Board Exam Desk

Food Technology Reviewer

Food Technology Licensure Examination | PRC | 120 original questions

2026 Edition | Updated November 2026

Original board-style practice questions with an answer key.

Practice questions

Food Chemistry and Analysis

1. A dried mango sample in a sealed chamber at 25 degrees C reaches an equilibrium water vapor pressure of 2.24 kPa. Pure water at the same temperature has a vapor pressure of 3.17 kPa. What is the water activity of the sample?

A. 0.29
B. 0.62
C. 0.71
D. 0.78

2. A 0.250 g sample of dried fish powder is analyzed by the Kjeldahl method. The distillate requires 12.4 mL of 0.1000 N HCl, and the reagent blank requires 0.4 mL. Using a factor of 6.25, what is the crude protein content?

A. 43.4%
B. 6.72%
C. 42.0%
D. 38.6%

3. A 5.000 g sample of fresh cassava chips weighs 4.150 g after oven drying to constant weight. What is its moisture content on a dry basis?

A. 20.5%
B. 17.0%
C. 83.0%
D. 24.3%

4. A 10.0 mL portion of calamansi juice is titrated with 0.100 N NaOH to a phenolphthalein endpoint, using 8.0 mL. Using a milliequivalent weight of 0.064 g for citric acid, what is the titratable acidity?

A. 0.64 g citric acid per 100 mL
B. 0.08 g citric acid per 100 mL
C. 5.12 g citric acid per 100 mL
D. 0.51 g citric acid per 100 mL

5. Sliced bananas left on a counter turn brown within minutes. Which reaction is mainly responsible?

A. Condensation of reducing sugars with amino acids
B. Thermal decomposition of sucrose into caramel
C. Hydrolysis of triglycerides by lipase enzymes
D. Oxidation of phenolic compounds by polyphenol oxidase

6. Which pair of reactants is required for the Maillard reaction that browns the crust of pandesal?

A. Sucrose and a long-chain fatty acid
B. Starch and a divalent metal ion
C. A reducing sugar and a free amino group
D. Ascorbic acid and dissolved oxygen

7. Pan de sal stored for two days becomes firm and crumbly even when kept in a sealed bag. What is the main cause of this staling?

A. Maillard browning continuing inside the crumb
B. Breakdown of gluten by flour proteases
C. Recrystallization of amylopectin in the crumb
D. Lipid oxidation by flour lipoxygenase

8. A quality analyst wants to estimate the degree of unsaturation of a coconut oil and palm olein blend. Which test should be used?

A. Saponification value
B. Acid value
C. Iodine value
D. Reichert-Meissl value

9. Frying oil in a fast-food outlet is checked for early oxidative deterioration. Which measurement best indicates the level of primary oxidation products?

A. Iodine value
B. Peroxide value
C. Saponification value
D. Refractive index

10. A fat sample has a higher saponification value than coconut oil reference standards normally show. What does this most directly suggest about its fatty acids?

A. They contain more double bonds
B. They contain more free fatty acids
C. Their average chain length is shorter
D. Their average chain length is longer

11. A processor makes a low-sugar guava jelly and cannot rely on high sugar levels for gel formation. Which gelling system is most appropriate?

A. High methoxyl pectin at pH 3 with 65% sugar
B. Low methoxyl pectin with added calcium ions
C. Native corn starch heated in neutral water
D. Gelatin set at a pH near its isoelectric point

12. Green beans cooked too long in an acidic sauce turn olive brown. What chemical change in chlorophyll causes this?

A. Replacement of magnesium by copper to form a stable complex
B. Removal of the phytol tail to form chlorophyllide
C. Oxidation of the porphyrin ring to carotenoids
D. Replacement of magnesium by hydrogen to form pheophytin

13. Fresh beef in an oxygen-permeable overwrap shows a bright cherry-red surface. Which pigment form is responsible?

A. Metmyoglobin
B. Deoxymyoglobin
C. Oxymyoglobin
D. Nitrosylmyoglobin

14. Which two wheat protein fractions combine on hydration and mixing to form the viscoelastic gluten network in bread dough?

A. Albumin and globulin
B. Zein and glutelin
C. Gliadin and glutenin
D. Casein and whey

15. A ready-to-drink juice must keep its labeled vitamin content through shelf life. Which vitamin is usually the most sensitive to heat, oxygen and light during processing?

A. Vitamin C
B. Vitamin A
C. Niacin
D. Vitamin K

16. A dressing manufacturer needs an emulsifier for a stable oil-in-water emulsion. Which hydrophilic-lipophilic balance (HLB) value is most suitable?

A. About 4
B. About 1
C. About 14
D. About 6

17. In the gravimetric determination of total ash, what does the residue left after incineration at about 550 degrees C represent?

