



KERALA AGRICULTURAL UNIVERSITY

B.Tech.(Food Engg) 2017 Admission

II Semester Final Examination-July 2018

Fden.1201 Engineering Properties of Biological Materials (2+1)

Marks: 50

Time: 2 hours

I **Fill up the blanks** (10x1=10)

- 1 Shape measurement compares the tracing with the shapes listed on a standard.
- 2 Porosity measurement apparatus works on the principles oflaw.
- 3 Volume of granular materials is determined by method.
- 4 Hertz proposed a solution for in two isotropic bodies.
- 5 The instrument which measures the firmness of fruits and vegetables is

State True or False

- 6 Static friction is the friction forces acting between the surfaces in relative motion.
- 7 For the spring, stress strain relationship is time dependent.

Choose the Correct Answer.

- 8 Tick the unit of thermal diffusivity
a. m^2/h b. m^2/sec c. m^2/kg d. none
- 9 Ideal elastic behavior is represented by
a. St.venant body b. Newtonian liquid c. Hookean body d. none
- 10 Ohmic heating is an example of
a. Thermal heating b. Electric heating c. radiation heating d. all above

II **Write Short notes on any FIVE of the following** (5x2=10)

- 1 What is the importance of frictional properties in design and operation of agricultural equipments?
- 2 Differentiate roundness and roundness ratio.
- 3 Thermal conductivity of biological materials.
- 4 Draw a general force–deformation curve of biological material.
- 5 What is the steady state heat flow?
- 6 List out the fundamental assumptions made by Hertz in developing theory of contact stresses.
- 7 What is the dielectric loss factor and loss tangent?

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III Answer any FIVE of the following.

(5x4=20)

- 1 Describe the methods for determination of shape of biological materials.
- 2 Explain methods for defining the different modulus in non linear stress strain diagram.
- 3 Write the procedure to determine the specific heat of granular materials.
- 4 What is mechanical damage? Explain factors and causes of mechanical damages.
- 5 Explain the method for measurement of viscosity of liquid food material.
- 6 Explain the procedure to determine coefficient of friction and angle of external friction of granular materials.
- 7 Explain electrical conductivity with its application in agricultural processing.

IV Write an essay on any ONE of the following

(1x10=10)

- 1 Derive an equation of generalized Maxwell model for biological material.
- 2 Discuss the effect of load, sliding velocity, temperature, water film and surface roughness on friction in agricultural materials.
