Odisha OSSC FSO Technical Sample Paper (Paper–II)

Q1. Match the following terms used in HACCP in Column I with their meaning in Column II.

Column I	Column II
1. Decision Tree	D. A sequence of questions to assist in determining whether a control point is a CCP.
2. Corrective Action	C. Procedures followed when a deviation occurs.
3. Deviation	B. Failure to meet a critical limit.
4. Control Measure	A. Any action or activity that can be used to prevent, eliminate or reduce a significant hazard.

(a) 1-A, 2-B, 3-C, 4-D
(b) 1-B, 2-A, 3-D, 4-C
(c) 1-D, 2-C, 3-B, 4-A
(d) 1-C, 2-D, 3-A, 4-B

Ans.(c)

Sol. Decision Tree → A logical sequence of questions that helps in determining whether a step is a Critical Control Point (CCP) or not. Hence, 1 → D.
Corrective Action → The procedures or steps taken when a deviation occurs from a critical limit, to bring the process back under control. Hence, 2 → C.
Deviation → A failure to meet a critical limit set in the HACCP plan. This indicates loss of control and possible food safety risk. Hence, 3 → B.
Control Measure → Any action or activity used to prevent, eliminate, or reduce a food safety hazard to an acceptable level. Hence, 4 → A.
Correct matching: 1 – D (Decision Tree: CCP determination) 2 – C (Corrective Action: Procedures taken) 3 – B (Deviation: Failure to meet critical limit) 4 – A (Control Measure: Prevent/reduce hazard)
Thus, the correct answer is Option (c).

Q2. Match the group of spoilage organisms in Column I with the lowest a_w (water activity) values permitting their growth from Column II:

Column I	Column II
1. Osmophilic yeast	A. 0.80
2. Many bacteria	B. 0.91
3. Many molds	C. 0.75
4. Halophilic bacteria	D. 0.60

Options:
(a) 1-D, 2-C, 3-B, 4-A
(b) 1-D, 2-B, 3-A, 4-C
(c) 1-B, 2-D, 3-C, 4-A
(d) 1-C, 2-B, 3-A, 4-D

Ans.(b)

Sol. Water activity (a_w) is a critical factor influencing microbial growth in food products. Microorganisms have minimum a_w thresholds below which they cannot grow.
Let's match each organism group with its minimum a_w requirement:

1. Osmophilic yeasts:
These thrive in high sugar, low moisture environments.
Can grow at very low a_w values, as low as 0.60.
Match: D (0.60)
2. Many bacteria:
Require higher water activity to grow.
Most common spoilage bacteria need a_w of at least 0.91.
Match: B (0.91)
3. Many molds:
More tolerant to low moisture than bacteria.
Can grow at a_w as low as 0.80 or even lower for xerophilic molds, but many common molds start at 0.80.
Match: A (0.80)
4. Halophilic bacteria:
These salt-loving microbes can grow in low water activity due to high salt concentrations.
Many can grow at a_w of around 0.75.
Match: C (0.75)
Therefore, the correct matching is: 1-D, 2-B, 3-A, 4-C
Thus, the correct answer is Option (b).

Q3. Match the causative agents of diseases in Column I with the year in which they were discovered in Column II.

Column I	Column II
1. Tubercle bacillus	A. 1884
2. Cholera vibrio	B. 1880
3. Typhoid bacillus	C. 1883
4. Diphtheria bacillus	D. 1882

Options:
(a) 1-A, 2-B, 3-C, 4-D
(b) 1-B, 2-A, 3-D, 4-C
(c) 1-D, 2-C, 3-B, 4-A
(d) 1-C, 2-B, 3-A, 4-D
Ans.(c)
Sol. Tubercle bacillus → D (1882): Robert Koch discovered *Mycobacterium tuberculosis* in 1882, identifying the cause of tuberculosis.
Cholera vibrio → C (1883): Koch also discovered *Vibrio cholerae* in 1883 during his research in Egypt and India.
Typhoid bacillus → B (1880): Karl Eberth identified *Salmonella typhi* (typhoid bacillus) in 1880, later confirmed by Robert Koch.
Diphtheria bacillus → A (1884): Friedrich Loeffler discovered *Corynebacterium diphtheriae* in 1884 as the causative agent of diphtheria.
Correct match: 1-D, 2-C, 3-B, 4-A → Option (c).

Q4. In the question below is given a statement followed by two options numbered 1 and 2. Based on this choose the correct option.
Statement: Basic processes in the milling of pulses are cleaning, dehulling, splitting, separation and bagging.
Option 1: Dehulling produces refined cotyledons which are easily digested, have a good appearance, texture, and cooking qualities. Option 2: During splitting, the germ, which forms about 2 percent to 5 percent, is typically lost.
Options:
(a) If only option 1 is correct
(b) If only option 2 is correct
(c) If both 1 and 2 are correct
(d) If both 1 and 2 are incorrect
Ans.(c)
Sol. The statement is correct: Milling of pulses involves cleaning → dehulling → splitting → separation → bagging to obtain dal.
Option 1 is correct:
Dehulling removes the outer seed coat (testa), producing refined cotyledons.
This improves digestibility, appearance, texture, and cooking quality, making pulses more palatable.
Option 2 is also correct:
In the splitting process, cotyledons are separated, and the germ (about 2–5% of seed weight) is often lost.
This results in slight nutritional loss, particularly of protein and vitamins, since the germ is nutrient-rich.
Thus, both Option 1 and 2 are correct, making the right choice Option (c).

Q5. Select the option that is true regarding the following two statements labelled Assertion and Reason.
Assertion (A): *Salmonellae* can get onto the shell of eggs when birds lay eggs and the eggs touch bird droppings. Reason (R): *Salmonellae* can get inside eggs while the egg is being formed and before the egg makes a shell.
Options:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true
Ans.(b)
Sol. Assertion is true: *Salmonella* is commonly found in the intestinal tracts of poultry. During egg laying, eggs can become contaminated externally if they come in contact with feces or soiled nesting material. This is a recognized pathway of shell contamination.
Reason is also true: Certain strains of *Salmonella*, especially *Salmonella enteritidis*, can infect the hen's reproductive tract, entering the egg before the shell is formed, leading to internal contamination of egg contents (yolk or albumen).
However, the Reason does not directly explain the shell contamination described in the Assertion. Instead, it explains internal contamination, which is a different route.
Therefore, both statements are true, but the Reason is not the correct explanation of the Assertion.

Hence, the correct answer is Option (b).

Q6. Match the terms in Column I with their meaning from Column II.

Column I	Column II
1. Free Residual Chlorine	A. The point at which the chlorine demand of the water is met
2. Combined Chlorine	B. Concentration of chlorine reacted with nitrogen in the water and unavailable for disinfection
3. Break-point	C. Chlorine needed to destroy bacteria, and to oxidize all the organic matter and ammoniacal substances present
4. Chlorine Demand	D. Protects against microbial recontamination during distribution and storage

(a) 1-A, 2-C, 3-B, 4-D
(b) 1-D, 2-B, 3-A, 4-C
(c) 1-B, 2-D, 3-C, 4-A
(d) 1-C, 2-B, 3-A, 4-D

Ans.(b)

Sol. Free Residual Chlorine → D: This is the chlorine remaining in water after disinfection which continues to protect against microbial recontamination during storage and distribution.
Combined Chlorine → B: This is the chlorine that has reacted with nitrogen compounds (e.g., ammonia) forming chloramines, which are less effective for disinfection.
Break-point → A: The stage at which the chlorine demand of water is fully met, and any additional chlorine added remains as free residual chlorine.
Chlorine Demand → C: The total amount of chlorine required to destroy bacteria and oxidize all organic and ammoniacal matter present in water.
Correct matching: 1 – D 2 – B 3 – A 4 – C
Thus, the correct answer is Option (b).

Q7. Select the option that is true regarding the following two statements labelled Assertion and Reason.
Assertion (A): The most widely used indicator for assessment of nutritional status in preschool children is weight for age. Reason (R): Weight for age is an easy to measure parameter.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

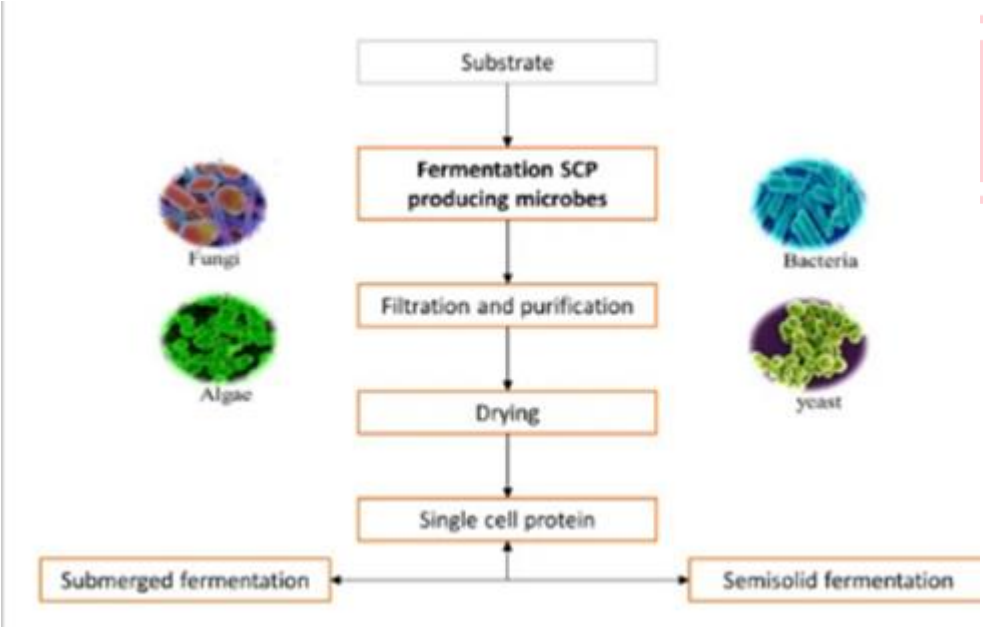
Ans.(a)

Sol. Weight-for-age is a commonly used anthropometric measurement for assessing nutritional status in preschool children.
It is used to identify underweight children, which may be due to acute or chronic undernutrition.
This indicator is particularly effective in large-scale screenings and growth monitoring programs, such as those conducted in public health or community settings.
The reason is also true — weight is easy to measure, requires simple equipment like weighing scales, and does not involve complex calculations or reference data like height-for-age or weight-for-height.

