Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18AT2002** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ENGINEERING PROPERTIES OF BIOLOGICAL MATERIALS AND FOOD QUALITY** | **Max. Marks :** | **100** |

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| **Q. No.** | **Questions** | **Course Outcome** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | |
| 1. | Choose the reliable slope angle for funnel flow  (a) 30o to 40o (b) 40o to 50o (c) 50o to 60o (d) 60o to 70o | CO1 | 1 |
| 2. | What is stress relaxation? | CO1 | 1 |
| 3. | Summarize the advantages of dielectric heating. | CO1 | 1 |
| 4. | Define rheology. | CO2 | 1 |
| 5. | Name the chemical used for determination of specific gravity of granular agricultural material. | CO1 | 1 |
| 6. | Relate shear stress and shear rate. | CO2 | 1 |
| 7. | What is the SI unit of viscosity? | CO3 | 1 |
| 8. | Define shear thinning. | CO2 | 1 |
| 9. | Give an example for thixotropic rheological behavior. | CO2 | 1 |
| 10. | What is the formula to find the true density? | CO1 | 1 |
| 11. | Name a fruit with a shape of i) oblate ii) oblong. | CO2 | 1 |
| 12. | Infer why toluene is used in pycnometer. | CO2 | 1 |
| 13. | Outline the use of planimeter. | CO3 | 1 |
| 14. | Define angle of repose. | CO3 | 1 |
| 15. | Define specific heat. | CO2 | 1 |
| 16. | What is the use of differential scanning calorimeter? | CO3 | 1 |
| 17. | What is kinetic friction? | CO3 | 1 |
| 18. | What is the SI unit of thermal conductivity? | CO2 | 1 |
| 19. | When the value of angle of internal friction is low it indicates that the material is \_\_\_\_\_\_\_\_\_\_.  (a) Cohesive (b) Easily flowing (c) No indication of flow | CO3 | 1 |
| 20. | Name the instrument which measures true volume of food materials. | CO3 | 1 |

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| **PART – B (10 X 5 = 50 MARKS)**  **(Answer any 10 from the following)** | | | |
| 21. | Discuss on electrical equivalence of mechanical model. | CO1 | 5 |
| 22. | Explain the influence of water film on the coefficient of friction. | CO1 | 5 |
| 23. | Discuss on study of flow of solid particles. | CO2 | 5 |
| 24. | Compile the classification of rheology. | CO1 | 5 |
| 25. | Explain the rolling resistance. | CO2 | 5 |
| 26. | Explain the behavior of Bingham plastic foods. | CO3 | 5 |
| 27. | Compare deep bin and shallow bin. | CO3 | 5 |
| 28. | Explain the pycnometer method to determine the volume and density of agricultural products. | CO3 | 5 |
| 29. | Explain the importance of physical characteristics of food materials in the design of a specific machine. | CO3 | 5 |
| 30. | Describe the apparatus used for measurement angle of repose. | CO2 | 5 |
| 31. | Discuss the effect of temperature on the electrical conductivity of liquid foods. | CO3 | 5 |
| 32. | Discuss on the Non-Newtonian fluids. | CO3 | 5 |

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| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | |
| 33. | a. | Discuss on the types of flow curves. | CO2 | 10 |
| b. | Explain the Kelvin model. | CO1 | 5 |
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| 34. | a. | Elaborate the electrolytic conductivity of liquid foods. | CO2 | 7 |
| b. | Estimate the volume and specific gravity of an apple using platform scale method with the following data.  i) Weight of apple in air = 0.150 kg.  ii) Weight of container + water = 1.020 kg.  iii) Weight of container + water + apple submerged = 1.200 kg.  Assume specific gravity of 1 and weight density of 1000 kg/m3 for water. | CO3 | 8 |
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| 35. | a. | Explain the importance of Engineering properties of food materials in the design of a specific machine. | CO3 | 7 |
| b. | Discuss on the apparatus used for the measurement of static and kinetic coefficient of friction. | CO1 | 8 |