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 of ....law.

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?   **P.T.O**

| 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.

****