Because of its simplicity and the availability of standard growth charts (such as WHO child growth standards), weight-for-age is widely adopted.
In this case, the reason directly explains why weight-for-age is widely used as an indicator.
Hence, both the assertion and the reason are true, and the reason is the correct explanation of the assertion. Correct answer: Option (a).

Q8. What is the primary benefit of fermenting foods?
(a) To enhance the flavor and texture
(b) To preserve the food
(c) Both to enhance the flavor and preserve the food
(d) To increase the food's cooking time
Ans.(c)
Sol. Fermentation enhances the flavor and texture of food while also preserving it by producing lactic acid, alcohol, or acetic acid, which can inhibit the growth of harmful bacteria.

Q9. Microorganisms can be cultivated on industrial wastes or by-products as nutrients. What is the primary purpose of this process?
(a) Reduce industrial waste
(b) Produce microbial by-products
(c) Yield a large cell crop rich in protein
(d) Create energy-efficient processes
Ans.(c)
Sol. Microorganisms are cultivated on industrial wastes or by-products to produce large cell crops rich in protein. This is an efficient way to use waste materials while producing protein-rich biomass, often referred to as single-cell protein (SCP), which is used in animal feed or as a food supplement.



Q10. The structure formed by joining the amino acids by a peptide bond is called _____ structure of a protein.

(a) Quaternary
(b) Tertiary
(c) Secondary
(d) Primary
Ans.(d)
Sol. The primary structure of a protein is formed by linking amino acids through peptide bonds. This linear sequence of amino acids determines the unique characteristics of the protein.

Q11. Weakness and pain in the limbs, difficulty walking, and irregular heartbeat are symptoms of Beriberi due to deficiency of_____
(a) Vitamin B2
(b) Vitamin B6
(c) Vitamin B1
(d) Vitamin B12
Ans.(c)
Sol. Weakness and pain in the limbs, difficulty walking, and irregular heartbeat are symptoms of Beriberi due to deficiency of Vitamin B1.

Q12. Match the unit operations in Column I with their description from Column II:

Unit Operation	Description
1. Peeling	A. Assessment of overall quality
2. Sorting	B. Separation on the basis of one characteristic
3. Grading	C. Removal of contaminants making surface suitable for processing
4. Cleaning	D. To remove inedible or unwanted material and improve appearance

Options:
(a) 1-A, 2-C, 3-B, 4-D
(b) 1-D, 2-B, 3-A, 4-C
(c) 1-B, 2-D, 3-C, 4-A
(d) 1-D, 2-A, 3-C, 4-B
Ans.(b)
Sol. 1.Peeling – D: It involves removal of inedible or unwanted outer layers (like skins of fruits and vegetables) to improve appearance and make them suitable for consumption or further processing.
2.Sorting – B: This refers to separation based on a single characteristic, such as size, shape, color, or weight. It is used to streamline processing and packaging.
3.Grading – A: This is an assessment of overall quality, often based on multiple parameters such as size, maturity, texture, color, or presence of defects. It assigns value or class (e.g., Grade A eggs or fruits).
4.Cleaning – C: Cleaning removes dirt, dust, microorganisms, pesticides, or any foreign matter, making the food hygienically suitable and safe for processing.
Thus, the correct matching is: 1-D, 2-B, 3-A, 4-C
The correct answer is Option (b).

Q13. In the question below is given a statement followed by two options numbered 1 and 2. Based on this choose the correct option. Statement: Serial dilutions are routinely used in microbiology to estimate the number of microorganisms in samples with an unknown concentration. Option 1: By diluting one

ml of a sample containing one billion bacterial cells/ml in nine ml of diluent, you will get a concentration of one hundred million bacterial cells/ml. Option 2: Serial dilutions are done until you get a more easily countable concentration of 30 to 300 bacterial cells/ml. Options:
(a) If only option 1 is correct
(b) If only option 2 is correct
(c) If both 1 and 2 are correct
(d) If both 1 and 2 are incorrect
Ans.(c)
Sol. Serial dilution is a common microbiological method used to reduce a dense culture of cells to a more usable concentration, typically to allow for accurate colony counting on agar plates.
Option 1 is correct: If you dilute 1 ml of a sample with 1×10^9 CFU/ml (colony forming units) into 9 ml of sterile diluent (such as sterile water or buffer), the total volume becomes 10 ml. The dilution factor is 1:10, which means the concentration becomes:

$$\frac{1 \times 10^9}{10} = 1 \times 10^8 \text{ CFU/ml}$$

i.e., 100 million bacterial cells/ml — so the statement is correct.
Option 2 is correct: In microbial enumeration (especially using the pour plate or spread plate technique), plates yielding 30 to 300 colonies are considered statistically reliable for accurate colony counting. Too few colonies (<30) may not be representative, and too many (>300) may cause overlap and counting errors.
Therefore, both statements are scientifically accurate, and the correct answer is Option (c).

Q14. Match the column (a) with column (B) and choose the correct option from those:

Column (A)	Column (B)
A. Lycopene	i. Flavanols belong to this group
B. Xanthophyll	ii. Beetroot is a rich source
C. Betalains	iii. Converted to Vitamin A
D. Anthoxanthin	iv. Tomato is a rich source

(a) A-iii, B-ii, C-iv, D-i
(b) A-ii, B-iv, C-i, D-iii
(c) A-iii, B-iv, C-i, D-ii
(d) A-iv, B-iii, C-ii, D-i
Ans.(d)
Sol. Lycopene is a red carotenoid pigment found in high amounts in tomatoes and tomato-based products. It is not converted to vitamin A, but it acts as a powerful antioxidant. Hence, A matches with iv.
Xanthophylls are a subclass of carotenoids and are oxygenated pigments. Some xanthophylls, like lutein and zeaxanthin, are converted into Vitamin A, supporting vision health. Hence, B matches with iii.
Betalains are water-soluble pigments found in certain plants, and beetroot is a rich source of these pigments, giving it a deep red-violet color. Hence, C matches with ii.
Anthoxanthins are a class of flavonoids, which include flavanols. These pigments give a white to yellow color and are found in onions, cauliflower, and potatoes. Hence, D matches with i.

Correct matching: A – iv (Tomato is a rich source) B – iii (Converted to Vitamin A) C – ii (Beetroot is a rich source) D – i (Flavanols belong to this group)
Therefore, the correct answer is Option (d).

Q15. Match List-I (Minerals) with List-II (Functions) and choose correct answer.

List-I (Minerals)	List-II (Functions)
A. Calcium	[i] Blood coagulation
B. Sodium	[ii] Maintenance of electrical equilibrium between intracellular fluid
C. Iron	[iii] Anaemia
D. Iodine	[iv] Formation of Thyroid hormone

(a) A-iii, B-ii, C-iv, D-i
(b) A-ii, B-iii, C-i, D-iv
(c) A-i, B-ii, C-iii, D-iv
(d) A-iv, B-i, C-ii, D-iii
Ans.(c)
Sol. Calcium is essential for blood clotting (coagulation).
Sodium helps maintain electrolyte balance in body fluids.
Iron deficiency leads to anaemia due to its role in hemoglobin.
Iodine is needed for thyroid hormone synthesis.

Q16. Match List-I with List-II and select the correct answer using codes given below the lists:

List-I	List-II
a. Meristem culture	iii. Virus free plants
b. Cryopreservation	iv. Liquid Nitrogen
c. Pollen culture	i. Haploid Plants
d. Totipotency	ii. Haberlandt

(a) a-iii, b-iv, c-i, d-ii
(b) a-ii, b-i, c-iv, d-iii
(c) a-i, b-iii, c-ii, d-iv
(d) a-iv, b-ii, c-iii, d-i
Ans.(a)
Sol. Meristem culture → Virus free plants
Cryopreservation → Liquid Nitrogen (used to preserve cells/tissues)
Pollen culture → Haploid Plants
Totipotency → Haberlandt (father of plant tissue culture) Correct match: a-iii, b-iv, c-i, d-ii

Q17. In the question below is given a statement followed by two options numbered 1 and 2. Based on this choose the correct option.
Statement: The natural history of disease signifies the way in which a disease evolves over time.
Option 1: The earliest stage is pre-pathogenesis phase which terminates as recovery, disability or death, in the absence of treatment or prevention. Option 2: Each disease has its own unique natural history, which is not necessarily the same in all individuals.
(a) If only option 1 is correct
(b) If only option 2 is correct

(c) If both 1 and 2 are correct
(d) If both 1 and 2 are incorrect
Ans.(c)
Sol. The natural history of disease describes the progression of a disease process in an individual over time, without intervention.
The earliest stage is the pre-pathogenesis phase, where the individual is exposed to risk factors but the disease has not yet developed. If prevention or treatment is absent, the disease may progress through the pathogenesis phase, ultimately ending in recovery, disability, or death. Hence, Option 1 is correct.
Each disease has a unique course of development, but its progression may vary depending on age, immunity, genetics, nutrition, and environmental conditions. Therefore, not all individuals will experience the same disease outcome in the same way. Hence, Option 2 is also correct.
Thus, both Option 1 and Option 2 are correct, making the answer Option (c).

