

***** EXAMINATION *****

**QUANTIFYING ANISTROPIC ELASTIC MATERIAL PROPERTIES
OF BIOLOGICAL TISSUE USING MEMBRANE INFLATION**

1. **The mechanical properties of many types of soft tissue are**
 - a) important to the physiological function of the tissue
 - b) important to the psychological function of the tissue
 - c) important to the biological function of the tissue
 - d) important to the pathological function of the tissue

2. **Membrane inflation analysis is quantification of**
 - a) material properties, presumed to be uneven
 - b) material properties, presumed to be ignored
 - c) material properties, presumed to be homogeneous
 - d) material properties, presumed to be dependent

3. **Material parameter regression was automated using**
 - a) same finite element analysis
 - b) inverse finite element analysis
 - c) same infinite element analysis
 - d) inverse infinite element analysis

4. **A type of soft tissue includes**
 - a) cardiovascular tissue
 - b) tendon or ligament
 - c) skin
 - d) All of the above

5. **Pathology of the tissues is mostly accompanied by alteration**
 - a) of the chemical properties due to structural changes
 - b) of the mechanical properties due to structural changes
 - c) of the electrical properties due to structural position
 - d) of the mechanical properties due to structural position

6. **A single test is sufficient for interrogating anisotropic**
 - a) nonlinear properties because of the multiaxial loading state
 - b) nonlinear properties because of the biaxial loading state
 - c) nonlinear properties because of the uniaxial loading state
 - d) nonlinear properties because of the triaxial loading state

7. **Interrogation of the nonlinear and anisotropic properties of**
 - a) a tissue is possible through different modes of defoliation
 - b) a tissue is possible through different modes of deformation
 - c) a tissue is possible through different modes of devaluation
 - d) a tissue is possible through different modes of derivation
8. **The modes used in interrogating the nonlinear and anisotropic**
 - a) properties of cardiovascular tissue include uniaxial/biaxial
 - b) properties of cardiovascular tissue include suction/aspiration
 - c) properties of cardiovascular tissue include inflation
 - d) All of the above
9. **Simulation of the membrane inflation test is based on an**
 - a) accurate representation of the chemical behavior
 - b) accurate representation of the electrical behavior
 - c) accurate representation of the material behavior
 - d) accurate representation of the experimental behavior
10. **Due to typical geometries of the tissues of interest**
 - a) uniaxial extension were assumed
 - b) membrane conditions were assumed
 - c) thick layer conditions were assumed
 - d) outer layer conditions were assumed
11. **Prior to inflation, a small perturbation is applied to the**
 - a) central node of the model to initiate deflation
 - b) central node of the model to initiate defoliation
 - c) central node of the model to initiate deformation
 - d) central node of the model to initiate derivation
12. **Profile strain is extracted from the simulations based on the**
 - a) elemental deformations
 - b) mechanical deformations
 - c) chemical deformations
 - d) experimental deformations
13. **Vasculature has an orthotropic material symmetry where material**
 - a) axes is aligned with the radial material way
 - b) axes is aligned with the circumferential material way
 - c) axes is aligned with the longitudinal material way
 - d) All of the above
14. **The tissue that acts as nonlinear anisotropic material in**
 - a) the continuum sense is myocardium tissue
 - b) the continuum sense is ligament tissue
 - c) the continuum sense is mesodermal tissue
 - d) the continuum sense is skin tissue

15. **The technique that more fully explores the parameter space**
- a) is the inflation technique
 - b) is the gradient based technique
 - c) is the global technique
 - d) is the uniaxial technique
16. **Python scripting language is used**
- a) to govern the inverse procedure
 - b) in driving the finite element analysis
 - c) in extracting relevant results from the FE output database
 - d) All of the above
17. **Membrane is a useful methodology for measuring constitutive**
- a) information for anisotropic ground tissue
 - b) information for anisotropic soft tissue
 - c) information for isotropic ground tissue
 - d) information for isotropic soft tissue
18. **The technique that is restricted to optimizing within a localized**
- a) region of the parameter space is an inflation technique
 - b) region of the parameter space is a gradient-based technique
 - c) region of the parameter space is a global technique
 - d) region of the parameter space is an uniaxial technique
19. **A deformation mode with single refraction in one direction**
- a) biaxial extension
 - b) compression
 - c) suction
 - d) uniaxial extension
20. **Global exploration is computationally expensive for data**
- a) from experimental test that require FE analysis
 - b) from experimental test that require mathematical analysis
 - c) from experimental test that require computational model
 - d) from experimental test that require automated techniques

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