University of Mumbai
Examination 2020

Program: Mechanical Engineering
Curriculum Scheme: Rev2016
Examination: Second Year Semester: V
Course Code: MEC504 and Course Name: Dynamics of Machinery
Time: 1-hour Max. Marks: 50

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

Q1.	Magnification factor is defined as ratio of
Option A:	Steady state Amplitude / Static Deflection
Option B:	Static Deflection / Steady state amplitude
Option C:	Frequency of forced vibration / Natural Frequency
Option D:	Natural Frequency / Frequency of forced vibration
Q2.	Transmissibility ratio is defined as ratio of magnitude of
Option A:	Applied force / Transmitted force
Option B:	Natural Frequency / Frequency of external force
Option C:	Frequency of external force / Natural Frequency
Option D:	Transmitted force / Applied force
Q3.	Angle between spring force and damping force is
Option A:	90^0
Option B:	40^0
Option C:	0^0
Option D:	180^0
Q4.	**The transmissibility is same for all values of damping factor at frequency ratio ω / ω_n of**
Option A:	1
Option B:	2
Option C:	$\sqrt{2}$
Option D:	0
Q5.	A governor is said to be isochronous when equilibrium speed of all radii of rotation of the balls with in the working range
Option A:	is constant
Option B:	varies uniformly
Option C:	is not constant
Option D:	none of the above
Q6.	**Which one of the following is a Dead weight type governor?**
Option A:	Hartnell
Option B:	Porter
Option C:	Hartung
Option D:	Wilson - Hartnell

Q7.	Gyroscopic effect is not observed in which of the following actions performed by the ships?
Option A:	Pitching
Option B:	Steering
Option C:	Pitching and Rolling
Option D:	Rolling
Q8.	What is the effect of reactive gyroscopic couple when ship takes a left turn and propeller rotates in clockwise direction when viewed from bow?
Option A:	The stern is dipped and bow is raised
Option B:	The stern is raised and bow is dipped
Option C:	Reactive gyroscopic couple has no effect when propeller rotates in clockwise direction
Option D:	None of the above
Q9.	SHM is a motion where
Option A:	Acceleration of a body is inversely proportional to displacement of body
Option B:	Acceleration of a body is inversely proportional to velocity of body
Option C:	Acceleration of a body is directly proportional to Displacement of body
Option D:	Acceleration of a body is directly proportional to velocity of body
Q10.	During free vibrations, body vibrates _____
Option A:	Under the absense of external force
Option B:	Under presence of constant periodic applied force
Option C:	At natural frequency
Option D:	With zero frequency
Q11.	Time period of a system is 'x' sec. Now if mass is reduced to 1/8th of original mass and stiffness is doubled. New time period witll be
Option A:	x/2
Option B:	x/16
Option C:	4x
Option D:	x/4
Q12.	What is the effect of reactive gyroscopic couple when ship pitches down and propeller rotates in clockwise direction when viewed from bow?
Option A:	Bow moves towards starboard
Option B:	Bow moves towards port
Option C:	Stern moves towards port
Option D:	Stern moves towards Starboard
Q13.	Balancing couple on two wheeler is given by
Option A:	mg sinθ
Option B:	mghsinθ
Option C:	mgcosθ
Option D:	mghcosθ

Q14.	What is gyroscopic couple acting on a disc which has mass moment of inertia equal to 0.02135 kg m2. If a disc has a speed of 500 rpm and is made to precess at 100 rpm?
Option A:	12.7 Nm
Option B:	40.4 Nm
Option C:	11.7 Nm
Option D:	25.6 Nm
Q15.	A porter governor has all four arms of 200 mm are pivoted on spindle axis. m = 2kg, M = 50 kg, r1 = 160 mm, r2 = 180 mm. Find range of speed.
Option A:	38 rpm
Option B:	76 rpm
Option C:	42 rpm
Option D:	60 rpm
Q16.	For a hartnell governor sleeve arm is 120 mm, ball arm is 80 mm, mean radius is 200 mm, minimum radius is 180 mm. Find sleeve travel from mean position to minimum position
Option A:	30 mm
Option B:	15 mm
Option C:	40 mm
Option D:	25 mm
Q17.	Damping in a system can be provided
Option A:	Only internally
Option B:	Only externally
Option C:	Both externally and internally
Option D:	Cant be provided
Q18.	Damped natural frequency will exist for?
Option A:	Underdamped systems
Option B:	Undamped systems
Option C:	Overdamped systems
Option D:	Critically damped systems
Q19.	Control panels in aircrafts ideally should be?
Option A:	Underdamped
Option B:	Overdamped
Option C:	Undamped
Option D:	Critically damped
Q20.	A mass of 1 kg is supported on a spring of 9800 N/m and has a dashpot having damping coefficient of 6 N-sec/m. Find the amplitude after 4 cycles, if the initial displacement is 5 mm.
Option A:	2.33 mm
Option B:	3.22 mm

Option C:	4.36 mm
Option D:	5.11 mm
Q21.	The turbine rotor of ship rotating at 1800 rpm has a mass of 900 kg and radius of gyration 600 mm. Determine magnitude of gyroscopic couple when the ship is travelling at 16 knots and steers to left in curve of 100m radius
Option A:	5.08 kN-m
Option B:	13.65 kN-m
Option C:	10.84 kN-m
Option D:	9.73 kN-m
Q22.	A spring mass system has a natural period of 0.25 seconds. What will be the new period of the system if the spring contant is increased by 60%?
Option A:	0.24s
Option B:	0.36s
Option C:	0.48s
Option D:	0.19s
Q23.	In a system damping factor is 0.25, natural frequency is 20 rad/sec, frequency of periodic excitation is 40 rad/sec. Find transmissibility ratio
Option A:	12.5 %
Option B:	30.8 %
Option C:	44.7 %
Option D:	18.9 %
Q24.	A In a seismic instrument if mass m = 0.1kg, stiffness of spring, K = 1 N/mm and damping ratio 0.5 determine the amplitude of recorded motion if the motion of vibrating body is 3sin (200t) (mm).?
Option A:	2.8 mm
Option B:	3.3 mm
Option C:	4.2 mm
Option D:	2.5 mm
Q25.	An instrument used for measuring amplitude of a machine running at 1000 rpm shown a reading of 0.5 mm. The instrument has natural frequency 20 rad/sec. Neglect damping. What is acceleration of machine?
Option A:	5.3 m/s^2
Option B:	0.26 m/s^2
Option C:	1.4 m/s^2
Option D:	145 m/s^2