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B.E./B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS April/May 2019
MECHANICAL ENGINEERING BRANCH
(REGULATIONS 2012)

ME8007 MECHANICAL VIBRATIONS AND NOISE CONTROL
Time: 3 hr Max Mark: 100

Answer ALL Questions

Part-A (10 x 2 =20 mark)

1. Define coulomb damping
2. Write down the general response equations of a two degree freedom free vibration.
3. Calculate the sound pressure level associated with the following sound pressures.
(i) 0.02 Pa (ii) 100 Pa
4. Explain the term loudness.
5. How assessment of combustion noise has been done.
6. What is the source for aerodynamic noise?
7. Explain various Vibration isolators used in industries
8. What is meant by Un-tuned viscous dampers?
9. Explain the term mechanical noise?
10. Write short notes on subjective and objective assessment of sound?



Part – B (5 x 16 = 80 Mark)

11) Discuss various automotive noise sources

12) a) An automobile chassis along with the engine weighing 2 tons is held on the front and rear axles of an automobile through 4 identical leaf springs each having 14 leaves. If the natural frequency of this system in the vertical direction is 1 cps, figure out the breadth and thickness of each leaf. Length of the leaf spring is 300 mm. b/t for the leaf is 10. (OR)

(b) A single cylinder vertical engine weighing half a tonne with a vertical line of stroke has a predominant exciting frequency of 6000 rpm. It is supported by four helical springs. Transmissibility of the isolator is $1/10$. What should be the natural frequency of the system? What is the required stiffness of each helical spring? Each helical spring has a number of active coils $n=10$. What is the mean

diameter D of the coils? G for spring steel 80,000 MPa. Stiffness of spring = $Gd^4/8D^3n$ ($D/d=1/2$)

- 13) (a) Six machines operating individually, make sound levels of 89, 29, 36, 79, 37 and 56 dB respectively. Find overall sound pressure level when all of them operate simultaneously

(OR)

- (b) Explain the measurement and analysis of noise.

- 14) (a) Explain the modal analysis of the mass elastic model shock absorbers.

(OR)

- (b) Give an example of tuned absorber and explain in detail.

- 15) (a) Discuss various methods used in controlling engine and combustion noise

(OR)

- (b) Write short notes on

- a) Sound enclosures
- b) Automotive noise control principles



02-05-19
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