Q18. Match the items of Column-A with those given in Column-B and select the correct combinations:

Column-A	Column-B
a. Ascorbic acid	i. Antioxidant
b. Aspartame	ii. Dipeptide
c. Lecithin	iii. Emulsifier

(a) a-i, b-ii, c-iii
(b) a-i, b-iv, c-iii
(c) a-iii, b-ii, c-i
(d) a-i, b-iv, c-ii
Ans.(a)
Sol. Ascorbic acid (Vitamin C) → Antioxidant
Aspartame → Dipeptide-based artificial sweetener
Lecithin → Emulsifier commonly used in food and pharmaceuticals So, the correct match is: a-i, b-ii, c-iii

Q19. Which of the following statements about the genus *Clostridium* are correct? (a) All species of *Clostridium* are catalase-negative and anaerobic to microaerophilic. (B) *Clostridium thermosaccharolyticum* causes gaseous spoilage of canned vegetables. (C) *Clostridium perfringens* causes late gas production in cured cheese. (D) Soil is a primary source of *Clostridium* species.
Choose the correct answer from the options below:
(a) A, B, and D only
(b) A, B, and C only
(c) A, B, C, and D
(d) A, C, and D only
Ans.(a)
Sol. Statement A is correct: All *Clostridium* species are catalase-negative and either anaerobic or microaerophilic.
Statement B is correct: *C. thermosaccharolyticum* is a thermophilic, saccharolytic species that causes gaseous spoilage of canned vegetables.
Statement C is incorrect: *Clostridium butyricum* (not *C. perfringens*) is responsible for late gas in cured cheese. *C. perfringens* causes stormy fermentation in milk.

Statement D is correct: Soil is indeed a primary natural source of *Clostridium* spp.

Q20. In the question below is given a statement followed by two options numbered 1 and 2. Based on this choose the correct option.
Statement: AGMARK is a certification scheme for agricultural produce like cereals, pulses, oil seeds, vegetable oils, etc.
Option 1: Multi-source edible oil can be sold in loose form. Option 2: Agmark certification is voluntary for all packaged multi-source vegetable oil.
(a) If only option 1 is correct
(b) If only option 2 is correct
(c) If both 1 and 2 are correct
(d) If both 1 and 2 are incorrect
Ans.(d)
Sol. AGMARK is a certification mark governed by the Directorate of Marketing and Inspection, Ministry of Agriculture and Farmers Welfare, Government of India, to ensure the quality of agricultural produce.
Option 1 is incorrect because multi-source edible oil cannot be sold in loose form. As per FSSAI regulations, it must only be sold in sealed, tamper-proof packages to avoid adulteration and ensure safety.
Option 2 is also incorrect because AGMARK certification is mandatory for packaged multi-source edible vegetable oils and blended edible vegetable oils. It is not voluntary in this case.
Hence, both statements are incorrect, making the correct answer Option (d).

Q21. Select the option that is true regarding the following two statements labelled Assertion and Reason. Assertion (A): Sporulation usually appears in the late logarithmic phase of growth Reason (R): This is possibly because of nutrient depletion or product accumulation Options:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true
Ans.(a)
Sol. Sporulation, or endospore formation, is a survival mechanism observed in certain bacterial genera such as *Bacillus* and *Clostridium*. It typically occurs when environmental conditions become unfavorable for normal vegetative growth.
Assertion is true: Sporulation is commonly initiated during the late logarithmic (exponential) phase or more precisely during the early stationary phase of bacterial growth. This is when the rapid growth rate begins to slow down.
Reason is also true: The trigger for sporulation is often the depletion of essential nutrients (like carbon, nitrogen, or phosphorus) and/or the accumulation of toxic metabolic by-products. These stress signals prompt the bacterial cell to initiate sporulation as a means to survive harsh conditions.
The Reason accurately explains why sporulation occurs in the late log phase — as nutrient availability decreases and waste builds up, the cell prepares to enter a dormant state.
Therefore, both the Assertion and Reason are true, and the Reason correctly explains the Assertion.
Hence, the correct answer is Option (a).

Q22. Diseases caused by consumption of certain proteins from Leguminosae and Euphorbiaceae families causing clumping of red blood cells are: Options:
1. Haemagglutinins
2. Phytohaemagglutinins
3. Agglutination
4. Haemolysis
(a) Options 1, 2 & 3 are correct
(b) All the options (1, 2, 3 & 4) are correct
(c) Options 1 & 2 are correct
(d) All the options (1, 2, 3 & 4) are incorrect
Ans.(c)
Sol. ✅ (c) Options 1 & 2 are correct: • Haemagglutinins and Phytohaemagglutinins are plant-derived proteins, especially in beans (e.g., red kidney beans), which can cause red blood cell clumping if not properly cooked.
❌ (3) Agglutination: • It is an outcome of haemagglutinin activity, not a cause or protein itself.
❌ (4) Haemolysis: • Not typically caused by these plant proteins; this refers to rupture of red blood cells rather than clumping.

Q23. For the Nutritional Information declaration per single consumption pack of the product and per serve percentage (%) contribution to Recommended Dietary Allowance is calculated on the basis of _____ energy per day.
(a) 1500
(b) 2500
(c) 2000
(d) 3000
Ans.(c)
Sol. As per FSSAI guidelines, nutritional values and RDA percentages on food labels are calculated based on a daily intake of 2000 kcal for an average adult.

Q24. Food Safety and Standards Act, 2006 operationalised on
(a) 5th August, 2007
(b) 5th August, 2011
(c) 5th August, 2012
(d) 5th August, 2013
Ans.(b)
Sol. The FSS Act, 2006 came into force on 5th August, 2011, marking the operational start of FSSAI's implementation.

Q25. How many Acts are repealed by Food Safety and Standards Act, 2006?
(a) 4
(b) 5
(c) 7
(d) 8
Ans.(d)

Sol. The FSSA, 2006 repealed 8 earlier food-related Acts including PFA, MMPO, Fruit Product Order, etc., to create a unified law.

Q26. How many Acts are repealed by Food Safety and Standard Act, 2006?
(a) 4
(b) 5
(c) 7
(d) 6
Ans.(c)
Sol. The Food Safety and Standards Act, 2006 repealed 7 Acts/Orders, as listed:
1. Prevention of Food Adulteration Act, 1954
2. Fruit Products Order, 1955
3. Meat Food Products Order, 1973
4. Vegetable Oil Products (Control) Order, 1947
5. Edible Oils Packaging (Regulation) Order, 1998
6. Solvent Extracted Oil, De-oiled Meal, and Edible Flour (Control) Order, 1967
7. Milk and Milk Products Order, 1992

Q27. Section 12 of The Food Safety and Standards Act, 2006 deals with
(a) Functions of Central Advisory Committee
(b) Scientific Committee
(c) Officers and other employees of Food Authority
(d) General principles to be followed in the administration of Act
Ans.(a)
Sol. ✅ (a) Functions of Central Advisory Committee:
· Section 12 of The Food Safety and Standards Act, 2006 outlines the formation, powers, and functions of the Central Advisory Committee.
· The committee advises the Food Authority on matters related to the Act's implementation, policies, and food safety standards.
· It plays a key role in recommending standards, procedures, and regulations to ensure food safety and public health.
· The committee comprises experts from various fields related to food safety, science, and policy.
❌ (b) Scientific Committee: Related to Section 13, not Section 12. ❌ (c) Officers and other employees: Covered under a different section. ❌ (d) General principles: Addressed elsewhere in the Act.

Q28. Why is HACCP, a prerequisite and important to a food manufacture?
(a) It prioritizes and controls potential hazards in food production.
(b) Public health protection is strengthened as it controls major food risks.
(c) Consumer assurance that the products are as safe.
(d) All of the above
Ans.(d)
Sol. HACCP (Hazard Analysis and Critical Control Point) is a systematic preventive approach to food safety.
It helps prioritize and control hazards in food production (option a).

It ensures public health protection by preventing outbreaks of foodborne diseases (option b).
It builds consumer confidence that products are safe and consistently manufactured under control (option c).
Since all statements are true, the correct answer is option (d) all of the above.

Q29. Food adulteration primarily refers to:
(a) Only adding preservatives
(b) Adding or removing substances affecting food quality
(c) Washing food with water
(d) Heating food before sale
Ans.(b)
Sol. • Food adulteration is defined as the addition of unwanted substances or removal of valuable components from food.
• Such changes negatively affect the natural composition, nutritional value, and purity of food.
• It can occur intentionally (to gain profit) or unintentionally (contamination due to poor hygiene or handling).
• Consumption of adulterated food may lead to health hazards and violates legal food quality standards established by regulatory authorities like FSSAI.
• Therefore, option (b) is the most accurate description of food adulteration.

Q30. Who heads the food safety administration in each State under the Food Safety and Standards Act, 2006?
(a) Food Safety Officer
(b) Designated Officer
(c) Commissioner of Food Safety
(d) Chief Medical Officer
Ans.(c)
Sol. • The Commissioner of Food Safety is the apex authority at the State level responsible for administering provisions of the FSS Act, 2006.
• This position ensures effective and uniform implementation of food standards and compliance across the entire State.
• All enforcement activities such as inspections, prosecutions, and food chain oversight fall under their command.
• Lower-level enforcement personnel like Food Safety Officers and Designated Officers work under the Commissioner and do not head the state food safety structure.
→ Hence, the Commissioner of Food Safety is the head of the State food safety framework.

Q31. A method of drying in which the moisture in the food is frozen, and then sublimed to vapour under vacuum is called as
(a) Sun-drying
(b) Lyophilization
(c) Spray drying
(d) Drum drying
Ans.(b)

Sol. Lyophilization, or freeze-drying, freezes the product and then removes ice by sublimation under low pressure, preserving structure and heat-sensitive compounds.
This method gives a porous, lightweight product that rehydrates rapidly and retains much of the original flavor and nutrients.
Spray drying and drum drying are thermal drying methods; sun-drying is passive solar drying.
Hence the correct term for freeze→sublimation drying is lyophilization.

