LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

DEGREE EXAMINATION – **FOOD CHEMISTRY AND FOOD PROCESSING**

THIRD SEMESTER – **NOVEMBER 2014**

P 3808 – **INORGANIC, PHYSICAL & CHEMICAL COMPONENTS OF FOOD**

Date : 01/11/2014
Time : 09.00 – 12.00

Dept. No.

Max. : 100 Marks

Part A

**Answer all the questions.**

(10 x 2 = 20)marks

1. List the parameters involved in studying the physical properties of water.
2. Define and differentiate water binding and water holding capacities.
3. Define fugacity. How is that related to temperature and relative vapour pressure?
4. Differentiate adsorption and absorption with suitable examples.
5. What is BET monolayer? How that is considered as unique in foods?
6. Define Lewis acid base theory.
7. Write the equation stating Gibbs free energy. List the significances of ΔH, ΔS, ΔG.
8. A given pasta at 50.14 K has a vapor pressure of 258.9 torr. Calculate its heat of vaporization in kJ/mol if it has a vapor pressure of 161.2 torr at 277.5 K.
9. How Kirchhoff's equation is related to understand chemical equilibria?
10. $MWw = \frac{\sum niMi^2}{niMi}$, Expand the notatations.

Part B

Answer any eight questions.

(8 x 5 = 40)marks

11. Comment the concept *"free volume is mechanically related to molecular mobility in foods"*.
12. Explain the surface tension gradients for the following representations.
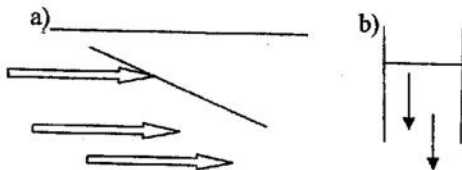
13. Describe the types of dispersion effects observed in food systems.
14. What is the vapor pressure of a substance at 308.1 K if it has a vapor pressure of 73.15 torr at 286.6 K? Given that heat of vaporization is 25.44 kJ/mol.
15. Explain the functional properties of minerals in food.

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16. Describe the Arrhenius approach to study the shelf life plots of food systems.

17. Interpret the importance of moisture assay in food samples. Enumerate the various types of drying technologies.

18. Explain the relationship of the equation $D = kT/\pi\beta\eta rs$. How can it be applied to study molecular mobility in food stability?

19. i) An adiabatic process often is observed when a hot tea is placed in an insulated flask. Explain the reason.

   ii) When the same flask is then kept open to the atmospheric temperature what type of changes will be observed with the system and the surrounding?

20. Explain the significance of thermodynamics in food engineering.

21. Derive the state equation for ideal gases.

22. Explain the possible coupled reactions and its significances in biological systems. Which law of thermodynamics can be applied to explain such reactions in the system?

Part C

Answer any four questions.   (4 x 10 = 40) marks

23. Explain the technological aspects of ice with a phase diagram.

24. Explain the following
   a) Interfacial tension and
   b) Adsorption

25. Explain any two methods of determining ash content in food.

26. Explain the kinetics of frozen pizza with reference to ASLT scheme.

27. What are surfactants? Explain the role of surfactants in studying surface phenomena.

28. Explain
   i)   Critical micelle concentration
   ii)   Laplace pressure (curved interfaces)