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BINA CHOWDHURY CLERK
(GIMT & GIPS)
Azara, Hatkhowapara,
Guwahati - 781017

2022

B.Tech. 8th Semester End-Term Examination

ME

NOISE AND VIBRATION CONTROL

(New Regulation (w.e.f. 2017-18)) &

(New Syllabus w.e.f. 2018-19))

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Answer question No. 1 and any *four* from the rest.

1. Answer the following : (Fill in the blanks) (10)
- Plane waves moving inside a wave guide are termed as _____ wave.
 - Noise radiation from vibrating bodies primarily deals with the _____ wave only.
 - For vibration measurement, in general, displacement transducer is used for _____ frequency measurement.
 - For vibration measurement, in general, acceleration transducer is used for _____ frequency measurement.
 - A machine would generally be _____ if its moving parts were fabricated to closer tolerances.
 - Sound Pressure Level (SPL) is give as: $SPL =$ _____ in dB.
 - Sound Intensity Level (IL) is give as: $IL =$ _____ in dB.
 - Sound Power Level (wL) is give as: $IL =$ _____ in dB.
 - _____ are used for audio privacy between adjacent cabins.
 - One may protected himself from excessive noise exposure by means of _____.

[Turn over

2. (a) What is 1 Octave band. How for an octave band the upper and lower frequency limits are correlated. How geometric mean frequency of a standard octave is expressed. Find the upper and lower frequency limits of octave bands whose center frequencies are 250 Hz, 1000 Hz and 2000 Hz. (10)
- (b) Sound pressure levels at four points around a machine are 85, 88, 92 and 86 dB when the machine is on. The ambient SPL at the four points is 82 dB. Calculate the average SPL of the machine alone. (5)
3. (a) Explain the ambient air quality standards in respect of noise as per the noise pollution (regulation and control) rules of our country for different category of zone (or area). (8)
- (b) Explain the prescribed noise limit (given by MOEF of GOI) for diesel generator sets. (7)
4. (a) A vibrating machine of 100 kg is mounted on a rubber pad which has stiffness of 500 N/m. Determine force transmitted to the foundation if the unbalanced 500 N acts on it. The frequency ratio is $\frac{\omega}{\omega_n} 1.5$ and $\zeta = 0.5$. (8)
- (b) What do you mean by transmissibility of motion. What is the function of the controller in active vibration isolation system? (7)
5. (a) What is vibration absorber? Describe a method to describe to reduce excitation level at the source. (8)
- (b) Describe various methods available for vibration control. Explain the function of vibrometer. (7)
6. The floor walls and ceiling of a $12\text{ m} \times 10\text{ m} \times 4\text{ m}$ room is made of varnished wood joints, bricks and 13 mm suspended mineral tiles respectively. Calculate the average absorption coefficient and reverberation time of the room in the 500 Hz frequency band when the floor is:
- (a) Unoccupied and unfurnished
- (b) Unoccupied but furnished with well-upholstered seats
- (c) 100% occupied
- The sound absorption coefficient at 500 Hz for different surfaces is as follows:
- Bare varnished wood joints floor is 0.1, Unoccupied but furnished with well-upholstered seats is 0.77, 100% occupied floor is 0.85 Brick walls is 0.03 and of tile ceiling is 0.65. (15)
7. What are the common practices adopted to control the noise of a machine at source? (15)