

KATHMANDU UNIVERSITY
End Semester Examination
March, 2022

Marks Scored:

Level : B.E.
Year : IV

Course : ETEG 440
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No. :

Date :

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Encircle the most appropriate option.

- Persistence of Hearing for a Human being is _____ second.
a. 1 b. 2 c. 0.1 d. 0.5
- The pitch of the sound depends on _____.
a. frequency b. amplitude
c. amplitude and frequency d. energy of wave
- Sound is a kind of _____.
a. work b. energy c. force d. variables
- Due to which phenomena sound is heard at longer distances in nights than in day?
a. Reflection b. Refraction
c. Dense atmosphere d. Diffractions of sound
- Air borne noise can be minimized by _____.
a. allotting proper places for doors and windows
b. generating similar sound energy
c. using large barrier behind the sound source.
d. changing the interior of room.
- Dog here the frequency greater than _____.
a. 400 Hz b. 20,000 Hz c. 45,000 Hz d. 65,000 Hz
- The essential feature of good acoustic is, _____.
a. there should be resonance within the building.
b. there should be no reverberation
c. there should be no resonance within the building.
d. there should be large reverberation.
- Which of the following is not a characteristic of a musical sound?
a. Pitch b. Wavelength c. Quality d. Loudness

9. A man standing in between two parallel cliffs, he produces a sound and first echo is heard from cliff-2 after 3 seconds and second echo is heard from cliff -1 after 4 second. If the speed of sound in air is 340m/s. The distance between two cliffs is _____.
- a. 1360 m b. 2380 m c. 1190 m d. 680 m
10. In any medium, the nature of sound wave will be _____.
- a. only transverse b. both longitudinal and transverse
c. neither longitudinal nor transverse d. only longitudinal
11. The loudness of sound varies directly with vibrating body's _____.
- a. amplitude b. pitch c. frequency d. tone
12. In which medium speed of sound will be maximum _____.
- a. sea water b. distilled water c. methanol d. ethanol
13. In human beings, which of the following body part produces the sound?
- a. Larynx b. Wind pipe c. Eardrum d. Lungs
14. Which of the following is/are the effects of noise pollution?
- a. Insomnia b. Hypertension
c. masking d. Insomnia and Hypertension
15. Identify the three delicate bones present in the middle ear of Human.
- a. Pinna, anvil and cochlea b. Hammer, anvil and cochlea
c. Pinna, eardrum and anvil d. Hammer, anvil and stirrup
16. The sound power level of a jet plane flying at a height of 1km is 160 dB. What will be the maximum sound pressure level on the ground directly below the flight path assuming that the aircraft radiates sound equally in all directions?
- a. 59 dB b. 69.5 dB c. 79 dB d. 89.1 dB
17. _____ is the sound energy per unit area at right angles to the propagation direction per unit time?
- a. Loudness b. Coherence c. Sound pressure d. Sound intensity
18. If the distance between the listener and the source of the sound is decreased to $\frac{1}{2}$ the original amount, the intensity of the sound would be _____.
- a. 2 times higher b. 3 times higher c. 4 times higher d. 6 times higher
19. Calculate the velocity of sound in ft/sec. if the temperature is 149° C.
- a. 1530.03 ft/sec b. 1320 ft/sec c. 1357.03 ft/sec d. 1920.345 ft/sec
20. 80 phons + 80 Phons is equal to _____.
- a. 83 phons b. 160 phons c. 90 phons d. 86 phons

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Level : B.E.
Year : IV
Time : 2 hrs. 30 mins.

Course : ETEG 440
Semester : II
F. M. : 40

SECTION "B"
[4Q. × 10 = 40 marks]

Attempt ANY FOUR questions.

Missing data may be suitably assumed. Each symbol carries their usual meaning.

1.
 - a. Find the speed of sound in air at 20⁰ C and at one atmospheric pressure. Air has density of 1.21 kg/m³ and ratio of specific heats 1.0402 at 20⁰ C. [4]
 - b. What is acoustics and acoustic energy? [3]
 - c. Explain the term acoustic reciprocity with reference to simple source. [3]

2.
 - a. A room of 12 m × 10 m × 4 m has an average Sabine absorptivity $\alpha = 0.1$ find the reverberation time of room. [4]
 - b. What are acoustic factors in architectural design? [2]
 - c. State and explain the fundamental properties of hearing? [4]

3.
 - a. What are the different sound absorption materials used in acoustic design? Explain in brief about their selection criteria. [5]
 - b. What is psychoacoustics? Explain the essential parameters need to be considered to enhance the quality of hearing. [5]

4.
 - a. Explain speech phenomena in the presence of noise and possible noise reduction techniques. [5]
 - b. What are the basic difference to be considered to design a general purpose auditorium and music recording room? [5]

5.
 - a. Propose a design for school layout based on better acoustic properties near the busy highway. Your design must include the sketch for class rooms areas, playground, auditorium and music room. Justify your views with the help of technical parameters. [7]
 - b. Define reverberation time. How will you choose the reverberation time in small and big auditorium? [3]

