


University : Menoufia Faculty : Electronic Engineering Department : Electronics & Communications Academic level : 3 Course Name : Acoustics & Ultrasonics Course Code : ECE 313		Date : 17/01/2019 Time : 3 Hours No. of pages : 1 Full Mark : 70 Marks Exam : Final Exam Examiner : Prof. Adel Abdel Masieh Saieb
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Answer all the following questions :

Question No 1 :

(14 Marks)

- Define : Ultrasonics, Magnetostrictive effect.
- An ultrasonic transducer is employed to measure the thickness of a steel plate. If the difference of two adjacent harmonics is found to be 56,000 cyc/sec, find the thickness of the plate.
- Which method do you use to produce an ultrasonic wave with frequency 500 MHz?

Question No 2:

(14Marks)

- In underwater acoustics, define : cavitation – reverberation.
- Let I_1 be the intensity at a distance of 1 m from the sound source; find the intensity at a distance r meters from the same sound source .
- What are the factors affecting sound transmission losses in sea water?

Question No 3 :

(14 Marks)

- In room acoustics, define : reverberation time – reverberation chamber.
- For decay of sound in a live room, the sound intensity at any time t is

$$I(t) = \frac{1}{2} E_0 c e^{-\alpha c t}$$

Find the rate of change of intensity level.

- In a classroom the reverberation time is 1 sec, the absorption of sound in the room is doubled , what is the new reverberation time ?

Question No 4 :

(14Marks)

- Prove that the speed of sound in air is proportional to the square root of the absolute temperature.
- The power output from a loudspeaker is raised from 5 to 50 watts. What is the change in sound power level?

Question No 5 :

(14 Marks)

- What are the factors to be considered when selecting a microphone?
- What are the main components of a loudspeaker?