```

Frequency-hopping spread-spectrum

10. OFDM utilizes what to transport information in from one particular user to another?

OFDM utilizes multiple subcarriers to transport information in from one particular user to another.

11. What are 2 benefits of OFDM?

The benefits of OFDM are high spectral efficiency, resiliency to RF interference, and lower multi-path distortion.

12. WiMAX can provide broadband wireless access (BWA) up to how many miles for fixed stations?

WiMAX can provide broadband wireless access (BWA) up to 30 miles (50 km) for fixed stations.

13. Which OSI level is associated with handling error recovery, flow control, and sequencing?

Data link

14. Why is the velocity of propagation significantly slower in a waveguide than in free space?

The component waves travel at an angle with respect to the axis of the guide.

Scores
1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____
13. _____ 14. _____ Total _____