G 1314 (Pages : 2)

B.TECH. DEGREE EXAMINATION, MAY 2016

Seventh Semester

Branch : Mechanical Engineering

ME 010 702—DYNAMICS OF MACHINES (ME)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

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

1. State the principle of "transference of a force from one plane to another".

2. Define viscous damping.

3. Write a note on "torsionally equivalent shaft".

4. Discuss the importance of shock spectrum.

5. Write a note on "musical scale".

$(5 \times 3 = 15 \text{ marks})$

Part B

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

6. Discuss balancing of in-line engines.

7. Explain the behaviour of an underdamped system.

8. Explain Dunkerly's method.

9. Write the applications of Laplace transformations in vibrations.

10. With sketches, explain equivalent sound level and loudness contours.

$(5 \times 5 = 25 \text{ marks})$

Part C

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

11. A single cylinder reciprocating engine has a reciprocating mass of 60 kg. The crank rotates at 60 r.p.m. and the stroke is 320 mm. Mass of revolving parts at 160 mm. radius is 40 kg. If two-thirds of the reciprocating parts and the whole of revolving parts are to be balanced, determine the balance mass required at a radius of 350 mm.

Or

Turn over
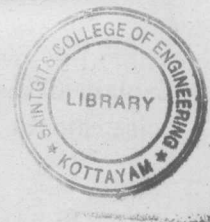
12. Discuss the steps in balancing of V-engines. Explain direct crank and reverse crank techniques.

13. In a single-degree damped vibrating system, a suspended mass of 8 kg. makes 30 oscillations in 18 seconds. The amplitude decreases to 0.25 of initial value after 5 oscillations. Determine : (i) Stiffness of spring ; (ii) Logarithmic decrement ; (iii) Damping factor ; and (iv) Damping coefficient.

Or

14. Derive an expression for amplitude of vibrations in forced-damped vibration system.

15. Explain the following concepts, with neat sketches :—

    (i)   Lumped mass system.   (6 marks)

    (ii)   Distributed mass system.   (6 marks)

Or

16. Explain all the principal modes of vibration. What are rectilinear and angular modes ? Discuss.

17. A machine weighing 3.5 kg. vibrates in a viscous medium. A harmonic exciting force of 40 N acts on the machine and produces a resonant amplitude of 18 mm. with a period of 0.2 second. Determine the damping coefficient.

Or

18. Explain the characteristics of forced vibration with non-linear forces. Derive the Duffing's equation from fundamentals.

19. Discuss the Doppler effect. Explain the working of loud speakers and microphones.

Or

20. Explain all the research issues in industrial noise control. Discuss the precautions for environmental noise control.

[5 × 12 = 60 marks]