A. The crude fiber content
B. The nitrogen-free extract
C. The inorganic mineral content
D. The non-volatile organic acids

18. Partial hydrogenation of soybean oil to make a margarine base has which notable side effect?

A. Formation of more polyunsaturated fatty acids
B. Formation of trans fatty acids
C. Lowering of the oil's melting point
D. Conversion of triglycerides into glycerol

19. A muscovado sugar syrup is heated strongly in an open kettle with no protein or amino acid present, and it browns and develops a burnt-sugar flavor. Which reaction is this?

A. Maillard reaction
B. Enzymatic browning
C. Strecker degradation
D. Caramelization

20. Which instrument is routinely used in a juice plant to measure soluble solids in degrees Brix?

A. Refractometer
B. Polarimeter
C. Viscometer
D. Colorimeter

Food Microbiology

21. During a heat resistance test at a constant temperature, a spore suspension falls from 1.0 x 10^6 to 1.0 x 10^2 survivors per mL in 12 minutes. What is the D-value?

A. 3.0 min
B. 2.0 min
C. 4.0 min
D. 12 min

22. A bacterium with a generation time of 20 minutes is inoculated into a broth at 1.0 x 10^3 CFU/mL. Assuming exponential growth with no lag, what count is expected after 2 hours?

A. 6.0 x 10^3 CFU/mL
B. 1.2 x 10^4 CFU/mL
C. 3.2 x 10^4 CFU/mL
D. 6.4 x 10^4 CFU/mL

23. A plate inoculated with 0.1 mL of the 10^-4 dilution of a ground pork sample shows 156 colonies. What is the count in the sample?

A. 1.6 x 10^6 CFU/g
B. 1.6 x 10^7 CFU/g
C. 1.6 x 10^5 CFU/g
D. 1.6 x 10^8 CFU/g

24. Canned foods with an equilibrium pH above 4.6 are classified as low-acid and need a botulinum cook. Why is pH 4.6 used as the dividing line?

A. Most yeasts and molds are destroyed at or below it
B. Can corrosion begins sharply above it
C. Enzymes in fruits and vegetables are inactive below it
D. Clostridium botulinum spores cannot germinate and produce toxin below it

25. Party guests fall ill 2 to 4 hours after eating ham sandwiches that were reheated thoroughly before serving. The ham had been sliced by hand and left at room temperature for hours. Which organism is the most likely cause?

A. Staphylococcus aureus
B. Clostridium botulinum
C. Salmonella Typhimurium
D. Listeria monocytogenes

26. Cooked rice left in a warm rice cooker overnight is used for fried rice the next day. Diners vomit within a few hours. Which organism is most likely responsible?

A. Vibrio parahaemolyticus
B. Campylobacter jejuni
C. Clostridium perfringens
D. Bacillus cereus

27. Which foodborne pathogen is a particular concern for ready-to-eat chilled products such as hotdogs and soft cheeses because it can multiply at refrigeration temperatures?

A. Staphylococcus aureus
B. Clostridium perfringens
C. Bacillus cereus
D. Listeria monocytogenes

28. A large pot of beef stew is cooked in the morning and left to cool slowly on the stove until dinner. Diners develop abdominal cramps and diarrhea 8 to 16 hours later. Which organism best fits?

A. Staphylococcus aureus
B. Bacillus cereus emetic strain
C. Clostridium perfringens
D. Vibrio cholerae

29. Which organism is the preferred indicator of recent fecal contamination in water used in a food plant?

A. Bacillus subtilis
B. Escherichia coli
C. Pseudomonas fluorescens
D. Lactobacillus plantarum

30. A dried product has a water activity of 0.85. Which group of microorganisms is the main spoilage concern?

A. Molds and osmotolerant yeasts
B. Most Gram-negative bacteria
C. Clostridium botulinum type E
D. Pseudomonas species

31. Which bacterium is used to produce the cellulose pellicle of nata de coco from coconut water?

A. Komagataeibacter xylinus (formerly Acetobacter xylinum)
B. Lactobacillus delbrueckii subsp. bulgaricus
C. Leuconostoc mesenteroides
D. Bacillus subtilis var. natto

32. Peanuts stored in a humid warehouse develop greenish-yellow mold. Which toxin is the main concern?

A. Aflatoxin from Aspergillus flavus
B. Patulin from Penicillium expansum
C. Ochratoxin from Fusarium species
D. Ergot alkaloids from Claviceps species

33. Canned corn has normal flat ends but is sour on opening, with no gas produced. Which organism is the classic cause of this defect?

