Mechanical Vibrations  
Department of Mechanical Engineering

1. Frequency of vibrations is usually expressed in

(a) number of cycles per hour

(b) number of cycles per minute

(c) number of cycles per second

(d) none of these

2. The particles of a body move \_\_\_\_\_\_\_\_ its axis in torsional vibrations.

(a) in a circle about

(b) parallel to

(c) perpendicular to

(d) away from

3. In a spring-mass system, if the mass is halved and the spring stiffness is doubled, the natural frequency is

(a) halved

(b) doubled

(c) unchanged

(d) quadrupled

4. The frequency of damped vibrations is always\_\_\_\_\_\_the natural frequency.

(a) equal to

(b) more than

(c) less than

(d)double

5. At resonance, the amplitude of vibrations is

(a) very large

(b) small

(c) zero

(d) depends upon frequency

6. When there is a reduction in amplitude over every cycle of vibration, then the body is said to have

(a) free vibration

(b) forced vibration

(c) damped vibration

(d) none of the above

7. Longitudinal vibrations are said to occur when the particles of a body move

(a) perpendicular to its axis

(b) parallel to its axis

(c) in a circle about its axis

(d) none of the above

8. In under damped vibrating system, the amplitude of vibration

(a) decreases linearly with time

(b) decreases exponentially with time

(c) increases linearly with time

(d) increases exponentially with time

9. If the damping factor for a vibrating system is unity, then the system will be

(a) over damped

(b) under damped

(c) critically damped

(d) without vibrations

10. A motion that repeats itself after equal intervals of time is known as \_\_\_\_\_\_\_\_\_\_\_ .

(a) periodic motion

(b) cycle

(c) frequency

(d) isolation

11. The motion completed during one time period is known as \_\_\_\_\_\_\_.

(a) period of vibration

(b) cycle

(c) frequency

(d) Amplitude

12. Frequency is equal to \_\_\_\_\_\_.

1. time period

(b) 1/time period

(c) 𝜔 x time period

(d) 𝜔/time period

13. In a spring-mass system, which of the following force is not considered?

(a) Spring force

(b) Damping force

(c) Accelerating force

(d) Spring force and Damping force

14. The velocity of a particle moving with simple harmonic motion is \_\_\_\_\_\_\_ at the mean position.

(a) zero

(b) minimum

(c) maximum

(d) Infinite

15. The maximum acceleration of a particle moving with simple harmonic motion is \_\_\_\_\_\_\_\_\_\_.

(a) ω

(b) ω.r

(c) ω / 2π

(d) 2π / ω

16. At the mean position, the potential energy of the system is \_\_\_\_\_\_\_.

(a) zero

(b) minimum

(c) maximum

(d) Infinite

17. As per Energy Method, the summation of kinetic energy and potential energy must be \_\_\_\_\_\_\_\_ which is the same at all the times.

(a) zero

(b) minimum

(c) maximum

(d) Constant

18. In Rayleigh’s method, the \_\_\_\_\_\_\_\_\_\_\_\_\_ at the mean position is equal to the maximum potential energy (or strain energy) at the extreme position.

(a) minimum kinetic energy

(b) minimum potential energy

(c) maximum kinetic energy

(d) maximum potential energy

19. Equilibrium method is in accordance with which of the following principle?

(a) Taylor's principle

(b) D'Alembert's principle

(c) Energy conservation principle

(d) Mayor's principal

20. When a rigid body is suspended vertically and it oscillates with a small amplitude under the action of the force of gravity, the body is known as

(a) simple pendulum

(b) torsional pendulum

(c) compound pendulum

(d) second’s pendulum

21. When a body is subjected to longitudinal vibrations, the stress induced in a body will be

(a) shear stress

(b) tensile stress

(c) compressive stress

(d) tensile stress and compressive stress

22. When a body is subjected to torsional vibrations, the stress induced in a body will be

(a) shear stress

(b) tensile stress

(c) compressive stress

(d) bending stress

23. Which of the following method is not used to determine the frequency for free vibration?

(a) Equilibrium method

(b) Energy method

(c) Rayleigh's method

(d) Klein’s method

24. What is the effect on the undamped natural frequency of a single-degree-of-freedom system if the mass of the system is increased?

(a) The frequency will increase

(b) The frequency will stay the same

(c) The frequency will decrease

(d) The frequency will zero

25. The damping provided by fluid resistance is known as \_\_\_\_\_\_\_\_\_\_\_ .

(a) friction damping

(b) natural damping

(c) viscous damping

(d) coulomb damping

26. In which of the case, the factor c = 0?

(a) When there is damping

(b) No damping

(c) Resonance

(d) c is never 0

27. The unit of the damping coefficient is \_\_\_\_\_\_.

(a) N/sm

(b) N/m/s

(c) N/m

(d) Nm

28. The damping factor is the measure of the relative amount of damping in the existing system with that necessary for the \_\_\_\_\_\_ system.

(a) underdamped

(b) overdamped

(c) critical damped

(d) all of the mentioned

29. Logarithmic decrement is defined as the \_\_\_\_\_\_\_\_\_\_\_\_ of the amplitude reduction factor.

(a) reciprocal

(b) logarithm

(c) natural logarithm

(d) Equal

30. At a nodal point in a shaft, the amplitude of torsional vibration is \_\_\_\_\_\_\_\_\_\_\_ .

(a) zero

(b) minimum

(c) maximum

(d) negative