**These are sample MCQs to indicate pattern, may or may not appear in examination**

**University of Mumbai**

**Online Examination 2020**

Program: BE Automobile Engineering

Curriculum Scheme: Revised 2016

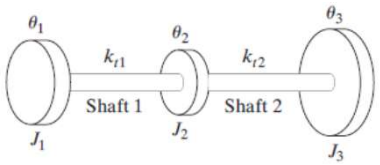
Examination: Third Year Semester VI

Course Code: AEC604 and Course Name: Mechanical Vibration

**Time: 1hour** **Max. Marks: 50**

**Note to the students:- All the Questions are compulsory and carry equal marks**

| Q NO | QUESTION | OPTIONS | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| 1 | A system has a mass 5 kg, and a spring of stiffness 1 kN/m. The undamped time period is _____ | 0.444 | 14.14 | 1.414 | 4.44 |
| 2 | When we add two simple harmonic motions having same frequency ω rad/s, then the resulting motion has a frequency = _____ rad/s | 2ω | ω/2 | ω^2 | ω |
| 3 | The mass of an undamped vibrating system is given an initial velocity of 1 m/s. The phase angle is | 90 | 180 | 0 | 45 |
| 4 | A cylinder of a 1 d.o.f. vibrating system has a mass 1 kg and radius 20 cm, and rolls without slip on a flat horizontal surface. The equivalent mass is _____ | 0.5 | 1 | 1.5 | 2 |
| 5 | In simple harmonic motion, acceleration is proportional to _____. | Velocity | Displacement | Rate of change of velocity | Amplitude |
| 6 | In which of the following cases of roots, underdamping occurs? | real, unequal, negative | real, negative, equal | complex conjugate | independent of the equation |

| | | | | | |
|---|---|---|---|---|---|
| 7 | The damping ratio of a single degree of freedom spring-mass-damper system with mass of 1 kg, stiffness 100 N/m and viscous damping coefficient of 25 Ns/m is | 1 | 1.25 | 1.5 | 1.75 |
| 8 | For an underdamped spring-mass-damper system, the initial displacement is X and the initial velocity is zero. The amplitude of x(t) after n complete cycles is | | | | |
| 9 | In underdamped vibrating system, the amplitude of vibration _____. | decreases linearly with time | increases linearly with time | decreases exponentially with | increases exponentially with |
| 10 | What is the value of damping ratio for the case of Coulomb Damping? | Greater than 1 | 1 | Less than 1 | Invalid |
| 11 | A single degree of freedom spring mass system is a _____ type of system. | Undistributed | Continuous | Lumped or Discrete | Distributed |
| 12 | Dunkerley's method is used for estimation of fundamental natural frequency for _____. | Longitudinal vibration | Torsional vibration | Transverse vibration | Nonlinear vibration |
| 13 | The vibration system shown in figure has _____ modes of vibrations.   | 3 | 2 | 1 | 4 |
| 14 | Holzer method of determining natural frequencies for torsional semi-definite system is based on the formula : | $\sum_{i=1}^{n} J_i\theta_i\omega^2 = 0$ | $\sum_{i=1}^{n} J_i\theta_i\omega^2 = 1$ | $\sum_{i=1}^{n} J_i\theta_i\omega^2 = 2$ | $\sum_{i=1}^{n} J_i\theta_i\omega^2 = 3$ |
| 15 | A vibrometer having a natural frequency of 4 rad/s and ξ = 0.3 is attached to a structure that performs a harmonic motion. If the difference between the maximum and the minimum recorded values is 8 mm, find the amplitude of motion of the vibrating structure | 3.82 mm | 3.90 mm | 3.97 mm | 4.05 mm |
| 16 | For the case of frequency-squared excitations, the peak value of steady state amplitude lies at frequency ratio r | > 1 | equal to 1 | < 1 | not a function of r |
| 17 | For experiencing the least vibrations, a driver should drive his vehicle at _____ speed. | equal to resonance speed | less than resonance speed | between frequency ratio of 1 to √2 | greater than frequency ratio of |

| | | | | | |
|---|---|---|---|---|---|
| 18 | A simple pendulum of 10 Hz natural frequency is excited by hand holding the thread with a frequency of 2 Hz. What is the actual frequency of the mass with | 2 Hz | less than 2 Hz | between 2 Hz and 10 Hz | 10 Hz |
| 19 | Often an unbalance of forces is produced in rotary or reciprocating machinery due to the_____ | Static forces | Friction forces | Inertia forces | Centripetal forces |
| 20 | For which angle in degrees, the primary unbalanced force in reciprocating engine mechanism is maximum? | 0 | 30 | 45 | 90 |
| 21 | For the static balancing of the engine, which of the condition is necessary? | Force polygon must not be closed | Couple polygon must be closed | Couple polygon must not be closed | Force polygon must be closed |
| 22 | The axis of precession is _____ to the plane in which the axis of spin is going to rotate | Parallel | Perpendicular | Spiral | Cicular |
| 23 | Which type of monitoring system uses stroboscope to measure speed of the machine? | Basic condition monitoring system | Portable condition monitoring system | Computer based condition monitoring system | monitoring condition system |
| 24 | Which among the following parameters is NOT used to measure vibration? | Frequency | Phase | Amplitude | Static Deflection |
| 25 | A systematic approach for maintenance is | Problem – Cause – Diagnosis – Rectification | Problem– Diagnosis – Cause – Rectification | Problem – Measure – Diagnosis – Rectification | Problem– Diagnosis – Measure – Rectification |