Q32. Which type of ionizing radiation is derived from isotopes such as Cobalt-60 or Cesium-137 and is characterized by high penetration depth?
(a) Beta particles
(b) Gamma rays
(c) Ultraviolet-A
(d) Visible light
Ans.(b)
Sol. (b): Gamma rays originate from radioactive isotopes—commonly Cobalt-60 and Cesium-137—and possess extremely high penetration capability, enabling them to pass through dense food matrices and thick packaging materials. This makes gamma irradiation well-suited for bulk sterilisation, deep decontamination, and shelf-life extension. Their high energy allows uniform dose delivery throughout the product, a distinct advantage over particle or non-ionizing radiation types which have limited penetration.
Incorrect options:
(a) Beta particles have lower penetration and are suitable only for surface or shallow-depth treatment.
(c) UV-A is non-ionizing with very low penetration.
(d) Visible light lacks sufficient energy to ionize matter or penetrate deeply.

Q33. An increase in concentration of the toxicants which are neither metabolized nor excreted and get deposited at successive trophic levels is called
(a) Biomonitoring
(b) Biomineralization
(c) Biomagnification
(d) Bioremediation
Ans.(c)
Sol. Biomagnification refers to the increase in concentration of toxic substances as they move up the food chain. For example, pesticides accumulate in the bodies of organisms at each trophic level.

Q34. State true or false: Statement 1: Preservatives are food additives Statement 2: Sweeteners consist of calorie, low-calorie and non-calorie sweeteners.
(a) True, False
(b) True, True
(c) False, False
(d) False, True
Ans.(d)
Sol. Statement 1 is False: Not all preservatives are considered food additives in every context.
Statement 2 is True: Sweeteners are classified as caloric, low-calorie, and non-caloric.

Q35. ISO 22000 integrates HACCP principles with which additional element to determine an effective hazard control strategy?
(a) Random sampling of food products
(b) Hazard analysis with prerequisite programmes
(c) Only product testing after processing
(d) Packaging inspection alone
Ans.(b)
Sol. ISO 22000 combines Codex HACCP principles with prerequisite programmes (PRPs) and uses hazard analysis to define the most suitable hazard control strategy. This ensures a systematic approach to identifying, evaluating, and controlling food safety hazards.
The integration provides a more comprehensive food safety management structure that strengthens HACCP application.
(a) Random sampling cannot replace a systematic hazard control strategy.
(c) Product testing alone cannot ensure prevention-focused food safety management.
(d) Packaging checks are only one step and do not constitute a full hazard control approach.
Therefore, the correct answer is (b).

Q36. The process by which organisms take in and utilize food for growth and maintenance is called
(a) Digestion
(b) Nutrition
(c) Assimilation
(d) Metabolism
Ans.(b)
Sol. Nutrition is the comprehensive biological process that includes food intake, digestion, absorption, assimilation, and egestion, enabling the organism to obtain energy, repair tissues, and support growth and survival. It ensures supply of essential nutrients like carbohydrates, proteins, fats, vitamins, minerals, and water required for metabolic and physiological functions.
It plays a fundamental role in maintaining immunity, body strength, hormone regulation, enzyme synthesis, and functioning of organ systems, making it vital for life and homeostasis in both plants and animals.
(a) Digestion is only one stage of nutrition where complex food is broken down into simpler absorbable forms.
(c) Assimilation is the utilization of absorbed nutrients by cells to build tissues and support biochemical functions.
(d) Metabolism refers to all chemical reactions in the body (catabolic and anabolic), and nutrition is only the input step for metabolism.

Q37. At which pH fruits and vegetables are divided into acidic and non-acidic for thermal processing:
(a) 4.5
(b) 5.5
(c) 6.5
(d) 7.5
Ans.(a)

Sol. ✅ (a) 4.5: The critical pH value used to classify foods for thermal processing is 4.5. Foods with a pH below 4.5 are considered acidic (e.g., most fruits), while those with pH above 4.5 are low-acid or non-acidic (e.g., vegetables, meat, dairy).
Acidic foods inhibit Clostridium botulinum growth, so they can be safely processed with less intense methods like water bath canning. In contrast, low-acid foods require pressure canning at higher temperatures to ensure sterility and food safety.
❌ (b), ❌ (c), ❌ (d): These values are incorrect thresholds and not used as classification cutoffs. Therefore, pH 4.5 is the correct dividing line in thermal food processing.

Q38. Golden rice is a genetically modified crop where the incorporant gene is meant for biosynthesis of
(a) Vitamin A
(b) Vitamin C
(c) Vitamin K
(d) None of these
Ans.(a)
Sol. Golden Rice is genetically engineered to produce beta-carotene, a precursor of Vitamin A, which helps combat Vitamin A deficiency, especially in developing countries.

Q39. Which one of the following food colours is NOT permitted to be used in foods?
(a) Annatto
(b) Malachite Green
(c) Tartrazine
(d) Brilliant Blue FCF
Ans.(b)
Sol. ✅ (b) Malachite Green: • Malachite Green is a toxic chemical dye used in aquaculture but not permitted in foods under FSSAI or Codex guidelines. • It is a potential carcinogen and mutagen, making it unsafe for human consumption. • Strictly banned in food items.
❌ (a) Annatto: • A natural food color derived from Bixa orellana seeds, approved for use.
❌ (c) Tartrazine: • A permitted synthetic food color, commonly used in beverages, candies, and desserts.
❌ (d) Brilliant Blue FCF: • Another approved synthetic dye, safe within prescribed limits.

Q40. Which statement correctly represents the typical composition range and functional consequence of whole milk powder (WMP)?
(a) WMP retains substantial milk fat (≈26–40%), providing richer reconstituted milk and creamier texture
(b) WMP is fat-free and used primarily where low-fat reconstitution is required
(c) WMP contains no native milk proteins and is used only for carbohydrate fortification
(d) WMP is chemically identical to sweetened condensed milk
Ans.(a)
Sol. (a): Whole milk powder is manufactured from full-fat milk and typically contains a significant fat fraction—commonly in the 26–40% range—together with milk proteins (casein and whey) and lactose. Because it retains native milk fat, reconstituted WMP yields a richer flavour and creamier mouthfeel compared with skim powders, and the presence of milk proteins supports emulsification and functional

properties in dairy formulations. This composition determines its applications in ice cream, confectionery, and high-fat dairy preparations.
Incorrect options:
(b) WMP is not fat-free; skim milk powder, not WMP, is low-fat.
(c) WMP contains substantial native milk proteins, not solely carbohydrates.
(d) Sweetened condensed milk is a liquid, sugar-added, concentrated milk product—compositionally and functionally distinct from spray-dried WMP.

Q41. Foods rich in high biological value proteins are mainly important for which physiological function?
(a) Regulation of water balance
(b) Tissue growth and repair
(c) Detoxification of free radicals
(d) Maintenance of social well-being
Ans.(b)
Sol. Protein-rich foods such as eggs, milk, and meat provide complete amino acid profiles required for cellular regeneration. These amino acids support enzymatic repair processes that maintain tissue integrity. They also contribute to growth during developmental stages by forming structural proteins. High biological value proteins ensure efficient nitrogen retention essential for anabolic functions.
(a) Water balance is chiefly regulated by electrolytes and kidney function rather than protein intake.
(b) Amino acids are directly used in synthesizing new cells and repairing damaged tissues in the body.
(c) Free radical detoxification depends largely on antioxidants and not proteins.
(d) Social well-being is linked to cultural food practices, not protein metabolism.

Q42. Which of the following packages is an example of aseptic packaging?
(a) Tetra Pak drinking boxes
(b) Paper bag
(c) Milk carton
(d) Plastic bread bag
Ans.(a)
Sol. Aseptic packaging involves sterilizing both the product and the packaging separately and then filling the product into the package in a sterile environment.
Tetra Pak drinking boxes are a classic example of aseptic packaging. The milk or juice inside is sterilized, and the multilayer packaging (paper, plastic, and aluminum) ensures a long shelf life without refrigeration.
Paper bags, milk cartons, and plastic bread bags do not provide complete aseptic conditions; they only protect the product from physical damage or contamination to some extent.

Q43. A condition in which certain foods trigger an abnormal immune response is called a:
(a) Food infestation
(b) Food allergy
(c) Food infection
(d) Food poisoning
Ans.(b)

Sol. ✅ Food allergy is caused by an immune system reaction to a food protein that is otherwise harmless. ❌ Food infection and poisoning are caused by pathogens or toxins, and food infestation relates to pests—not the immune system.

Q44. Factors which affect internal corrosion of cans include: Options:
1. Lacquer coating
2. Anthocyanins
3. Temperature
4. Acidic foods
(a) All the options (1, 2, 3 & 4) are incorrect
(b) All the options (1, 2, 3 & 4) are correct
(c) Options 1, 2 & 3 are correct
(d) Options 1 & 2 are correct
Ans.(b)
Sol. ✅ (b) All the options (1, 2, 3 & 4) are correct: • Lacquer coating: Acts as a protective barrier. Poor or damaged coatings can expose the metal surface to corrosion. • Anthocyanins: Natural pigments in some fruits; their chemical reactivity can promote corrosion when they interact with metal surfaces. • Temperature: High temperatures accelerate chemical reactions and can increase corrosion rates inside cans. • Acidic foods: Foods like tomatoes and citrus are corrosive due to their low pH, making proper can lining essential.

Q45. Which fermented product commonly relies on Saccharomyces cerevisiae?
(a) Curd
(b) Wine
(c) Pickle
(d) Vinegar
Ans.(b)
Sol. • Saccharomyces cerevisiae is a yeast species known for its role in alcoholic fermentation.
• It converts sugars found in fruits—such as grapes—into ethanol and carbon dioxide, which is the key step in wine production.
• Curd is produced using lactic acid bacteria, not yeast, and does not involve alcoholic fermentation.
• Pickles and vinegar may involve different microbes but do not primarily depend on S. cerevisiae.
• Therefore, wine is the fermented product that uses this yeast, making option (b) correct.