A. Clostridium sporogenes
B. Saccharomyces cerevisiae
C. Geobacillus stearothermophilus
D. Desulfotomaculum nigrificans

34. Several people experience flushing, headache and a peppery taste in the mouth shortly after eating grilled tuna that had been held unrefrigerated on a boat. What is the likely cause?

A. Ciguatoxin accumulated through reef fish food chains
B. Tetrodotoxin concentrated in the fish liver
C. Saxitoxin produced by dinoflagellate blooms
D. Histamine formed by bacterial decarboxylation of histidine

35. An outbreak is linked to raw oysters and kinilaw made from seawater fish. The isolate grows best in media with 3% salt. Which organism is most likely?

A. Shigella sonnei
B. Yersinia enterocolitica
C. Campylobacter jejuni
D. Vibrio parahaemolyticus

36. Chilled fish fillets stored at 2 degrees C develop slime and off-odors within a week. Which group of organisms most commonly causes this spoilage?

A. Thermophilic spore formers such as Geobacillus
B. Psychrotrophic Gram-negative rods such as Pseudomonas
C. Lactic acid cocci such as Pediococcus
D. Xerophilic molds such as Eurotium

37. In a vegetable fermentation such as burong mustasa, which organism typically starts the fermentation before more acid-tolerant lactobacilli take over?

A. Leuconostoc mesenteroides
B. Lactobacillus plantarum
C. Aspergillus oryzae
D. Acetobacter aceti

38. What is the main role of baker's yeast in bread dough?

A. Fermenting sugars to carbon dioxide and ethanol
B. Hydrolyzing gluten to soften the dough
C. Producing lactic acid for a sour flavor
D. Oxidizing flour pigments to whiten the crumb

39. A tocino producer combines curing salt, sugar, mild acidification and chilled storage, each at levels that alone would not stop spoilage. What preservation concept does this illustrate?

A. Commercial sterility
B. Competitive exclusion
C. Hurdle technology
D. Thermal death time

40. Which pathogen is most commonly associated with raw or undercooked eggs and poultry?

A. Clostridium botulinum
B. Vibrio vulnificus
C. Salmonella Enteritidis
D. Bacillus cereus

Food Processing and Preservation

41. Why are vegetables such as string beans blanched before freezing?

A. To sterilize the product so it is shelf stable
B. To add moisture that improves frozen texture
C. To develop color through Maillard browning
D. To inactivate enzymes that cause quality loss in storage

42. A juice plant concentrates 1000 kg/h of pineapple juice from 12% to 60% total solids in an evaporator. How much water is removed per hour?

A. 200 kg
B. 720 kg
C. 800 kg
D. 480 kg

43. How much 70 degrees Brix sugar syrup must be mixed with water to make 1000 kg of 40 degrees Brix syrup?

A. 571 kg
B. 429 kg
C. 600 kg
D. 700 kg

44. A pickle maker needs 25.0 kg of 8.0% (w/w) salt brine. How much salt and water are required?

A. 2.17 kg salt and 25.0 kg water
B. 2.00 kg salt and 23.0 kg water
C. 2.00 kg salt and 25.0 kg water
D. 1.85 kg salt and 23.2 kg water

45. A plant processes 500 kg of fresh mangoes and recovers 320 kg of pulp after peeling and seed removal. What is the pulp yield?

A. 36%
B. 56%
C. 156%
D. 64%

46. Why does quick freezing of shrimp give better thawed quality than slow freezing?

A. It forms fewer large crystals that hold water more tightly
B. It forms many small ice crystals that cause less cell damage
C. It raises the final freezing point of the tissue
D. It removes more water by sublimation during freezing

47. What principle allows freeze-dried fruit to keep its shape and rehydrate quickly?

A. Water is removed by boiling under high pressure
B. Water is bound by added humectants in the tissue
C. Water is removed by sublimation from the frozen state
D. Water is driven off by hot air at high velocity

48. What is the main purpose of exhausting filled cans before double seaming?

A. To sterilize the headspace before the retort process
B. To raise the pH of the product in the can
C. To remove air so a vacuum forms after cooling
D. To cool the contents before they reach the seamer

49. A processor dries salted fish (daing). How does the added salt mainly help preserve the product?

A. It destroys bacterial spores through ionic heating
B. It raises the pH beyond the range for bacterial growth
C. It lowers water activity and draws water from the tissue
D. It forms a protein film that blocks oxygen entry

50. In smoking fish such as tinapa, which smoke components contribute most to antioxidant and antimicrobial effects?

A. Carbon monoxide
B. Water vapor
C. Fine ash particles
D. Phenolic compounds

51. In what unit is the absorbed dose in food irradiation expressed?

A. Becquerel (Bq)
B. Sievert (Sv)
C. Curie (Ci)
D. Gray (Gy)

52. In modified atmosphere packaging of fresh fish fillets, what is the main purpose of raising the carbon dioxide level?

