



UNIVERSITY OF GHANA
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**BA/BSc. INFORMATION TECHNOLOGY,
FIRST SEMESTER UNIVERSITY EXAMINATIONS
2016/2017 ACADEMIC YEAR**

CSIT 413: WIRELESS SYSTEMS & NETWORKS

TIME ALLOWED: THREE (3) HOURS

INSTRUCTIONS:

There are Six (6) Questions in ALL. Answer ALL Questions in Your Answer Booklets. Answer Question One (1) And Any Three (3) Questions. Each Question Carries Equal Marks.

Q1.

- a. Briefly explain the concept of Radio Propagation. [7 marks]
- b. State and explain 3 Radio Propagation Issues that there are. [9 marks]
- c. For each of the issues stated in (1b) above, what are the proposed solutions to those issues. [9 marks]

Q2.

- a. Write briefly on the following: [10 marks]
 - i. Attenuation
 - ii. Line of Sight
 - iii. Antenna Gain
 - iv. Noise
 - v. Multipath
- b. Differentiate between an analog and a digital electromagnetic signal. [5 marks]
- c. State and explain the three (3) important characteristics of a periodic signal? [10 marks]

Q3.

- a. Briefly explain the following: **[15 marks]**
 - i. Ground Wave Propagation
 - ii. Sky Wave Propagation.
 - iii. Line-of-Sight Propagation
- b. What is the relationship between;
 - i. The wavelength and frequency of a sine wave? **[5 marks]**
 - ii. A signal's spectrum and its bandwidth? **[5 marks]**

Q4.

- a. State and explain the types of Antennas you know of. **[10 marks]**
- b. Define channel capacity? **[4 marks]**
- c. What key factors affect channel capacity? **[5 marks]**
- d. Differentiate between guided media and unguided media. **[6 marks]**

Q5.

- a. What are some major advantages and disadvantages of microwave transmission? **[5 marks]**
- b. A signal has a fundamental frequency of 1000 Hz. What is its period? **[5 marks]**
- c. Given a channel with an intended capacity of 20 Mbps, the bandwidth of the channel is 3 MHz. What signal-to-noise ratio is required to achieve this capacity? **[10 marks]**
- d. Explain the following **[5 marks]**
 - i. Aperiodic signal?
 - ii. Periodic signal?

Q6.

- a. What is Digital Modulation? **[2 marks]**
- b. Write briefly on the following popular standards; **[9 marks]**
 - i. WiF
 - ii. WiMax
 - iii. Bluetooth
- c. Discuss Point-to-Point Microwave Systems. **[5 marks]**
- d. With the aid of well labelled diagrams, explain the following; **[9 marks]**
 - i. Amplitude Shift Key Modulation
 - ii. Frequency Shift Key Modulation
 - iii. Phase Shift Key Modulation