KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Agrl. Engg.) 2020 Admission
I Semester Final Examination-November 2021

Fape. 1101 **Engineering Properties of Agricultural Produce (1+1)** **Marks: 50**
Time: 2 hours

I **Fill in the blanks:** **(10x1=10)**

1. Terminal velocity of wheat varies from _____ to _____ m/s.
2. Viscosity of gas _____ with increase in temperature.
3. Thermal conductivity _____ with the increase of moisture content.
4. Unit of thermal diffusivity is _____.
5. Define specific heat.

Choose the Correct Answer

6. Which of the following pigment is present in carrot?
   a. cartenoids b. flavonoids c. anthocyanin d. polyphenols
7. Angle of repose of paddy grain is (degree)
   a. 20-25 b. 23-28 c. 30-45 d. 35-40
8. A cyclone separator works on the principle of _____ force.
   a. Centrifugal force b. reciprocating force c. Rolling force d. Frictional force
9. The higher values of angle of internal friction indicates that the material is
   a. normal flow b. free flowing c. cohesive d. No indication of flow
10. Heat of vapourization of moist grain _____ with temperature at constant moisture content.
    a. increases b. decreases c. remains constant d. None of these

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

1. Angle of repose and angle of internal friction.
2. Maxwell and Kelvin rheological models.
3. Degree of Elasticity
4. Dielectric properties of foods.
5. Derive relationship between bulk density, true density and porosity.
6. Pseudoplastic and Dilatant fluid.
7. Frictional properties of food.

III **Answer any FIVE of the following.** **(5x4=20)**

1. Write briefly about any two ideal materials representing rheological behavior of food materials.
2. Draw and explain a possible force deformation curve for an agricultural product.
3. The volume of a pea was measured to be 2700 mm^3 by liquid displacement method. Find out equivalent diameter and sphericity of grain if radius of minimum circumscribing circle is 9 mm. determine roundness if projected area was measured to be 180 mm^2.
4. Write any two methods for measurement of thermal conductivity.
5. Derive expression for drag coefficient and terminal velocity.
6. Calculate the amount of ice required to cool 100 kg of tomato from 40°C to 15°C if only latent heat of fusion is available for cooling. The specific heat of mango is 3.6 kJ/kg.K. The latent heat of fusion is 335 kJ/kg.
7. The weight of apple is 115 gm before waxing. After waxing the weight of apple becomes 122 gm. Determine the surface area of apple. The thickness of wax coating is 1.2 mm over the apple & density of wax is 912 kg/m^3. Mention the effect of moisture content on angle of repose.

IV **Write an essay on any ONE of the following** **(1x10=10)**

1. Describe about applications of different engineering properties of food in designing of any equipment/ structure giving examples.
2. Describe about different physical and mechanical properties of food.

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