Q46. Which of the following statements about food irradiation is most accurate ?
(a) Irradiation preserves food only by heating and drying
(b) Microbial inactivation occurs only through DNA damage and no other mechanism
(c) Free radical formation, membrane damage, and interference with metabolism all contribute to microbial death
(d) Irradiated foods lose all nutritional value due to high energy exposure
Ans.(c)
Sol. • Microbial inactivation mechanisms listed in the passage include:
– Inhibition of DNA synthesis
– Cell membrane alteration

– Denaturation of enzymes
– Changes in RNA synthesis, phosphorylation, and DNA composition.
• Also, indirect actions via free radicals and direct ionization both disrupt cell metabolism and division, causing death.
• Hence, microbial death is a combined result of multiple mechanisms, not only DNA damage.
• The statement in option (c) correctly captures this multifactorial mechanism.
• Options (a) and (b) are incomplete or incorrect; (d) is wrong because nutrition loss is not total.
→ Option (c) is the most accurate.

Q47. Cleaning chemicals left on utensils lead to:
(a) Physical hazard
(b) Biological hazard
(c) Chemical hazard
(d) Taste enhancement
Ans.(c)
Sol. • Residual cleaning or sanitizing chemicals on utensils are classified as chemical hazards because they are toxic substances that may enter food.
• Ingestion can lead to mucosal irritation, gastrointestinal upset, and long-term health effects depending on chemical type and concentration.
• Proper rinsing, use of food-grade detergents, and correct dilution are essential to prevent contamination.
• Inadequate rinsing can allow residues to accumulate, increasing the risk of chemical exposure to consumers.
• FSSAI mandates cleaning protocols and verification procedures to ensure utensils are free from chemical residues before use.

Q48. Which symbol or information is mandatory on food labels as per standards?
(a) Vendor phone number
(b) FSSAI License Number
(c) Company logo
(d) Recipe suggestions
Ans.(b)
Sol. Option (b) is correct because every packaged food must display the FSSAI license/registration number for traceability, regulatory compliance, and accountability.
Option (a) is incorrect because vendor contact is optional, not mandatory.
Option (c) is incorrect as company logos are branding, not regulatory requirements.
Option (d) is incorrect because recipe suggestions are optional marketing content only.

Q49. Select the option that is true regarding the following two statements labelled Assertion and Reason. Assertion (A): Protein isolates and concentrates are regularly used for the formulation of protein-rich food products. Reason (R): Protein isolates have a minimum protein content of 90% and protein concentrates have a minimum protein content of 65% on a dry weight basis.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A

(c) A is true but R is false
(d) A is false but R is true
Ans.(a)
Sol. Protein isolates and concentrates are commonly used ingredients in the formulation of protein-enriched products, especially in health foods, sports nutrition, infant formulas, and functional foods.
They are derived from various sources such as soy, milk (whey and casein), peas, and other legumes.
Protein isolates and concentrates are preferred due to their high protein content, digestibility, and functional properties such as solubility, emulsification, and water-holding capacity.
Protein isolates are highly purified forms of protein with a minimum protein content of 90% on a dry weight basis. They are produced by removing most of the fat and carbohydrates.
Protein concentrates are less processed and typically contain a minimum of 65% protein, though the range may go up to 80%, depending on the source and method of processing.
The high protein content in both isolates and concentrates is the main reason they are used in protein-rich food product development.
Hence, both Assertion and Reason are factually correct, and the Reason correctly explains the Assertion.
Therefore, the correct answer is Option (a).

Q50. Why is food fortification considered an important intervention in India based on NFHS-4 findings?
(a) It provides immediate weight gain and cures severe malnutrition overnight
(b) High prevalence of anaemia and undernutrition requires strategies to increase micronutrient intake
(c) It replaces the need for healthcare services and nutritional programs
(d) It is only beneficial for urban populations with processed food dependency
Ans.(b)
Sol. NFHS-4 data shows high levels of anaemia in children (58.4%) and women (53.1%), as well as underweight children (35.7%), making micronutrient improvement a public health priority.
Food fortification enhances intake of essential micronutrients through widely consumed staples, helping reduce deficiencies at a population level.
It complements other nutrition programs and supports long-term strategies for improving national health indicators.
Fortification is cost-effective, scalable, and suitable for both rural and urban populations to improve nutrient intake.
(a) It does not cause rapid weight gain or cure malnutrition instantly.
(c) It supports but does not replace health and nutrition services.
(d) It is beneficial for all populations, not only urban consumers.
Therefore, the correct answer is (b).

Q51. "Not for Phenylketonuerics" shall carry on the label if the product contains following table top sweetener
(a) Aspartame
(b) Acesulfame-K
(c) Sucralose
(d) Neotame
Ans.(a)
Sol. Aspartame is a low-calorie artificial sweetener that contains phenylalanine.

People with the genetic disorder phenylketonuria (PKU) cannot metabolize phenylalanine, leading to toxic buildup in the body.
Therefore, any food containing aspartame must carry the warning label "Not for Phenylketonurics."
Other sweeteners like acesulfame-K, sucralose, and neotame do not require this warning.
Thus, the correct answer is Aspartame.

Q52. This is not an example of group of antibiotics.
(a) Tetracyclines
(b) β lactams
(c) Alkaloids
(d) Macrolides
Ans.(c)
Sol. Alkaloids are naturally occurring plant compounds (e.g., morphine, caffeine), not antibiotics. The others (Tetracyclines, β-lactams, Macrolides) are antibiotic classes.

Q53. Which of the following is the organ of detoxification?
(a) Liver
(b) Gall-bladder
(c) Spleen
(d) Pancreas
Ans.(a)
Sol. The liver is the primary organ of detoxification in the body. It processes and eliminates toxins from the bloodstream.

Q54. Which of the following food constituents are fermented first by the bacteria.
(a) Protein
(b) Sugars
(c) Fat
(d) Minerals
Ans.(b)
Sol. Sugars (carbohydrates) are the first to be fermented by bacteria because they are easier and faster to metabolize compared to proteins or fats.

Q55. Hygiene in food service establishments mainly helps in:
(a) Increasing taste
(b) Preventing foodborne illness
(c) Reducing cost
(d) Enhancing colour
Ans.(b)
Sol. • Hygiene primarily protects consumers from harmful microorganisms that cause foodborne diseases.
• It prevents contamination during food handling, preparation, cooking, and serving.
• Proper hygiene stops the growth of bacteria, viruses, and parasites that thrive in unclean environments.

• It ensures the food remains safe, wholesome, and fit for consumption at every stage.
• Hygiene practices are legally required under FSSAI to safeguard public health and prevent outbreaks.

Q56. What is the main principle behind food freezing?
(a) Removing all water from food
(b) Forming ice crystals to reduce free water and slow microbial/enzymatic activity
(c) Heating food to inactivate enzymes
(d) Adding preservatives to food
Ans.(b)
Sol. Option (b) is correct because freezing converts liquid water into ice, reducing water activity (a_v). With less free water available, microbial growth, enzymatic reactions, and chemical spoilage slow dramatically, extending shelf life.
Option (a) is incorrect because freezing does not remove water; it only converts it to ice.
Option (c) is incorrect since freezing does not rely on heat; enzymes are slowed, not inactivated.
Option (d) is incorrect because freezing does not require preservatives.

Q57. What is the primary purpose of food irradiation?
(a) To increase the fat content of food
(b) To improve the taste of food
(c) To eliminate pathogens and extend shelf life
(d) To add artificial colors
Ans.(c)
Sol. Option (c) is correct because food irradiation uses controlled ionizing radiation (gamma rays, electron beams, or X-rays) to destroy pathogens like Salmonella, E. coli, parasites, and spoilage microorganisms. It also delays ripening and sprouting, thereby significantly extending shelf life without raising temperature or adding chemicals.
Option (a) is incorrect because irradiation does not alter macronutrient composition, including fat.
Option (b) is incorrect—taste changes are minimal and not a primary goal.
Option (d) is incorrect because irradiation does not add any additives or colors to food.

Q58. _____ is part of micronutrient fraction of food.
(a) Magnesium
(b) Zinc
(c) Calcium
(d) Sodium
Ans.(b)
Sol. Zinc is a trace mineral and an essential micronutrient needed in small amounts for immune function, cell division, and wound healing.

Q59. Which of the following is considered a protective food?
(a) Wheat
(b) Papaya
(c) Chicken
(d) Butter

Ans.(b)

Sol. ✅ (b) Papaya: • Papaya is a fruit rich in beta-carotene (Vitamin A), which boosts immunity and vision. • Classified under protective foods due to its role in disease prevention. • Protective foods are generally vegetables and fruits, supplying vitamins, minerals, and fiber. • These nutrients are vital for preventing degenerative diseases like diabetes, cancer, and heart disease.

❌ (a) Wheat: • Belongs to energy-yielding foods, rich in carbohydrates.

❌ (c) Chicken: • A source of animal protein, classified as a body-building food.

❌ (d) Butter: • A fat source, part of energy-yielding foods, not protective.

Q60. A healthy food contains trans fatty acids content of:

(a) <0.2 gram per serving

(b) <1 gram per serving

(c) >1 gram per serving

(d) >0.2 gram per serving

Ans.(a)

Sol. ✅ (a) <0.2 gram per serving: • As per FSSAI guidelines and global nutrition science, trans fats are harmful fats that increase the risk of heart disease and other health issues. • Foods are labeled "trans fat-free" if they contain less than 0.2 grams per serving. • Trans fats are found in hydrogenated oils, bakery items, and fried foods. • WHO and FSSAI have both advocated for elimination of industrial trans fats, setting this benchmark to reduce cardiovascular risk. ❌ (b), (c), (d): • These values exceed the healthy limit, and such foods are not considered safe in regular diets.

Q61. Which food does ICMR state must be an essential item, particularly for infants, children and women?

