Ref. No.: Ex/FTBE/PC/B/T/411/2024

B.E. FOOD TECHNOLOGY AND BIO-CHEMICAL ENGINEERING FOURTH YEAR FIRST SEMESTER EXAM 2024

Subject: QUALITY CONTROL & FOOD SAFETY

Time: 3 hours (50 Marks for each Part) FM: 100

Use separate answer script for each Part

PART- I (50 MARKS)

ANSWER Q1 AND ANY TWO FROM THE REST

Q1. Fill in the blanks: **10 × 1 = 10**

1. In a paired comparison test between a sample of *glucosinolate-rich yellow mustard paste* (your test sample) vs. a competitive sample (Ireland's black mustard paste), out of 20 tests, the number of correct results expected at 0.1% level of error is.....
2. The content of *Anatoxin-a blue-green algal toxin* in our JU main campus pond water has to be analyzed by HPLC. The pond water has been collected in a 10 L capped plastic jar and brought to our Biochemical Engineering Laboratory for analysis. The DU is.....
3. For quantitative determination of MPL of *malachite-green* dye present in pickled-cucumber, the relationship between MPL and TMRL would be.....
4. The most reliable and rapid method you would employ to detect contamination in your breakfast egg would be.....
5. Use of fractal analysis in coffee manufacture would be .....
6. The fractal dimension for a bigger size cauliflower would be .....than that of a smaller one.
7. In a soft drink manufacturing line, sweetness index is varying among the different cans, the sensory evaluation method to be applied for detection of sweetness varying from its standardized level would be.....
8. Arrange the following for an aroma recognition test (by taste only) in the correct order. *Water melon, mango, litchi, lemon*
9. In absence of data for NOAEL assessment.....serves as a substitute.
10. If you need to assess whether sodium benzoate can be administered at 200 ppm in apple jelly, the highest dose of the same for a rat-model trial would approximately be.....

Q2. Describe the following (any two): **2 × 10 = 20**

a. Quantitative determination of MPL of a synthetic flavoring in a RTS beverage, considering TMRL
b. Thermal and non-thermal processing methods in combating allergen protein superfamilies' in peanuts
c. The methodology for estimating fractal dimension of a cauliflower.

Q3. Using flows sheets, diagrams and graphs, enumerate the following (any two):

$2 \times 10 = 20$

a. Procedures to quantify RDA and UL (show graphs) of acrylamide in bread.

b. An extended triangle test for assessment of *vanillin-flavored ice cream* manufactured in your company (consider competitor sample having synthetic vanillin). Out of 20 tests, how many correct results are expected in a paired comparison test at 1% level of error?

c. Sampling method needed in detail to perform analysis for the flavor-impact compound of *Basmati rice*, one sack (25 kg) of which has arrived in your factory, clearly stating the complete measurement process, uncertainties involved in each analysis step, the DU and the analytical sample.

Q4. Analyze the following:

a. The content of delphinidin-3-rutinoside pigment has to be analyzed by HPLC in a spray dried sample of egg-plant peels. One kg of the sample has arrived in the laboratory in a flexible laminate pouch.

1. What would be the DU? **1**
2. Identify the most important parameter that would contribute to analytical uncertainty. **1**
3. How can '2' be redressed? **1**
4. Would you prefer DNA extraction of the sample? Justify. **1 + 2**
5. If you are the manufacturer of the said sample, design the 'Quality Control' chart you would adopt in QC/QA department of your company for supply of the natural peel color to food industries having not more than 0.1 SD in percent content of the said pigment. **4**

b. Define flavor harmony and flavor dilution. **2**
Explain the importance of sequence of perception of flavor components in adjudging flavor profile of the following food products by sensory evaluation. **4 × 2 = 8**

1. Cola beverage
2. Caramel custard
3. Cold coffee

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Part: II (50 Marks)

Answer question no 4 and any two from the following.

1. What are the importance of different prerequisite programme for implementation and maintenance of HACCP plan? Give some example of common prerequisite programme should be included before HACCP plan implementation. Give some example of record should be maintained during HACCP implementation. 5+10+5=20

2. The Indian standard for drinking water IS 10500:2012 belongs to which technical department and committee under BIS? What are the most basic organoleptic and physical parameters that are assigned as per BIS specifications (IS 10500-2012) for drinking water standards?What do you mean by GMP? Discuss 5P of GMP system? (3+7+3+7=20)

3. What are the different logic sequence for application of HACCP?.How the different Stages of Hazard Analysis are used to Identify and Evaluate Hazards (explain with the example of Frozen cooked beef patties produced in a manufacturing plant)?10+10=20

4. Give some Examples of Questions to be Considered When Conducting a Hazard Analysis for food industry? 10