

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-VIII (NEW) - EXAMINATION – SUMMER 2018**

**Subject Code: 2180209/2180214**

**Date: 02/05/2018**

**Subject Name: Noise, Vibration & Harshness and Safety (Department Elective III)**

**Time: 10:30 AM to 01:00 PM**

**Total Marks: 70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		<b>MARKS</b>
<b>Q.1</b>	(a) Differentiate between free vibration and force vibration.	<b>03</b>
	(b) Explain the basic fundamentals of Noise, Vibration and Harshness in vehicle by necessary example.	<b>04</b>
	(c) Explain structure borne NVH and air borne NVH in details in context with vehicle	<b>07</b>
<b>Q.2</b>	(a) Explain Octave band in sound measurement.	<b>03</b>
	(b) Explain the anatomy of human ear and mechanism of hearing.	<b>04</b>
	(c) Classify the sources of vibration in vehicle and explain them in details with remedies.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(c) Explain basics of sound measurement device with necessary diagram.	<b>07</b>
	(a) What is seismic principle used to design measurement devices?	<b>03</b>
	(b) What are the differences between accelerometer and vibrometer?	<b>04</b>
	(c) Enlist different types of transducer and explain any two in details with neat sketch.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) What do you mean by piezoelectric devices?	<b>03</b>
	(b) Explain impulse hammer used to excite the vibration in structure.	<b>04</b>
	(c) Explain condenser microphone and piezoelectric microphone with neat sketch.	<b>07</b>
<b>Q.4</b>	(a) How does tyre tread pattern influence tyre road interaction Noise?	<b>03</b>
	(b) Explain: (i) pre-amplifier and (ii) RMS value in frequency analysis.	<b>04</b>
	(c) Explain pass by noise test used for vehicle and give its importance.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) Explain effect of vehicle speed on tyre road interaction Noise.	<b>03</b>
	(b) Elaborate strategies of interior noise refinement.	<b>04</b>
	(c) Explain source of noise in vehicle in details.	<b>07</b>
<b>Q.5</b>	(a) What do you mean by anechoic chamber?	<b>03</b>
	(b) Explain psychological effect of harshness on human being in short.	<b>04</b>
	(c) Give the details of NVH- Legislations applicable for vehicles in India.	<b>07</b>
<b>OR</b>		
<b>Q.5</b>	(a) What do you mean by Harshness? Explain its acceptable range.	<b>03</b>
	(b) Explain different noise absorbing material in short.	<b>04</b>
	(c) Explain Working principle of FFT analyzer used in analysis of vibration in detail.	<b>07</b>

\*\*\*\*\*