EX/PG/FTBE/T/111A/17/2017

M. TECH (F.T.B.E) 1 ST. SEMESTER EXAMINATION,2017

ADVANCED FOOD TECHNOLOGY

Time: Three hours Full Marks: 100

(Use separate Answer Script for each part)

Part-I (50 Marks)

Answer Question No. 1 and any Two from the rest.

1. Answer any Ten Questions: 1*10 = 10

(A) Which is the *false* statement?

(a.) Food science is the mass production of food products from raw animal and plant materials utilizing the principals of engineering

(b.) The IFT definition for food science implies that it is a discipline based upon biology, physical sciences, and engineering

(c.)Nutrition involves the study of what happens to foods after consumption to promote and maintain health

(d.)Food science and technology is concerned with aspects of agricultural, avian, mamalian, and marine food materials

(e.)Food science involves the study of quality aspects of foods prior to consumption

(B.) The manufacture of a HFCS (high fructose corn syrup)- sweetened soft drink involves the _____ processing industry.

(a.) Beverage , (b.) Fats and oil , (c.) Corn , (d.) Both (a) and (b) , (e.) Both (a) and (c)

(C .) This food scientist/technologist work area involves sampling raw products to ensure comformity to purchasing specifications

(a.) Product development (b .) Experimentation (c.) Quality control
(d.) Marketing (e.)Sensory research

(D) Which sequence most accurately represents the scientific method approach?

(a.) publish◊ experiment◊ hypothesis◊Problem

(b.) conclusion◊ experiment◊ hypothesis◊Problem

(c.) hypothesis◊ interpret◊ plan◊Experiment

(d.) report◊ experiment◊ hypothesis◊Plan

(e.) publish◊ experiment◊ hypothesis◊Plan

(E .)Which statement is *true*?

(a.) The physical state of water depends on the motion of oxygen molecules

(b.)Water molecules in steam are more closely aligned than in ice

(c.) The physical state of water depends on the motion of H2O molecules

(d) Water molecules in liquid water are more closely aligned than in ice

(e.)The physical state of water depends on the motion of hydrogen molecules

(F.) Cheese is --------

(a.) formed from milk proteins that bond to each other when pH is lowered to pH 4.6

(b.)Is made when milk proteins reach their isoelectric pH of pH 10

(c.) Is a poor source of calcium and phosphorus compared to sour cream

(d.) Is formed from acidified milk because the proteins repel each other at pH 4.6

(e.) Is formed by the coagulation of albumen protein

(G.) The food industry has been experimenting with developing fat replacers over the years. The reasons for this include all of the following, except:

(a.) To decrease fat calories in foods

(b.) To provide consumers products that may help them achieve their body weight goals

(c.) To provide opportunities for new products and increase their sales

(d.) To eliminate fat from the diet

(e.) Through better understanding of ingredient functional properties, this approach has become possible

(H.) Which is NOT an alternative sweetener?

(a.)Sugar alcohol (b.)Maltodextrin (c.)Acesulfame - K

(d.)Sucralose (e.) Aspartame

(I) Which choice correctly matches food proteins with the correct food source?

(a .) Actin/red meat; avidin/egg white; casein/milk; collagen/red meat; lactoferrin/milk; lipoxygenase/soybean

(b.) Avidin/red meat; lipoxygenase/egg white; whey/milk; collagen/red meat; lactoferrin/milk; casein/soybean

(c.) Myosin/red meat; whey/egg white; casein/milk; collagen/red meat; avidin/milk; lipoxygenase/soybean

(J) How s margarine different from butter?

(a.) Margarine potentially has a higher unsaturated fat content

(b.) A collagen molecule is composed of 3 amino acids in total

(c.)It is an important myofibrillar protein

(d.) Its physical structure and ability to form cross links contribute to toughness

(e.)Oil is the dispersed phase in butter

(K) Which statement regarding free radicals is true?

(a.) Free radicals injure cells, damaging the DNA, which creates the basis for disease

(b.) Normal cell functions can produce a small percentage of free radicals

(c.)Free radicals cannot affect fat molecules in foods

(d.) Both (a) and (b) (e.) Choices (a) (b) and (c)

(L) Carbon-to-carbon bonds in food molecules (carbohydrates, proteins, fats) are

(a.) Covalent bonds (b.) Intermolecular bonds (c.) Ionic bonds

(d.) Hydrogen bonds (e.) Neutron transfer bonds

2. (a) Discuss the basic properties of Anthocyanin as a natural pigment. How can it be used in food processing ?

(b) With the help of at least two examples, explain what do you mean by edible coatings ? , (14 + 6)

3.Discuss the methods of anti-browning treatments to control the quality of fresh cut fruits and vegetable. (20)

4. What are characteristics features of the process of ripening of whole fruit ? What is called artificial ripening ? Discuss the effect of ripening on the texture of whole fruit ? (6+4 +10)

5. Give two examples of fruit leathers. Why it is called leather ? Discuss the effect of packaging and storage on fruit leather. (3+3+14)

6. Discuss how can you use the natural ingredients to enhance the antioxidant capacity of processed foods ? Is it a preservation process -explain ? (15+5)

7. Write Short Notes on (Any Two) : (10+10)

(a) Antimicrobial edible coatings.

(b)) Microwave drying of fruit leathers.

(c) Correlation between antioxidant capacity and colour stability.

(d) Comparison between chemical and natural preservatives.

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ADVANCED FOOD TECHNOLOGY **TIME: 3 H** **FULL MARKS = 100**

PART- II (50 MARKS)

USE SEPARATE ANSWER SCRIPT FOR EACH PART

Answer **Q5** and **any Two** from the rest

Q5. a. Diagrammatically explain the working principle of a scanning electron microscope. Which signals generated due to interaction between high energy electrons and specimens are utilized in designing the same? 5+3

b. Enlist the phytochemicals in asparagus that confer it antioxidant properties. What processing would you recommend to retain these in asparagus? 3+2

c. Name two protein superfamilies of food allergens commonly present in foods with two examples of allergens in each category. What are the effects of thermal processing methods on these food allergens? Which regulatory body controls the levels of food allergens? 4+2+1

Q6. a. Comparatively evaluate 'Dry bag, indirect compression HPP process with 'Wet bag, direct compression HPP process'. How is HPP used in food freezing? 5+2

b. What properties of emulsifiers do you need to know to formulate emulsions? How would you achieve a stable emulsion using multiple emulsifiers? 3+2

c. Enumerate the uses of fluorescent dyes in food structure analyses. 3

Q7. a. What is a fractal? Explain the methodology for estimating fractal dimension of cauliflower. Discuss two promising areas of application of fractal analysis in food engineering. 1+4+2

b. What is an electron gun? What are TEM grids? Why thin sectioning is required for TEM analyses of food samples? 1+1+1

c. Name two commonly used emulsifiers in the food industry and their functions as dough conditioners. Why are non-ionic emulsifiers preferred over ionic ones in the food industry? 4+1

Q8. a. Comparatively evaluate TEM and SEM analyses of a protein-rich food of your choice. 5

b. Discuss the technique you would adopt to study distribution of fat in a food sample? 4

c. Describe the effects of HPP on milk and eggs. 6