(a) Oils

(b) Pulses

(c) Fruits

(d) Milk

Ans.(d)

Sol. Milk is emphasised as essential because it provides high-quality proteins, calcium and micronutrients critical for growth, bone development and maternal health.

Including milk and milk products helps prevent deficiencies in infants and supports adolescent growth and maternal bone health.

For populations unable to consume milk, fortified alternatives should be considered to meet calcium requirements.

ICMR stresses milk's role in early life and for women due to bone mineralization and reproductive needs.

(a) Oils provide energy but are not the primary source of calcium or complete protein.

(b) Pulses are important protein sources but milk supplies bioavailable calcium and vitamin B12 in non-vegetarian diets.

(c) Fruits supply vitamins and fibre but lack the concentrated protein and calcium of milk.

Q62. In India, which authority is responsible for regulating and granting approval for the Food Irradiation process?

(a) FDA

(b) Atomic Energy Regulatory Board (AERB)
(c) Environmental Protection Agency (EPA)
(d) World Health Organization (WHO)
Ans.(b)
Sol. • In India, the Atomic Energy Regulatory Board (AERB) is the primary body that regulates the use of ionizing radiation for food treatment.
• AERB ensures:
– Radiation facilities follow safety protocols
– Compliance with Atomic Energy Act, 1962
– Consumer protection by verifying public health standards
• Food Safety and Standards Authority of India (FSSAI) works alongside AERB to frame guidelines and labeling norms for irradiated foods.
• The Bhabha Atomic Research Centre (BARC) provides research and technology support for irradiation facilities.

Q63. In 1843, Winslow and Raymond Chevalier-Appert improved early canning by introducing which method of food processing?
(a) Use of chemical preservatives to stabilize canned foods
(b) Replacement of heat processing with vacuum dehydration
(c) Preparation of canned foods using water and steam under pressure
(d) Introduction of tin-free packaging for canned products
Ans.(c)
Sol. They developed a method of subjecting sealed foods to water and steam under pressure, which enabled higher processing temperatures than boiling water alone.
This advancement improved microbial destruction efficiency, increasing food safety and extending the shelf life of canned products.
The development acted as a precursor to modern pressure-based thermal sterilization systems used in industrial canning processes.
This method allowed more uniform, rapid, and large-scale heat treatment, enhancing commercial production viability.
(a) Chemical preservatives were not part of their processing innovation during that period.
(b) Vacuum dehydration is a separate method based on moisture removal and not related to pressurized thermal processing.
(d) Tin-free packaging advanced much later and was not connected to their 1843 contribution.
Therefore, the correct answer is (c).

Q64. Penetrating food-borne infections, such as those caused by Salmonella typhi, typically produce which illness pattern and stool finding?
(a) Watery diarrhoea with no leukocytes
(b) Dysentery with PMN leukocytes
(c) Enteric fever with mononuclear fecal leukocytes
(d) Rapid vomiting with normal stool findings
Ans.(c)

Sol. (c): Penetrating pathogens invade beyond the intestinal mucosa into deeper lymphoid tissues and bloodstream, producing enteric fever rather than simple diarrhoea. Because the immune response is systemic and cell-mediated, stool shows mononuclear leukocytes rather than PMNs. Classic organisms include Salmonella typhi, Yersinia enterocolitica, and Campylobacter fetus. Clinical features include sustained fever, abdominal pain, epatosplenomegaly, relative bradycardia, and sometimes constipation rather than diarrhoea.
(a) Incorrect because watery diarrhoea without leukocytes is non-inflammatory enterotoxin illness.
(b) Incorrect as PMNs represent mucosal invasion/dysentery (e.g., Shigella, EHEC).
(d) Incorrect because rapid vomiting with normal stools is seen with pre-formed toxins like Staph aureus and Bacillus cereus.

Q65. In the question below is given a statement followed by two options numbered 1 and 2. Based on this choose the correct option. Statement: Shiga toxin-producing *E. coli* (STEC) is transmitted to humans primarily through consumption of contaminated foods like raw or undercooked ground meat products, raw milk, and contaminated raw vegetables and sprouts. Option 1: STEC can grow in temperatures ranging from 45 °C to 65 °C, with an optimum temperature of 55 °C. Option 2: Some STEC can grow in acidic foods, down to a pH of 4.4, and in foods with a minimum water activity (a_w) of 0.95.
Options:
(a) If only option 1 is correct
(b) If only option 2 is correct
(c) If both 1 and 2 are correct
(d) If both 1 and 2 are incorrect
Ans.(b)
Sol. The statement is correct. STEC, including the dangerous *E. coli* O157:H7 strain, is transmitted through contaminated food products, particularly:
Raw or undercooked ground meat,
Unpasteurized milk,
Raw vegetables and sprouts.
Now evaluating the options:
Option 1 is incorrect: STEC is a mesophilic organism, typically growing between 7 °C and 50 °C, with an optimum around 37 °C (human body temperature). The range of 45 °C to 65 °C with optimum at 55 °C is characteristic of thermophilic bacteria, not E. coli.
Option 2 is correct: Some strains of STEC can tolerate and even grow in acidic environments, down to pH 4.4, and in foods with a minimum water activity (a_w) of 0.95. This resilience makes them a concern in acidified foods and products with lower moisture, like fermented or vacuum-packed items.
Therefore, only Option 2 is correct, making the right choice Option (b).

Q66. Which factor during freezing significantly influences the texture and quality of frozen food?
(a) Latent heat only
(b) Nucleation and ice crystal formation
(c) Food color
(d) Packaging material
Ans.(b)

Sol. Option (b) is correct because nucleation rate determines the number and size of ice crystals. Faster nucleation → more, smaller crystals → better texture and minimal tissue damage. Slow nucleation forms large crystals that rupture cells.
Option (a) is incorrect because latent heat removal supports freezing but does not decide crystal size.
Option (c) is incorrect—color does not affect texture during freezing.
Option (d) is incorrect as packaging affects surface dehydration but not internal crystal structure.

Q67. Select the option that is true regarding the following two statements labelled Assertion and Reason. Assertion (A): The FSS Act 2006, is an Act to consolidate the laws relating to food and to establish the Food Safety and Standards Authority of India (FSSAI) for laying down science-based standards for articles of food. Reason (R): Section 22 of the FSS Act empowers the Food Authority to make Regulations.
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true
Ans.(c)
Sol. The Assertion is correct. The Food Safety and Standards Act (FSSA), 2006 was enacted to consolidate multiple food laws and establish the Food Safety and Standards Authority of India (FSSAI). Its purpose is to lay down science-based standards for food, regulate manufacturing, storage, distribution, and sale, and ensure consumer health protection.
The Reason is false. Section 22 of the FSS Act does not empower FSSAI to make regulations. Instead, Section 92 of the Act empowers the Food Authority to frame regulations with the approval of the Central Government.
Section 22 deals with regulation of special food categories, such as functional foods, nutraceuticals, dietetic foods, health supplements, etc.
Thus, the assertion is true, but the reason is false. Correct answer: Option (c).

Q68. The H–O–H bond angle in water is about
(a) 100°
(b) 105°
(c) 109°
(d) 102°
Ans.(b)
Sol. In water (H_2O), the bond angle between hydrogen atoms is approximately 104.5° (rounded to 105°) due to lone pair repulsion on the oxygen atom.

Q69. Which reagent/test is suitable for detecting nitrates (indicative of pond water) adulteration of milk?
(a) Diphenylamine in H_2SO_4
(b) Rosalic acid
(c) Resorcinol
(d) Methylene blue
Ans.(a)

Sol. Diphenylamine (2% in sulfuric acid) produces a deep blue colour when nitrates (from pond water) are present in milk; pure milk shows no colour. Rosalic acid detects neutralizers; resorcinol detects sucrose; methylene blue/chloroform extraction is used for anionic detergents.

Q70. Which of the following Joint FAO/WHO expert scientific committees deals with food borne parasites?
(a) JECFA
(b) JMPR
(c) JEMRA
(d) None of the above
Ans.(c)
Sol. JEMRA stands for Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment.
It specifically deals with microbiological hazards in food, including bacteria, viruses, and parasites that can cause foodborne diseases.
JECFA (Joint Expert Committee on Food Additives) focuses on additives and contaminants.
JMPR (Joint Meeting on Pesticide Residues) evaluates pesticide residues.
Hence, the correct answer is JEMRA.

Q71. Vitamin which is not found in Fruits and Vegetables:
(a) Vitamin A
(b) Vitamin B_1
(c) Vitamin B_6
(d) Vitamin B_{12}
Ans.(d)
Sol. ✅ (d) Vitamin B_{12}: Vitamin B_{12} (cobalamin) is unique among the B-vitamins because it is not synthesized by plants. It is found naturally only in animal-based foods like meat, eggs, dairy, and fish. Fruits and vegetables do not contain vitamin B_{12}, making it a concern for vegetarians and vegans who may need fortified foods or supplements to meet their dietary needs.
❌ (a) Vitamin A: Present as beta-carotene in carrots, mangoes, spinach, etc. ❌ (b) Vitamin B_1 and ❌ (c) B_6: Found in green leafy vegetables, legumes, and whole grains.
Hence, vitamin B_{12} is the correct answer as it is absent in plant-based sources.

Q72. As per the provision of FSS (Laboratory and Sample Analysis) Regulations, 2011, the approximate Quantity of sample to be sent to the Food Analyst for Whole Spices, Condiments and Mixed Masala is _____.
(a) 500 g
(b) 100 g
(c) 200 g
(d) 1000 g
Ans.(a)
Sol. As per FSSAI sampling norms, 500 g of whole spices or condiments is the recommended sample size to be sent for food analysis under the 2011 regulations.

