

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– VIII (New) EXAMINATION – WINTER 2019****Subject Code: 2180214****Date: 25/11/2019****Subject Name: Noise, Vibration & Harshness And Safety****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.

- Q.1** (a) Define: noise, vibration and harshness. **03**  
(b) Explain plane wave and spherical wave. **04**  
(c) Explain the anatomy of human ear. **07**
- Q.2** (a) Define terms: Rolling, Pitching and Yawing. **03**  
(b) Differentiate between free vibration and forced vibration. **04**  
(c) Explain structure borne and air borne sound with respect to vehicle. **07**
- OR**
- (c) Explain wave equation. **07**
- Q.3** (a) What do you mean by single degree of freedom? **03**  
(b) Explain effect of road roughness and road irregularities on vehicle vibrations in brief. **04**  
(c) Explain anechoic chamber. **07**
- OR**
- Q.3** (a) What do you mean by accelerometer and vibrometer? **03**  
(b) Explain engine air intake and exhaust noise in details. **04**  
(c) Explain passive and active suspension. **07**
- Q.4** (a) What do you mean by vibration pick up? **03**  
(b) Explain brake squeal noise. **04**  
(c) Explain pass by noise test in details. **07**
- OR**
- Q.4** (a) What do you mean by interior noise? **03**  
(b) Write a short note on microphone. **04**  
(c) Enlist different types of transducers and explain any one in brief. **07**
- Q.5** (a) Write a short note on psychological effects of Noise & Vibrations **03**  
(b) Explain active safety system in vehicle. **04**  
(c) Explain sources of power train noise in vehicles. **07**
- OR**
- Q.5** (a) Write a short note on harshness and its effect. **03**  
(b) Explain passive safety system in vehicle. **04**  
(c) Explain vibration absorber/ isolator. **07**