



*Ministry of Higher Education and Scientific Research  
University of Technology  
Department of Computer Science  
Final Exam / 2015 -2016*

First trail

*Subject: Communications  
Branch: Networks Management  
Examiner: Dr. Ekhlas Khalaf*

*Stage: Fourth  
Date: 29-5-2016  
Time: 3 Hours*



**Note: Answer only six Questions please (10 Marks each)**

**Q1/ A/ Answer the following:**

1. Can we say if a signal is periodic or nonperiodic by just looking at its frequency domain plot? How?
2. We send a voice signal from a microphone to a recorder. Is this baseband or broadband transmission?
3. We modulate several voice signals and send them through the air. Is this baseband or broadband transmission?
4. What does the amplitude of a signal measure? What does the frequency of a signal measure? What does the phase of a signal measure?
5. Distinguish between a signal element and a data element.

**B/** We have an available bandwidth of 100 kHz which spans from 200 to 300 kHz. What are the carrier frequency and the bit rate if we modulated our data by using ASK with  $d = 1$ ?

**Q2/A/** what is the bandwidth of a signal that can be decomposed into five sine waves with frequencies at 0, 20, 50, 100, and 200 Hz? All peak amplitudes are the same. Draw the bandwidth.

**B/** Explain the Virtual-Circuit Identifier and draw the figure that shows the work of it.

**C/** what are the differences between serial transmission and parallel transmission?

**Q3/A/** Explain the structure of packet switches, and then draw the figure that shows the components of it.

**B/** We need to send data 3 bits at a time at a bit rate of 3 Mbps. The carrier frequency is 10 MHz calculate the number of levels (different frequencies), the baud rate, and the bandwidth. If we use FSK.

**Q4/A/** a device is sending out data at the rate of 1000 bps. How long does it take to send out a single character (8 bits)?

**B/** Define three of the following:

- 1- Isochronous transmission
- 2- Baseline Wandering
- 3-analog-to-analog conversion
- 4-Delta modulation

**Q5/A/** one of the important methods for analog to digital conversion is the pulse code modulation (PCM), explain it with details and then draw the figure that shows the three processes of it.

**B/** An analog signal has a bit rate of 8000 bps and a baud rate of 1000 baud. How many data elements are carried by each signal element? How many signal elements do we need?

**Q6/A/** what are the differences between circuit-switched networks and virtual-circuit networks according to three phases, delay, and efficiency.

**B/** What is TSI and its role in a time-division switching? Then draw the figure that shows the components of it.

**Q7/ A/** we need a three-stage space-division switch with  $N = 100$ . We use 10 crossbars at the first and third stages and 4 crossbars at the middle stage ( $n=10, k=4$ ).

- a. Draw the configuration diagram.
- b. Calculate the total number of crosspoints.

**B/** a sine wave is offset  $1/6$  cycle with respect to time 0. What is its phase in degrees and radians?

Good Luck