

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

University of Mumbai

Online Examination 2020

Program: BE Automobile Engineering

Curriculum Scheme: Revised 2012

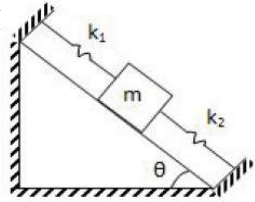
Examination: Third Year Semester VI

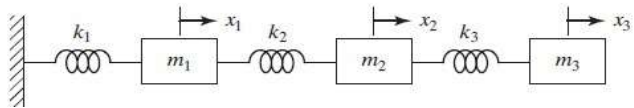
Course Code: AEC603 and Course Name: Mechanical Vibration

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	point of suspension is 100 mm. The distance between the point of suspension and the center of mass is 250 mm. Considering the acceleration due to gravity as $9.81 \text{ m/s}^2$ , the natural frequency (in radian/s) of the compound pendulum is _____ .	10.11	12.44	20.22	15.66
2	What is the natural frequency of the spring mass system shown below? The contact between the block and the inclined plane is frictionless 	$\sqrt{[(k_1 + k_2)/2m]}$	$\sqrt{[(k_1 + k_2)/4m]}$	$\sqrt{[(k_1 - k_2)/m]}$	$\sqrt{[(k_1 + k_2)/m]}$
3	Determine the torsional stiffness of the shaft ( $G = 210 \text{ GPa}$ ) of length 1.5m having internal and external radius of the shaft 15 mm and 30 mm respectively	134 KNm/rad	89 KNm/rad	60 KNm/rad	10.43 KNm/rad

4	The acceleration of the particle moving with simple harmonic motion is _____ at the mean position.	Zero	Minimum	Maximum	One
5	Longitudinal vibrations are said to occur when the particles of a body moves	Perpendicular to its axis	Parallel to its axis	In a circle about its axis	About its own axis
6	In which of the following cases of roots, critical damping occurs?	real, unequal, negative	real, negative, equal	complex conjugate	independent of the equation
7	When frequency ratio ( $r$ ) is greater than unity, phase angle decreases as _____.	damping factor increases	damping factor decreases	damping factor is constant	damping factor is zero
8	What is the effect of damping on phase angle at resonant frequency?	Phase angle increases as damping increases	Damping has no effect on phase angle	Phase angle increases as damping decreases	Phase angle is always zero
9	The theoretical mean position for the case of Coulomb damping is _____	is always zero	is always 1	never exists	alternatively between $F/k$ and $-F/k$
10	A spring mass system has a 10 kg mass and 220 N/m spring stiffness. The mass is given an initial displacement of 2 cm and released from rest. In how many cycles the amplitude will be reduced to approximately half of its initial value, Assume system to be viscously damped with damping ratio equal to	1	2	3	5
11	How many are the degrees of freedom for the system shown in figure? 	0	1	2	3
12	Eigen value indicates _____	$\omega n$	$\omega n^2$	$\omega n^3$	$\sqrt{\omega n}$
13	Dunkerley's method is used for estimation of fundamental natural frequency for _____.	Longitudinal vibration	Torsional vibration	Transverse vibration	Nonlinear vibration
14	A continuous system has	No degrees of freedom	One degrees of freedom	Two degrees of freedom	infinite number of degrees of freedom
15	In frequency response curve, the maximum value of the magnification factor is _____.	$\xi/\sqrt{1-\xi^2}$	$1/(2\xi\sqrt{1-\xi^2})$	$1/(\xi\sqrt{1-\xi^2})$	$1/\sqrt{1-\xi^2}$

16	with negligible damping, is used as a vibration pickup. When mounted on a structure vibrating with amplitude of 4 mm, total displacement of the mass of the pickup is observed to be 12 mm. Find the frequency of the vibrating structure.	12.5 Hz	18.4 Hz	22.7 Hz	26.2 Hz
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 $\sqrt{2}$	greater than frequency ratio of $\sqrt{2}$
18	by hand holding the thread with a frequency of 2 Hz. What is the actual frequency of the mass with which it oscillates?	2 Hz	less than 2 Hz	between 2 Hz and 10 Hz	10 Hz
19	A disturbing mass $m_1$ , radius $r_1$ attached to a rotating shaft may be balanced by a single mass $m_2$ attached radius $r_2$ in the same plane of rotation as that of $m_1$ such that	$m_1 * r_2 = m_2 * r_1$	$m_1 * r_1 = m_2 * r_2$	$m_1 = m_2 * r_2 * r_1$	$m_2 = m_1 * r_2 * r_1$
20	In a revolving rotor, the centrifugal force remains balanced as long as the centre of the mass of the rotor lies _____.	above the axis of shaft	below the axis of shaft	on the axis of the shaft	away from the axis of shaft
21	In locomotives, the ratio of the connecting rod length to the crank radius is kept very large in order to	have perfect balancing	to start the locomotive quickly	minimise the effect of primary forces	minimise the effect of secondary forces
22	In a system two masses are used to balance the unbalanced forces. Find the mass of the balancing mass which has to be situated at a distance of 20 cm, if the disturbing mass is 100 Kg having radius of rotation of 0.1 m. One of the balancing mass is 30 Kg with radius of rotation of 10 cm.	70	35	20	10
23	The critical speed of a shaft depends upon its	Mass	Stiffness	Mass and Stiffness	Stiffness and
24	Which type of monitoring system uses stroboscope to measure speed of the machine?	Basic condition monitoring system	Portable condition monitoring	Computer based monitoring system	monitoring condition
25	doubled, the whirling speed $N_c$ of the shaft, will become equal to	$2N_c$	$N_c / \sqrt{2}$	$N_c/2$	$N_c$