G 720 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Seventh Semester

Branch : Mechanical Engineering

ME 010 702—DYNAMICS OF MACHINES (ME)

(Improvement/Supplementary)

[2010 Admissions]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. How will you evaluate the performance of a balancing machine ?
2. Discuss a method to find out the equivalent stiffness.
3. Discuss the role of influence coefficients in vibrations.
4. How will you represent a transient vibration ?
5. Discuss tolerance levels of human ear in industrial context.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Differentiate between Balancing of rotating masses and Reciprocating masses.
7. Write expressions for critically damped system and explain the applications.
8. With neat sketch, explain the working of a centrifugal pendulum damper.
9. How will you control non-linear forces in forced vibrations ? Discuss the dynamic behaviour of the system.
10. List and detail the key parameters of acoustic measurements. Discuss an acoustic impedance filter.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Explain how will you choose a Reference Plane (RP) for balancing of different rotating masses in several planes. Discuss the issues in dynamic balancing.

(12 marks)

Or

12. Each crank and connecting rod of a four-crank in-line engine are 200 mm and 800 mm respectively. The outer cranks are set at 120° to each other and each has reciprocating mass of 200 kg. The spacing between adjacent planes of crank are 400 mm, 600 mm and 500 mm. If the engine is in complete primary balance, determine reciprocating masses of the inner cranks.

(12 marks)

13. A coil of spring stiffness 4 N/mm supports vertically a mass of 20 kg at the free end. The motion is resisted by the oil dashpot. It is found that the amplitude at the beginning of the fourth cycle is 0.8 times the amplitude of previous vibration. Determine the damping force per unit velocity. Also, find the ratio of frequency of damped and undamped vibrations.

(12 marks)

Or

14. Discuss all the conditions for transmissibility of vibration. How will you model transmissibility Why is vibration isolation important ?

(12 marks

15. Derive expressions for dynamic behaviour of (i) distributed mass system ; and (ii) lumped mas system, when the DOF of the system is more than two.

(12 mark

Or

16. With neat line diagrams, explain the following two techniques :—

(a) Dunkerley's approach. (6 mark

(b) Stodola approach. (6 mark

17. Discuss the response of a transient vibration system, when the input signal is :

    (a) Step waveform ; and

    (b) Impulsive. Derive the equations of motion.

(12 marks)

Or

18. A shaft of 50 mm dia, and 3 m long is supported at the ends and carries three weights of 1000 N, 1500 N and 750 N at 1 m, 2 m and 2.5 m from left support. Taking E = 200 GPa, find the frequency of transverse vibrations.

(12 marks)

19. Discuss the methods, equipments and criteria for recording and reproduction of sound. Explain the entire process with a flowchart.

(12 marks)

Or

20. Explain the importance of practical noise control. Discuss the strategies, measurements and techniques of industrial noise control. List all the challenges involved.

(12 marks)

[5 × 12 = 60 marks]