Q73. The pH of a solution formed by mixing equal volumes of two solutions A and B of a strong acid having pH 6 and pH 4 respectively is (given log 5 is 0.699)
(a) greater than 6
(b) less than 4
(c) between 4 and 5
(d) between 5 and 6
Ans.(c)
Sol. For strong acids:

$$[H^+]_A = 10^{-6}, \quad [H^+]_B = 10^{-4}$$

When equal volumes are mixed:

$$[H^+]_{\text{mixture}} = \frac{10^{-6} + 10^{-4}}{2} = \frac{0.000001 + 0.0001}{2} = 0.0000505$$

pH = –log(5.05×10^{-5}) ≈ 4.3 So, pH lies between 4 and 5.

Q74. Sampling and inspection for Agmark grading are performed by:
(a) APEDA Inspectors
(b) Authorized representatives of APEDA-approved laboratories
(c) DGFT Officials
(d) Customs Officers
Ans.(b)
Sol. • APEDA/AGMARK-recognized laboratories are formally assigned two core functions:
Drawl (collection) of samples from onion lots
Grading inspection as per prescribed onion standards (Schedule XIX)
• They perform:
– Physical quality check (size, shape, cleanliness)
– Labelling of each bag/lot using tamper-proof single-use seals
– Sending Inspection Report to AGMARK office
• This ensures transparency and traceability from sampling to shipment.
• APEDA officials do not inspect at lot level; DGFT & Customs have roles only at trade/licensing and port clearance stage respectively.
→ Hence (b) is the correct and legally valid functionary.

Q75. In the Rose–Gottlieb method for determining fat in ice cream, which of the following steps is essential to confirm that the extracted fat is of dairy origin?
(a) Measuring the pH of the fat at room temperature
(b) Checking the refractive index at 40°C and analyzing GLC composition
(c) Heating the fat to 100°C and observing color change
(d) Measuring the density of fat at 25°C
Ans.(b)
Sol. Option (b) is correct because after solvent extraction in the Rose–Gottlieb method, verifying the extracted fat as true dairy fat is crucial. Measuring its refractive index at 40°C and evaluating its fatty acid profile using gas–liquid chromatography (GLC) ensures the sample is not adulterated with vegetable oils or non-milk fats. This step confirms authenticity before reporting fat content.

Option (a) is incorrect because pH of isolated fat is not a reliable authenticity indicator.
Option (c) is incorrect since heating to 100°C and observing color change offers no compositional verification.
Option (d) is incorrect because density alone cannot distinguish dairy fat from other fats.

Q76. Which among the following is a limiting amino acid in wheat and rice?
(a) Lysine
(b) Methionine
(c) Phenylalanine
(d) Tryptophan
Ans.(a)
Sol. Lysine is the limiting amino acid in cereals like wheat and rice, meaning it is present in the lowest quantity relative to human nutritional requirements.

Q77. ____ is amino acid based sweetener.
(a) Sucralose
(b) Aspartame
(c) Saccharin
(d) Stevia
Ans.(b)
Sol. Aspartame is a low-calorie artificial sweetener derived from amino acids phenylalanine and aspartic acid, making it an amino acid-based sweetener.

Q78. Which amino acid is polar, uncharged, and capable of forming hydrogen bonds due to its $-CH_2OH$ side chain?
(a) Serine
(b) Glycine
(c) Alanine
(d) Arginine
Ans.(a)
Sol. Serine contains a $-CH_2OH$ side chain, allowing it to form hydrogen bonds and making it water-soluble and polar.
Polar uncharged amino acids stabilize protein structure through hydrogen bonding with nearby amino acids or water molecules.
Serine is often found on protein surfaces and active sites due to its ability to interact with aqueous environments.
It also plays a role in metabolic pathways and enzyme catalytic mechanisms.
(b) Glycine is non-polar with an H side chain.
(c) Alanine is non-polar with a CH_3 side chain.
(d) Arginine is basic and positively charged.
Therefore, the correct answer is (a).

Q79. In milk, fat exists mainly as:
(a) Water-in-oil emulsion

(b) Oil-in-water emulsion
(c) True solution
(d) Colloidal dispersion
Ans.(b)
Sol. Milk fat is dispersed as globules in an aqueous phase, forming an oil-in-water emulsion.
Fat globules are surrounded by a fat globule membrane (FGM) containing proteins, phospholipids, enzymes.
The FGM prevents coalescence and stabilises the emulsion.
This structure contributes to milk's creamy mouthfeel and white appearance.

Q80. Trans fat must be declared when:
(a) hydrogenated fats or bakery shortening are used
(b) product has no fat
(c) only total fat is given
(d) bakery products are exempt
Ans.(a)
Sol. Whenever a product contains:
• hydrogenated vegetable oils,
• vanaspati,
• bakery shortening, or
• any fat source that may produce trans fats,
the manufacturer must declare trans fat (in grams) on the label.
This is because hydrogenation generates trans fatty acids, which are linked to cardiovascular risks.
Regulations make trans fat declaration mandatory, especially to help consumers avoid unsafe fat profiles.
Incorrect options:
(b) If the product has no fat, trans fat declaration is irrelevant.
(c) Only total fat is NOT enough; fatty acid breakdown must be declared if claims involve fat.
(d) Bakery products are not exempt—many bakery fats contain trans fats.

Q81. Which method requires Mojonnier fat extraction flask?
(a) Gerber
(b) Rose–Gottlieb
(c) Acid digestion
(d) Gravimetric
Ans.(b)
Sol. Option (b) is correct because the Rose–Gottlieb (and Mojonnier) solvent extraction procedures use a Mojonnier flask—specially designed for solvent extraction of fat from dairy matrices—facilitating mixing, phase separation, and accurate solvent recovery.
Option (a) is incorrect because Gerber uses butyrometers, acid and amyl alcohol—not Mojonnier flasks.
Option (c) is incorrect since acid digestion (Werner–Schmidt) uses different glassware for digestion and ether extraction.
Option (d) is incorrect because gravimetric moisture/solids methods use drying dishes and ovens, not Mojonnier flasks.

Q82. Soft fats in milk fat are
(a) Lauric and Stearic
(b) Capric and Lauric
(c) Oleic and Butyric
(d) Oleic and Lauric
Ans.(c)
Sol. Oleic acid (a monounsaturated fatty acid) and Butyric acid (a short-chain fatty acid) are considered soft fats due to their lower melting points.

Q83. Which of the following indices is used for assessment of nutritional status of children under Gomez classification and IAP classification?
(a) Weight-for-height
(b) Height-for-age
(c) Weight-for-age
(d) Height-for-weight
Ans.(c)
Sol. Option (a): Incorrect
• Weight-for-height assesses wasting (acute malnutrition), not used in Gomez or IAP classifications.
Option (b): Incorrect
• Height-for-age assesses stunting (chronic malnutrition), also not used in these classifications.
Option (c): Correct
• Both Gomez classification and IAP (Indian Academy of Pediatrics) classification evaluate nutritional status using Weight-for-Age.
• Children are graded into normal, mild, moderate, and severe malnutrition based on how their weight compares to the standard for their age.
• This is the simplest field-level index used in community nutrition.
Option (d): Incorrect
• Height-for-weight is the same as weight-for-height; not used for Gomez or IAP.

Q84. Which material is most commonly used in pasteurization equipment due to its sanitary properties?
(a) Aluminum
(b) Stainless steel
(c) Copper
(d) Plastic
Ans.(b)
Sol. ✅ (b)
Stainless steel is the industry standard for pasteurization equipment due to its corrosion resistance, durability, and hygienic properties.
It is non-reactive, preventing metallic contamination of food.
The smooth, polished surfaces reduce microbial adhesion and make cleaning easier.
Stainless steel withstands high heat and pressure, making it ideal for continuous pasteurization operations.

❌(a)Aluminum is lightweight but prone to corrosion, especially with acidic foods.
❌(c)Copper is an excellent conductor of heat but can leach into food and is less corrosion-resistant in dairy environments.
❌(d)Plastic may deform under pasteurization temperatures and is less durable in high-volume operations.
□□ Example: Plate heat exchangers in modern dairies are typically constructed from food-grade stainless steel for optimal hygiene and performance.

Q85. Which is not included in the five kingdom system of classification?
(a) Viruses, Viroids and Lichens
(b) Slime moulds
(c) Bacteria
(d) Phycomycetes
Ans.(a)
Sol. The five kingdom classification system (Monera, Protista, Fungi, Plantae, and Animalia) does not include viruses, viroids, and lichens, as viruses are acellular and do not meet criteria for living organisms. They are studied separately in microbiology.

Q86. A laboratory which develops methods of testing, provides validation and technical support and evaluates performance is designated as a:
(a) Reference Food Laboratory
(b) Notified Food Laboratory
(c) Recognized Food Laboratory
(d) Referral Food Laboratory
Ans.(a)
Sol. ✅ Reference Food Laboratories are designated by FSSAI to develop analytical methods, validate tests, and provide technical guidance. ❌ The other types of labs serve different regulatory or analytical roles.

Q87. Select the option that is true regarding the following two statements labelled Assertion and Reason. Assertion (A): Oleoresins can replace spice powders in food products without altering the flavor profile. Reason (R): An oleoresin represents the wholesome flavour and true essence of spices enriched with volatile and non-volatile essential oil and resinous fractions.
Options:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true
Ans.(a)
Sol. Assertion is true: Oleoresins are concentrated extracts from spices that can fully substitute spice powders in processed foods. They provide consistent flavor without changing the profile, especially valuable in industrial food manufacturing.
Reason is also true: Oleoresins are made by solvent extraction of spices and contain:
Volatile oils (responsible for aroma),

Non-volatile resins (contribute to flavor, pungency, and color). This makes them a true representation of the spice's flavor essence.
Since the Reason explains why oleoresins can replace spice powders without altering flavor, the correct answer is Option (a).

Q88. Lactobacilli, important groups of bacteria in food microbiology, have their pH optima between_____
(a) 6.0 – 8.0
(b) 4.5 – 6.0
(c) 5.0 – 6.0
(d) 3.5 – 4.0
Ans.(c)
Sol. Lactobacilli thrive in mildly acidic conditions and their optimum pH range is 5.0 – 6.0. They are important in fermentation of dairy and other food products.

