

Unit 9 - Response to Sinusoidal oscillations

Course outline

How does an NPTEL online course work?

Introduction to viscoelasticity

Viscoelasticity and Introduction to polymers

Viscoelasticity and Introduction to polymers

Constitutive Equations

Viscoelastic models

Viscoelastic models

Viscoelastic models (cont.) & Constitutive modelling

Response to Sinusoidal oscillations

- Objectivity
- Sinusoidal oscillations
- Sinusoidal oscillations (Cont.)
- Sinusoidal oscillations (Cont.)
- Summary
- Tutorial
- Tutorial Cont.
- Quiz : Week 8 Assessment

Weekly Feedback forms

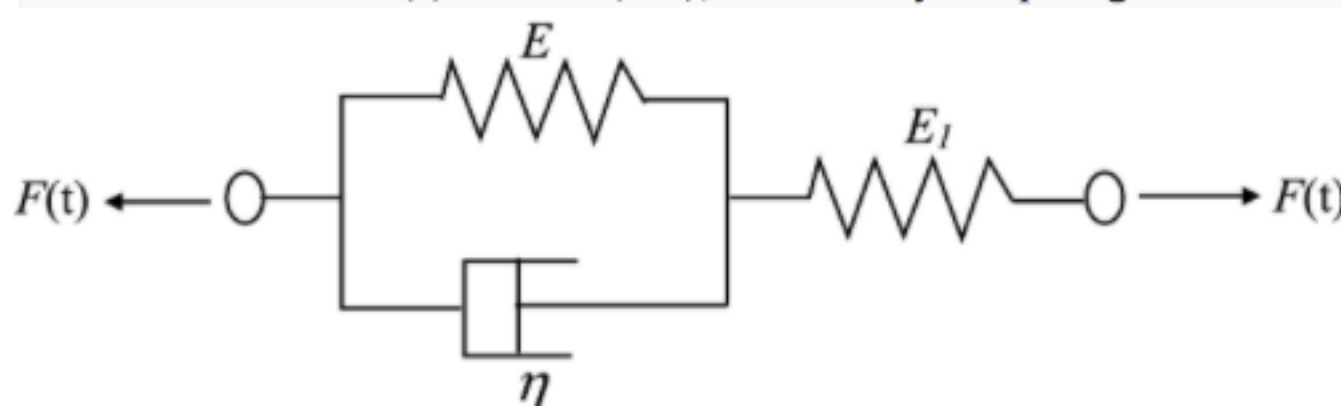
Text Transcripts

Week 8 Assessment

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-04-22, 23:59 IST.

1) Consider a Kelvin-Meyer-Voigt model with $E = 200 Pa$ and $\eta = 5 Pa \cdot s$, connected to a spring in series with $E_1 = 300 Pa$ as shown in figure below which has stress relaxation function in the form $G(t) = G_\infty + (G_0 - G_\infty)e^{-(t/\lambda)}$ is subjected to sinusoidal oscillations of where $\epsilon(s) = 15 \sin(10s)$, s is time. By comparing stress relaxation function with $G(t) = G_\infty + \Delta G(t)$ answer **questions 1 to 8.**



What is the value of G_∞ in Pa?

- 100
- 110
- 120
- 80

No, the answer is incorrect. Score: 0

Accepted Answers: 120

2) What is the value of G_0 in Pa?

- 300
- 350
- 100
- 120

No, the answer is incorrect. Score: 0

Accepted Answers: 300

3) What is the value of storage modulus in Pa?

- 120
- 125
- 121.78
- 119.63

No, the answer is incorrect. Score: 0

Accepted Answers: 121.78

4) What is the value of loss modulus in Pa?

- 5.62
- 20
- 10.54
- 17.82

No, the answer is incorrect. Score: 0

Accepted Answers: 17.82

5) What is the magnitude of complex modulus in Pa?

- 120.1
- 113.1
- 123.1
- 130.4

No, the answer is incorrect. Score: 0

Accepted Answers: 123.1

6) What is the magnitude of complex viscosity in Pa. s?

- 10
- 15.4
- 11.5
- 12.3

No, the answer is incorrect. Score: 0

Accepted Answers: 12.3

7) What is the value of dynamic viscosity in Pa. s?

- 1
- 1.12
- 1.4
- 1.78

No, the answer is incorrect. Score: 0

Accepted Answers: 1.78

8) What is the value of phase difference in radians?

- 0.145
- 0.225
- 0.384
- 0.236

No, the answer is incorrect. Score: 0

Accepted Answers: 0.145

9) A tensor $\underline{\underline{\sigma}}$ is said to be frame invariant if it satisfies $\underline{\underline{\sigma}}^* = \underline{\underline{Q}}\underline{\underline{\sigma}}\underline{\underline{Q}}^T$. What is the value of determinant of tensor $\underline{\underline{Q}}$ for the above equation to be satisfied?

- 0
- 1
- ∞
- 2

No, the answer is incorrect. Score: 0

Accepted Answers: 1

10) Identify whether the below statement is true or false:

The rate of Cauchy stress tensor is frame invariant.

- True
- False

No, the answer is incorrect. Score: 0

Accepted Answers: False