VIB : Continuous systems

Number of participants: 27

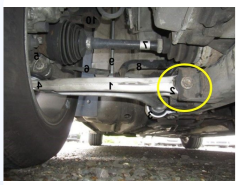
1. A continuous system has

20 correct answers
out of 21 respondents

	as many eigenfrequencies as there are joints in the structure	0%	0 votes
✓	an infinite number of eigenfrequencies	95%	20 votes
	it depends on the frequency band of the excitation signal	5%	1 vote

2. Can you match the boundary condition type for these real world structures

21 respondents



Lower control arm of a car

7 correct answers

1 — B

Hinged

Bridge support

8 correct answers

2 — C

Rolling

Wind turbine

15 correct answers

3 — A

Clamped

3. If the length of a bar is divided by 4, its natural frequency corresponding to traction-compression modes is

10 correct answers
out of 19 respondents

	divided by 2	0%	0 votes
	multiplied by 2	16%	3 votes
✓	multiplied by 4	53%	10 votes
	divided by 4	32%	6 votes

4. If the length of a beam is divided by 2, its first natural frequency corresponding to a bending mode shape is

14 correct answers
out of 21 respondents

	divided by 2	0%	0 votes
	multiplied by 2	29%	6 votes
✓	multiplied by 4	67%	14 votes
	divided by 4	5%	1 vote

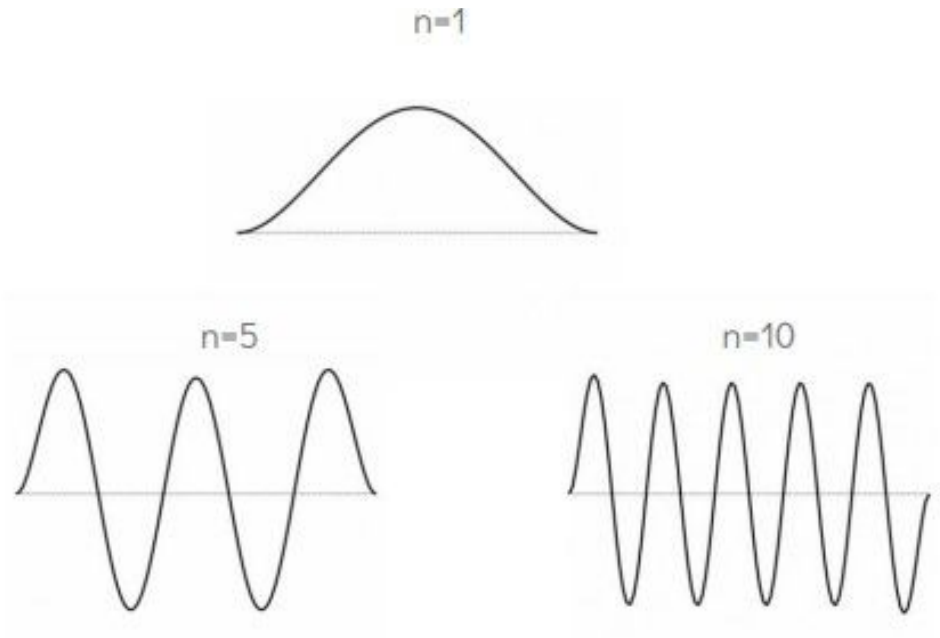
5. If the stiffness of a beam is multiplied by 4, its natural frequencies are

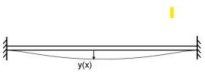
11 correct answers
out of 20 respondents

	multiplied by 4	5%	1 vote
✓	multiplied by 2	55%	11 votes
	divided by 2	25%	5 votes
	multiplied by 16	15%	3 votes

6. From which kind of continuous system are these the modeshapes?

9 correct answers
out of 21 respondents



	A simply supported beam	38%	8 votes
	A cantilevered beam	19%	4 votes
	A double cantilevered beam	43%	9 votes

7. Modal truncation consists in

10 correct answers
out of 18 respondents

✓	computing the response of a system using only the modes which are excited by the external forces	56%	10 votes
	computing the response of a system using only the first 5 modes	17%	3 votes
	using a truncation of the Fourier series of the excitation signal	28%	5 votes

8. When we truncate, what error do we introduce?

13 correct answers
out of 20 respondents

	We change the number of resonance frequencies in the frequency band of interest	35%	7 votes
	We change the frequencies of the first 5 modes	0%	0 votes
✓	We ignore the influence of out-of-band modes in the frequency band of interest	65%	13 votes

9. When performing modal truncation, the usual practice consists in

9 correct answers
out of 21 respondents

	taking strictly the number of modes present in the frequency band of interest	10%	2 votes
✓	taking the number of modes in the band [0 1.5*wmax] where wmax is the max frequency of the band of interest	43%	9 votes
	taking the number of modes in the band [0 wmax/1.5] where wmax is the max frequency of the band of interest	48%	10 votes

10. Consider a bar for which the ten first natural frequencies are at 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 Hz. You wish to compute the response using the truncation in the modal basis, from 0 to 5 Hz. How many modes should you use ?

20 correct answers
out of 21 respondents

	5 modes	0%	0 votes
	10 modes	5%	1 vote
✓	8 modes	95%	20 votes