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Courses » Audio System Engineering

Announcements

Course

Ask a Question

Progress

Mentor

## Unit 5 - Week 4:

### Course outline

How to access the Portal ?

Week 1

Week-2:

Week 3

Week 4:

- Lecture 19: Transduction - I
- Lecture 20: Transduction - II
- Lecture 21: Transduction - III
- Lecture 22: Microphone - I
- Lecture 23: Microphone Sensitivity
- Lecture 24: Loudspeaker
- Assignment 4 Solution
- Quiz : Assignment 4

### Assignment 4

The due date for submitting this assignment has passed.

**Due on 2016-08-23, 23:30 IST.**

#### Submitted assignment

A moving –coil loudspeaker is used both as a microphone and as a loudspeaker in a intercom system the specification of the loudspeaker is as given below.

- a. Mass of the speaker diaphragm and voice coil,  $m=3g$
- b. Radius of the diaphragm,  $a=0.05 m$
- c. Stiffness of the speakers  $s=50,000N/m$
- d. Mechanical resistance of the speaker  $R_m=10N.s/m$
- e. Inductance of the voice coil  $L_0=0.01H$
- f. Resistance of the voice coil  $R_0= 5 \Omega$
- g. Length of the voice coil  $l=5m$
- h. Magnetic field  $B=0.8T$

(Data for question 1 and 2)

- 1) Calculate the open circuit voltage sensitivity level *re 1V/Pa* for **1 kHz**. 2 points
- (a) Range of 12.6 dB to 13.5 dB
- (b) Range of 13.6 dB to 14.5 dB
- (c) Range of 14.6 dB to 15.5 dB
- (d) Range of 15.6 dB to 16.5 dB

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

- (c) Range of 14.6 dB to 15.5 dB

- 2) Calculate the Available Input Power level ( $L_{AIP}$ ) of the microphone. 1 point
- (a) Range of 50.01 dB to 52.00 dB
- (b) Range of 52.01 dB to 54.00 dB
- (c) Range of 54.01 dB to 56.00 dB
- (d) Range of 56.01 dB to 58.00 dB

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

- (a) Range of 50.01 dB to 52.00 dB

3)

2 points

A microphone is connected to an amplifier and the specification of microphone and amplifier as in given below. If the microphone is placed in a speech studio and if a talker produces 80dB near the microphone find out the signal to noise ratio at amplifier output at  $20^{\circ}\text{C}$  temperature.

**Microphone specification**

$$S_v = -60\text{dB}$$

$$L_{AIP} = -60\text{dB}$$

$$R_0 = 200\Omega$$

**Amplifier specification**

$$V = \text{RMS value of the noise voltage}; K = 1.38 \times 10^{-23}$$

$$\text{Frequency respons} \rightarrow 150\text{Hz} - 15\text{KHz}$$

$$NF = 5\text{dB}$$

$$R_s = 200\Omega$$

- (a) Range of 120 dB to 124 dB
- (b) Range of 125 dB to 129 dB
- (c) Range of 130 dB to 134 dB
- (d) Range of 135 dB to 139 dB

No, the answer is incorrect.

Score: 0

Accepted Answers:

- (c) Range of 130 dB to 134 dB

4)

1 point

During the testing, a microphone produced an open circuit voltage  $E_0 = 0.002\text{ V}$ , at 100 dB sound pressure level (SPL) find out the sensitivity ( $S_v$ ) of the microphone.

- (a) - 23 dB
- (b) - 33 dB
- (c) - 35 dB
- (d) - 39 dB

No, the answer is incorrect.

Score: 0

Accepted Answers:

- (b) - 33 dB

5)

1 point

A microphone has  $R_0 = 100\Omega$  &  $S_v = -60\text{dB}$  calculate the Available Input Power level ( $L_{AIP}$ ).

- (a) -50 dBm
- (b) -52 dBm
- (c) -54 dBm
- (d) -56 dBm

No, the answer is incorrect.

Score: 0

Accepted Answers:

- (d) -56 dBm

6)

1 point

Surface velocity of a Loudspeaker is  $u = 0.2\text{cm/s}$  and Radius of the diaphragm is  $0.05\text{ m}$  find out the strength(Q) of the Loudspeaker.

- (a)  $0.062\text{ m}^3/\text{sec}$
- (b)  $0.0063\text{ m}^3/\text{sec}$

- (c) 0.0062 m<sup>3</sup>/sec
- (d) 0.0065 m<sup>3</sup>/sec

No, the answer is incorrect.

Score: 0

Accepted Answers:

(c) 0.0062 m<sup>3</sup>/sec

7) Which of the following acoustic transducer is/ are Reciprocal Transducer 1 point

- A. Piezo-electric microphones
- B. Condenser microphones
- C. Ribbon microphones
- D. Electrets microphones

- (a) A & B
- (b) B
- (c) B & D
- (d) A, B & D

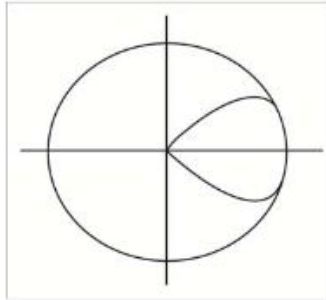
No, the answer is incorrect.

Score: 0

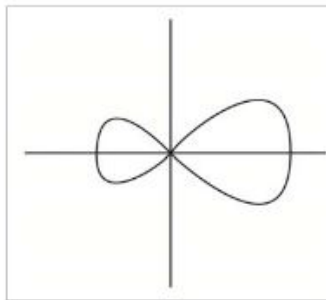
Accepted Answers:

(d) A, B & D

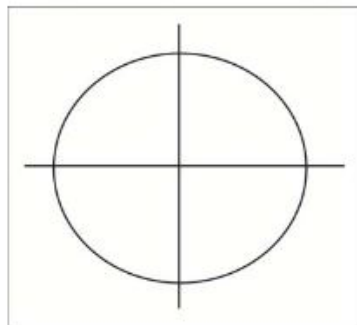
8) Which of the option are directivity pattern of a Unidirectional microphones. 1 point



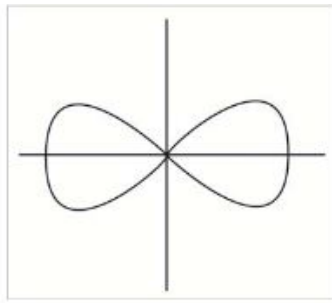
(a)



(b)



(c)



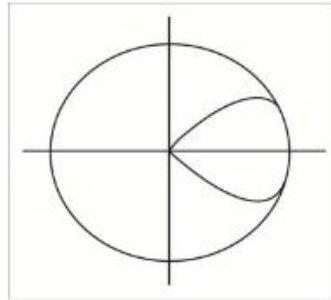
(d)



No, the answer is incorrect.

Score: 0

Accepted Answers:



(a)

Previous Page

End

