Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2022

Subject Code:3170211 Date:10/06/2022

Subject Name:Automotive Noise Vibration and Harshness

Time:02:30 PM TO 05:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define: (i) Frequency (ii) simple harmonic motion (iii) Damped Vibration	**03**
	(b)	Differentiate between Free vibration and force vibration.	**04**
	(c)	Explain the Impedance and sound intensity in details.	**07**
Q.2	**(a)**	Enlist the different type of noise weighting and its various application.	**03**
	(b)	Explain one octave and one third octave band in noise frequency analysis.	**04**
	(c)	Explain the anatomy of human ear and its hearing mechanism with neat sketch.	**07**
		OR	
	(c)	Explain the effect of noise on human hearing by explaining noise induced hearing loss.	**07**
Q.3	**(a)**	Define: (i) Loudness (ii) sampling (iii) Signal to Noise ratio	**03**
	(b)	Differentiate between Vibrometer and accelerometer used to measure the vibrations.	**04**
	(c)	Explain the working principle of sound level meter with block diagram/sketch in detail.	**07**
		OR	
Q.3	**(a)**	Explain the working principle of piezoelectric transducer in short.	**03**
	(b)	Explain the data acquisition system in brief	**04**
	(c)	Explain the noise signal analysis based on Fourier Transform method.	**07**
Q.4	**(a)**	Explain noise of induction system in short.	**03**
	(b)	Explain the exterior sources of noise in vehicles.	**04**
	(c)	Explain the psychological effect of noise on human behavior and working efficiency.	**07**
		OR	
Q.4	**(a)**	Explain the Exhaust system noise criteria in short.	**03**
	(b)	Explain the internal sources of noise in vehicles.	**04**
	(c)	Explain condenser type microphone used in sound measuring devices with neat sketch.	**07**
Q.5	**(a)**	Explain the effect of tyre tread pattern and tyre road friction on vehicle noise level.	**03**
	(b)	Explain structure borne NVH and Air borne NVH in short	**04**
	(c)	Explain Piezoelectric type microphone used in sound measuring devices with neat sketch.	**07**
		OR	
Q.5	**(a)**	Explain the transmission and gear box noise in short.	**03**
	(b)	Enlist the noise produce from engine and explain them in brief.	**04**
	(c)	Explain the working of simple muffler with neat sketch.	**07**

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