

X

NPTEL

reviewer2@nptel.iitm.ac.in ▼

Courses » Introduction to Mechanical Vibration Announcements Course Ask a Question Progress



Unit 8 - Week 7

Course outline

How to access the portal

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

- Lesson 1 - Undamped dynamic vibration absorber
- Lesson 2 - Tuned absorber
- Lesson 3 - Numerical problems
- Lesson 4 - Critical speed of shafts (Single rotor system)
- Lesson 5 - Critical speed of shafts (Multi-rotor system)
- Quiz : Week 7 Assignment
- Feedback Form For Week 7
- Introduction to mechanical vibration : Week 7 - Solution

Week 8

Week 7 Assignment

The due date for submitting this assignment has passed. **Due on 2018-03-28, 23:59 IST**
As per our records you have not submitted this assignment.

This assignment contains 15 questions, 5 questions of 1 mark each and 10 questions of 2 marks each. Full marks are 25.

1) The unbalanced force caused by an eccentric mass m rotating at an angular speed ω and located at a distance r from the axis of rotation is **1 point**

- $mr^2\omega^2$
- $mr\omega^2$
- $mg\omega^2$
- $rm^2\omega^2$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$mr\omega^2$

2) Critical speed of a rotating shaft depends upon **1 point**

- stiffness
- mass
- both (a) and (b)
- eccentricity

No, the answer is incorrect.

Score: 0

Accepted Answers:

both (a) and (b)

3) A rotor having a mass of 5 kg, is mounted midway on a 0.01 m diameter shaft supported at the ends by two bearings. The bearing span is 0.40 m. Find the stiffness of the shaft in N/m. Take $E = 1.96 \times 10^{11} \text{ N/m}^2$ **1 point**

- 52000
- 62000
- 72000
- 82000

No, the answer is incorrect.

Score: 0

DOWNLOAD
VIDEOS

Accepted Answers:

72000

4) The critical speed of a uniform shaft with a rotor at the center of span can be reduced by 1 point

- reducing the shaft length
- reducing the rotor mass
- increasing the rotor mass
- increasing the shaft diameter

No, the answer is incorrect.

Score: 0

Accepted Answers:

increasing the rotor mass

5) Vibration neutralizer is also known as dynamic vibration _____. 1 point

- absorber
- velometer
- vibrometer
- none

No, the answer is incorrect.

Score: 0

Accepted Answers:

absorber

6) A Shaft, having the stiffness of 3500 kN/m, rotates at 4000 rpm. and a rotor, having a mass of 50 kg and an eccentricity of 1500 microns, is mounted on the shaft. The steady-state whirl amplitude of the rotor is 2 points

- 2.55 mm
- 2.50 mm
- 4.55 mm
- 5.44 mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

2.50 mm

7) **Common data for Q. 07 and Q.08** 2 points

A machine runs at 5000 rpm. Its forcing frequency is very near to its natural frequency. If the nearest frequency of the machine is to be at least 20% of the forced frequency, design a suitable vibration absorber (m_2 , k_2) for the system. Assume the mass of the machine as 30 kg.

Q.07 The value of m_2 (in kg) be_____.

- 5
- 6
- 7
- 8

No, the answer is incorrect.

Score: 0

Accepted Answers:

6

8) The value of k_2 (in kN/m) will be _____.

2 points



- 1369.37
- 1950.56
- 1117.12
- 1665.49

No, the answer is incorrect.

Score: 0

Accepted Answers:

1665.49

9) When a rotor of mass 150 kg is mounted on a shaft, a bending deflection of 0.2 mm is observed at the place where the rotor is placed, what is the critical speed. **2 points**

- 400
- 850
- 1650
- 2115

No, the answer is incorrect.

Score: 0

Accepted Answers:

2115

10) A shaft of 80 mm diameter and 1.5 m length carries a disc which has mass eccentricity is equal to 180 microns. The displacement of the shaft at a speed which is 0.8 times of critical speed is _____ micron. **2 points**

- 610
- 320
- 430
- 450

No, the answer is incorrect.

Score: 0

Accepted Answers:

320

11) A cylinder shaft supporting on two bearing at the and carries a disc with an eccentricity 'e' from the axis of rotation. The critical speed of the shaft is N. if the disk is replaced by a second one of the same weight but mounted with an eccentricity '3e' critical speed of the shaft in the second case **2 points**

- $1/2 N$
-
- $1/\sqrt{2} N$
- N
- 2N

No, the answer is incorrect.

Score: 0

Accepted Answers:

N

12) A flywheel, with a weight of 45kg and an eccentricity of 3 mm., is mounted at the center of a steel shaft (modulus of elasticity of steel $E = 200\text{GPa}$) of diameter 20 mm. If the length of the shaft between the bearings is 750 mm. and the rotational speed of the flywheel is 1200 rpm. the critical speed (in rad/sec) is **2 points**

- 54.57
- 73.215
- 53.065
- 43.045

No, the answer is incorrect.

Score: 0



Accepted Answers:

54.57

13A small motor, weighing 60 kg, is found to have a natural frequency of 150 rad/s. It is proposed that an undamped vibration absorber weighing 8 kg be used to suppress the vibrations when the motor operates at 50 rad/s. Determine the necessary stiffness of the absorber 2 points

- 40 kN/m
- 20 kN/m
- 30 kN/m
- 35 kN/m

No, the answer is incorrect.

Score: 0

Accepted Answers:

20 kN/m

14Common data for Q.14 & Q.15 2 points

A rotating machine weighing 2500 N, is supported on a pedestal mount. and it induces vibration into the surrounding area through its pedestal mount at an operating speed of 4500 rpm. What is auxiliary mass and stiffness of the vibration absorber that will reduce the vibration when mounted on the pedestal? The magnitude of the exciting force is 300 N, and the amplitude of motion of the auxiliary mass is to be limited to 3 mm.

Q14. What is the auxiliary mass of vibration absorber?

- 0.450 kg
- 0.856 kg
- 1.25 kg
- 2.5 kg

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.450 kg

15Q.15 What is the stiffness (in kN/m) of absorber vibration 2 points

- 200
- 250
- 100
- 300

No, the answer is incorrect.

Score: 0

Accepted Answers:

100

Previous Page

End

© 2014 NPTEL - Privacy & Terms - Honor Code - FAQs -

A project of



In association with



Funded by



Powered by

