**2016-2015 أسئلــــة الإمتحانــات النهائيـــة للعــــام الدراســي**

**Sub: Digital Communication. AL-Maaref university college**

**Time: Three hours. Computer engineering techniques**

**Stage: Third. Note: Answer five questions**

 **Sample(C) \_\_\_\_\_\_\_\_\_\_ الدور( )**

Q1: What is difference between analog modulation and digital modulation.

Q2: Explain in brief a sampling theorem.

Q3: An analog signal is expressed by the equation x(t)=4 sin(30πt)+12 cos(150πt)-sin(50πt). Calculate the Nyquist rate of this signal.

Q4: Define a quantizer. Classify a quantization process.

Q5: Draw a block diagram of pulse cod modulation (PCM).

Q6: The information in an analog signal voltage wave form is it to be transmitted a bandwidth of 1 KHz and a maximum amplitude 10 Volts ,and the maximum quantization error is (0,01). Find the :

a. Minimum sampling rate required.

b. Number of bits in each PCM word.

c. Minimum bit rate required in the PCM signal.

d. Minimum absolute channel bandwidth required for the transmission of the PCM signal.

**Head of Department Lecturer**

**Dr. Eng. Yousif Hardan Dr. Eng. Yousif Hardan**