Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2012

Examination: Third Year Semester VI

Course Code: MEC603 and Course Name: Mechanical Vibration

Time: 1hour Max. Marks: 50

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

Q1.	When a body is subjected to transverse vibrations, the stress induced in a body will be
Option A:	shear stress
Option B:	bending stress
Option C:	tensile stress
Option D:	compressive stress
Q2.	Two springs have spring stiffness of 1500 N/m and 2000 N/m respectively. If they are connected in series, what is the spring stiffness if they are replaced by an equivalent system.3500 N/m
Option A:	3500 N/m
Option B:	1166 N/m
Option C:	857.63 N/m
Option D:	2000N/M
Q3.	Which of the following relations is true when springs are connected parallel? where K = spring stiffness
Option A:	$K_e = K_1 + K_2$
Option B:	$(1 / K_e) = (1/K_1) + (1/ K_2)$
Option C:	$K_e = (1/K_1) + (1/ K_2)$
Option D:	K
Q4.	In which type of vibrations, amplitude of vibration goes on decreasing every cycle?
Option A:	Damped vibrations
Option B:	Undamped vibrations
Option C:	Random Vibrations
Option D:	Resonance
Q5.	Which among the following is the fundamental equation of S.H.M.?
Option A:	$x + (k / m) x = 0$
Option B:	$x + \omega^2 x = 0$
Option C:	$x + (k/ m)^2 x = 0$
Option D:	$x^2 + \omega x^2 = 0$

Q6.	Determine logarithmic decrement, if the amplitude of a vibrating body reduces to $1/6^{th}$ in two cycles.
Option A:	0.223
Option B:	0.8958
Option C:	0.3890
Option D:	0.2658
Q7.	Calculate logarithmic decrement if damping factor is 0.33.
Option A:	1.36
Option B:	3.23
Option C:	5.16
Option D:	2.19
Q8.	In which direction does the accelerating force acts?
Option A:	Opposite to the motion
Option B:	Along the motion
Option C:	Perpendicular to motion
Option D:	Variable
Q9.	Eddy current damping is an example of
Option A:	Coloumb damping
Option B:	Hysterisis damping
Option C:	Viscous damping
Option D:	Dry friction damping
Q10.	What is meant by coupled differential equation?
Option A:	The differential equation in which only rectilinear motions exit
Option B:	The differential equation in which only angular motions exit
Option C:	The differential equation in which both rectilinear and angular motions exit
Option D:	The differential equation in which neither rectilinear nor angular motions exit
Q11.	A cantilever shaft having 50 mm diameter and length of 300 mm has a disc of mass 100 kg at its free end. The Young's modulus for the shaft material is 200 GN/m 2 . Calculate the natural longitudinal frequency in Hz.
Option A:	575
Option B:	625
Option C:	525
Option D:	550
Q12.	A cantilever shaft having 50 mm diameter and a length of 300 mm has a disc of mass 100 kg at its free end. The Young's modulus for the shaft material is 200 GN/m 3 . Determine the static deflection of the shaft in mm.
Option A:	0.147
Option B:	0.213

Option C:	0.132
Option D:	0.112
Q13.	Calculate critical speed of a vehicle which moves on a road having sinusoidal profile of wavelength 2.5 m. The mass of the vehicle is 300 kg and natural frequency of its spring suspension system is 8 rad/sec
Option A:	4.15 m/sec
Option B:	3.18 m/sec
Option C:	2.36 m/sec
Option D:	1.46 m/sec
Q14.	Consider the steady-state absolute amplitude equation shown below, if $\omega / \omega_n = \sqrt{2}$ then amplitude ratio (X/Y) =? $(X/Y) = \sqrt{1 + [2\xi (\omega/\omega_n)]^2} / \sqrt{[1 - (\omega/\omega_n)^2]^2 + \{2\xi (\omega/\omega_n)^2\}}$
Option A:	0
Option B:	1
Option C:	less than 1
Option D:	greater than 1
Q15.	What is meant by phase difference or phase angle in forced vibrations?
Option A:	Difference between displacement vector (x_p) and velocity vector V_p
Option B:	Angle in which displacement vector leads force vector by ($F_0 \sin\omega t$)
Option C:	Angle in which displacement vector (x_p) lags force vector ($F_0 \sin\omega t$)
Option D:	Multiply of displacement vector (x_p) and velocity vector V_p
Q16.	In which of the cases the factor c = 0?
Option A:	When there is damping
Option B:	No damping
Option C:	Resonance
Option D:	c is never 0
Q17.	The accelerometer is used as a transducer to measure earthquake in Richter scale. Its design is based on the principle that
Option A:	its natural frequency is very low in comparison to the frequency of vibration
Option B:	its natural frequency is very high in comparison to the frequency of vibration
Option C:	its natural frequency is equal to the frequency of vibration
Option D:	measurement of vibratory motion is without any reference point
Q18.	Which of the following instruments measure the amplitude of a vibrating body?
Option A:	Vibrometers
Option B:	Magnifier
Option C:	Exciter
Option D:	Dial gauge indicator
Q19.	If the static deflection is 1.665×10^{-3}m, calculate the critical speed of the shaft in rps.

	Centre of disc at 0.25m away from centre of axis of shaft.
Option A:	8.64
Option B:	9.64
Option C:	10.64
Option D:	12.2
Q20.	From the following data, calculate the static deflection in mm. Shaft diameter = 5mm length = 200mm Mass of disc = 100Kg at centre of shaft E = 100GN/m^2 Centre of disc at 0.25m away from centre of axis of shaft.
Option A:	4.32
Option B:	9.64
Option C:	0.64
Option D:	11.64
Q21.	Which type of monitoring system uses stroboscope to measure speed of the machine?
Option A:	Portable condition monitoring system
Option B:	Basic condition monitoring system
Option C:	Computer based condition monitoring system
Option D:	Non-Portable condition monitoring system
Q22.	The balancing of rotating and reciprocating parts of an engine is necessary when it runs at
Option A:	slow speed
Option B:	medium speed
Option C:	high speed
Option D:	moderate speed
Q23.	At which angle primary unbalanced force in reciprocating engine mechanism is maximum?
Option A:	0^o
Option B:	90^o
Option C:	360^o
Option D:	60^o
Q24.	The unbalanced force caused due to reciprocating mass is given by the equation
Option A:	$mr\omega^2 \sin\theta+mr\omega^2 (\sin2\theta/n)$
Option B:	$mr\omega^2 \sin\theta+mr\omega^2 (\cos2\theta/n)$
Option C:	$mr\omega^2 \cos\theta+mr\omega^2 (\cos2\theta/n)$
Option D:	$mr\omega^2 (\sin\theta + \sin 2\theta/n)$
Q25.	The partial balancing means

Option A:	balancing partially the revolving masses
Option B:	balancing partially the reciprocating masses
Option C:	best balancing of engines
Option D:	balancing partially the rotating masses