Q89. The common intermediate of carbohydrate, protein and lipid metabolism is–
(a) Ammonia
(b) Pyruvic Acid
(c) Acetyl CoA
(d) Phosphoglyceraldehyde
Ans.(c)
Sol. Option (c): Correct
• Acetyl CoA is the central metabolic intermediate:
– Carbohydrates → Pyruvate → Acetyl CoA
– Fatty acids → β-oxidation → Acetyl CoA
– Amino acids → deamination → Acetyl CoA
• It enters the TCA cycle, linking all major nutrient pathways.
Option (b): Incorrect
• Pyruvic acid connects carbohydrate and amino acid metabolism but not lipids directly.
Option (a): Incorrect
• Ammonia is a protein metabolism by-product only.
Option (d): Incorrect
• Phosphoglyceraldehyde is a glycolysis intermediate, not common to all three pathways.

Q90. Deficiency of which of these vitamins causes conjunctivitis, keratitis and increases sensitivity to light?
(a) Vitamin A
(b) Nicotinic acid
(c) Riboflavin
(d) Vitamin B_2
Ans.(a)
Sol. Vitamin A deficiency affects the epithelial tissues, especially in the eyes, leading to conjunctivitis, keratitis, night blindness, and photophobia. It is essential for the maintenance of visual pigment and eye health.

Q91. What physiological response occurs when Vitamin D deficiency leads to low blood calcium levels?
(a) Decreased parathyroid hormone secretion
(b) Increased parathyroid hormone secretion
(c) Inhibition of bone resorption
(d) Increased urinary calcium loss
Ans.(b)
Sol. Vitamin D deficiency reduces intestinal calcium absorption, lowering blood calcium. The parathyroid glands respond by increasing PTH secretion (secondary hyperparathyroidism). PTH restores calcium levels by stimulating bone resorption, enhancing renal calcium reabsorption, and activating vitamin D.
(a) PTH does not decrease.
(c) PTH stimulates bone resorption.
(d) PTH decreases, not increases, urinary calcium loss.

Q92. Which factor can increase mineral requirements and thereby contribute to deficiency if not met?
(a) Regular sleeping patterns
(b) Pregnancy and rapid growth
(c) Warm climate
(d) High-fiber diet
Ans.(b)
Sol. (b): Pregnancy, lactation, and rapid growth in childhood significantly increase the body's need for minerals such as iron, calcium, zinc, and iodine. If dietary intake does not match these elevated requirements, deficiency occurs despite normal absorption.
Incorrect options:
(a) Sleep does not increase mineral needs.
(c) Climate alone does not substantially increase mineral requirements.
(d) Fiber may reduce absorption of some minerals but does not increase physiological requirements.

Q93. In the question below is given a statement followed by two options numbered 1 and 2. Based on this choose the correct option. Statement: The WIFS programme was launched by the Ministry of Health and Family Welfare to curb the problem of adolescent anaemia. Option 1: School-going adolescent girls and boys and out-of-school adolescent girls are given an IFA tablet once a week for 52 weeks Option 2: Each IFA tablet contains 1000 mg of elemental iron and 500 mg of folic acid
(a) If only option 1 is correct
(b) If only option 2 is correct
(c) If both 1 and 2 are correct
(d) If both 1 and 2 are incorrect
Ans.(a)
Sol. WIFS (Weekly Iron and Folic Acid Supplementation) is a program initiated by the Ministry of Health and Family Welfare, Government of India to address the widespread problem of iron deficiency anaemia among adolescents.
Under this program, school-going adolescent boys and girls (10–19 years) and out-of-school adolescent girls are given one Iron Folic Acid (IFA) tablet per week for 52 weeks. This makes Option 1 correct.

Each IFA tablet under the WIFS scheme contains 100 mg of elemental iron and 500 micrograms (mcg) (not milligrams) of folic acid.
Option 2 is factually incorrect, as it significantly overstates the quantity of iron and misrepresents the unit for folic acid.
Therefore, only Option 1 is correct, making the right answer Option (a).

Q94. In the question below is given a statement followed by two options numbered 1 and 2. Based on this choose the correct option. Statement: Severe heating of surface layers of food during baking causes Maillard browning reactions between sugars and amino acids. Option 1: High temperatures and low moisture contents in the surface layers also cause caramelization of sugars and oxidation of fatty acids to aldehydes, lactones, ketones, alcohols, and esters. Option 2: Each amino acid produces a characteristic aroma when heated with a given sugar, owing to the production of a specific aldehyde. Options:
(a) If only option 1 is correct
(b) If only option 2 is correct
(c) If both 1 and 2 are correct
(d) If both 1 and 2 are incorrect
Ans.(c)
Sol. The given statement refers to Maillard reactions, which are non-enzymatic browning reactions between reducing sugars and amino acids, and are triggered during baking, roasting, or frying at high temperatures. This is a key process responsible for the development of browned colors and desirable flavors in baked and roasted foods.
Option 1 is correct. During baking, especially at the surface where moisture is low and temperature is high, caramelization of sugars can occur independently of Maillard reactions. Additionally, fatty acids undergo thermal oxidation, producing volatile aroma compounds such as:
Aldehydes (e.g., hexanal),
Lactones (from hydroxy fatty acids),
Ketones, alcohols, and esters, all of which contribute to the complex aroma profile of baked goods.
Option 2 is also correct. In Maillard reactions, different amino acids react with reducing sugars to yield specific aromatic compounds. For example:
Cysteine produces meaty or sulfurous aromas,
Lysine or arginine may lead to different types of aldehydes and pyrazines, which means that each amino acid-sugar pair contributes uniquely to the flavor by generating specific aldehydes and heterocyclic compounds.
Thus, both options 1 and 2 are correct, and the correct answer is Option (c).

Q95. As per the provisions of the FSS (Food Products Standards and Food Additives) Regulations, 2011, the Sucrose content in Refined sugar shall not be less than _____.
(a) 99.0 per cent by weight
(b) 98.0 per cent by weight
(c) 99.5 per cent by weight
(d) 98.5 per cent by weight
Ans.(c)
Sol. According to FSSAI standards, refined sugar must have a minimum of 99.5% sucrose content by weight to ensure purity and quality.

Q96. An example of a critical control point is:
(a) Dicing raw ingredient for the preparation of soup mix.
(b) Reviewing the source of raw ingredients for a food product.
(c) Cooking a raw food product to the critical limit.
(d) Serving the finished, ready-to-eat product.
Ans.(d)
Sol. A critical control point (CCP) is a stage in food production where control can be applied to eliminate or reduce a food safety hazard to acceptable levels.
Cooking is often a CCP, but in this case, serving the finished, ready-to-eat product is considered the point where safety must be ensured because contamination risk is highest and no further processing occurs.
Thus, option (d) is correct.

Q97. Which of the following is a correct pairing of source and key characteristic used in food irradiation?
(a) Gamma rays – low penetration, only for surface treatment
(b) Electron beams – high penetration suitable for bulk frozen blocks
(c) X-rays – good penetration, generated from machine sources
(d) Gamma rays – generated only from electrical accelerators
Ans.(c)
Sol. • Three sources are given:
– Gamma rays from radionuclides (Co-60, Cs-137): high penetration, suitable for bulk and industrial scale.
– Electron beams from accelerators: comparatively shallow penetration (~8 cm), ideal for surface or thin-layer treatments.
– X-rays from machine sources: better penetration than e-beams; generated from X-ray generators.
• Option (c) – "X-rays – good penetration, generated from machine sources" – matches the description exactly.
• Option (a) is wrong: gamma rays have high, not low, penetration.
• Option (b) is wrong: e-beams have limited penetration, not ideal for large bulk.
• Option (d) is wrong: gamma rays come from radioisotopes, not electrical accelerators.
→ Therefore, option (c) is correct.

Q98. Under the FSS Act, 2006, which statement correctly describes the Food Safety and Standards Authority of India (FSSAI)?
(a) A temporary advisory body
(b) A body corporate with perpetual succession
(c) A private regulatory agency
(d) A state-level organization
Ans.(b)
Sol. (b): Section 4 of the FSS Act establishes FSSAI as a body corporate with perpetual succession and a common seal. This legal structure enables it to acquire, hold, and dispose of property, enter contracts, and sue or be sued under its own name. Its corporate status ensures continuity, independent functioning, and long-term regulatory authority over national food safety standards.
Incorrect options:

(a) It is permanent, not temporary.
(c) It is a statutory body, not a private agency.
(d) It operates at the national level, not at a state level.

Q99. HACCP can be applied 1) in Distribution and Retail 2) From farm to table 3) By food industry.
(a) 2 & 3
(b) 1 & 2
(c) 1 & 3
(d) 1 & 2 & 3
Ans.(d)
Sol. HACCP is applicable across the entire food chain.
It can be implemented in distribution and retail systems (1), in farm-to-table approaches covering the whole chain (2), and directly in food manufacturing industry (3).
Therefore, all three areas are valid applications, making option (d) correct.

Q100. Which is the most effective and permanent anti-rodent measure which should be used in a food facility?
(a) Trapping using baits
(b) Use of rodenticides
(c) Environmental sanitation
(d) Fumigation of premises
Ans.(c)
Sol. Option (a): Traps and baits can reduce rodent numbers temporarily but do not eliminate the root cause.
Option (b): Rodenticides may control rodents but pose risks of contamination and are not considered safe in food facilities.
Option (d): Fumigation is costly, temporary, and not sustainable for routine rodent control.
Option (c): Environmental sanitation is the most effective and permanent solution. This includes:
Proper waste disposal.
Sealing entry points.
Maintaining clean surroundings and storage areas.
Removing food and water sources that attract rodents.
These measures prevent rodent infestation in the first place and provide long-term control.
Thus, the most effective and permanent measure is Option (c) – Environmental sanitation.