A. To keep the flesh bright red through oxygenation
B. To raise surface pH so proteins hold more water
C. To replace nitrogen as an inert filler gas
D. To inhibit aerobic Gram-negative spoilage bacteria

53. Which commercial milk pasteurization treatment is an example of a high-temperature short-time (HTST) process?

A. 63 degrees C for 30 minutes
B. 72 degrees C for 15 seconds
C. 121 degrees C for 15 minutes
D. 140 degrees C for 2 seconds

54. In soy sauce manufacture, which mold is grown on a soybean and wheat mixture to make koji?

A. Aspergillus oryzae
B. Rhizopus oligosporus
C. Penicillium roqueforti
D. Mucor rouxii

55. What distinguishes ohmic heating from conventional heating of a particulate soup?

A. Heat moves inward only by conduction from a heated wall
B. Heat is generated within the food as electric current passes through it
C. Heat is supplied by infrared radiation absorbed at the surface
D. Heat is produced by microwaves causing dielectric polarization

56. During hot-air drying of banana slices, the drying rate begins to decrease after the constant-rate period. What mainly controls drying in this falling-rate period?

A. Internal movement of moisture to the surface
B. Evaporation from a fully wetted surface
C. Air temperature alone at the exposed surface
D. Sublimation of ice crystals within the slices

57. Which process is used to make expanded corn snacks by forcing a moist mix through a die at high temperature and pressure?

A. Spray drying
B. Extrusion cooking
C. Drum drying
D. Hydrostatic sterilization

58. Why is fruit jam typically cooked to about 65 degrees Brix?

A. The sugar fully sterilizes the fruit at that level
B. The sugar raises the pH to stop browning
C. The high sugar lowers water activity and aids pectin gel formation
D. The sugar replaces the need for fruit acid

59. Pineapple slices are soaked in concentrated sugar syrup before drying. What process is this?

A. Osmotic dehydration
B. Freeze concentration
C. Reverse osmosis
D. Vacuum frying

60. What is the main advantage of a retort pouch over a metal can for a low-acid sterilized product?

A. It allows sterilization at much lower temperatures
B. It allows the product to skip a validated thermal process
C. Its thin profile shortens the heating time to sterility
D. It makes the product suitable for acidification

Food Engineering

61. How much heat is required to warm 200 kg of mango juice (specific heat 3.9 kJ/kg K) from 25 degrees C to 85 degrees C?

A. 66 300 kJ
B. 46 800 kJ
C. 19 500 kJ
D. 780 kJ

62. A low-acid product is held at 115 degrees C for 30 minutes. Using z = 10 degrees C and a reference temperature of 121.1 degrees C, what is the equivalent F0 value?

A. 7.4 min
B. 18.3 min
C. 3.0 min
D. 12.2 min

63. With z = 10 degrees C and a reference of 121.1 degrees C, what is the lethal rate at a can cold-spot temperature of 118 degrees C?

A. 0.49
B. 0.31
C. 2.04
D. 0.69

64. A spore has a D-value of 5.0 min at 112 degrees C and 0.80 min at 118 degrees C. What is its z-value?

A. 7.5 degrees C
B. 6.0 degrees C
C. 9.6 degrees C
D. 4.2 degrees C

65. Using a D121 value of 0.21 min for Clostridium botulinum, what minimum F0 does a 12D botulinum cook require?

A. 1.26 min
B. 2.52 min
C. 0.21 min
D. 5.04 min

66. Each can of a product initially contains 100 spores of a spoilage organism with D = 1.5 min at the process temperature. If the process delivers 9 minutes at that temperature, what is the expected spoilage rate?

A. 1 can in 1000
B. 1 can in 10 000
C. 1 can in 1 000 000
D. 1 can in 100

67. A batch of 500 kg of fish containing 75% water is frozen, and 90% of the water turns to ice. Taking the latent heat of fusion as 334 kJ/kg, how much latent heat must be removed?

A. 125 250 kJ
B. 150 300 kJ
C. 112 725 kJ
D. 83 500 kJ

68. A kettle heats 1000 kg of sauce (cp 3.8 kJ/kg K) from 20 to 90 degrees C using steam that gives up 2200 kJ/kg on condensing. Ignoring losses, how much steam is needed?

A. 266 kg
B. 121 kg
C. 173 kg
D. 88 kg

69. A stainless steel wall (k = 16 W/m K) 3.0 mm thick with an area of 2.0 m2 has a temperature difference of 10 K across it. What is the steady conduction heat flow?

A. 10.7 kW
B. 1.07 kW
C. 107 kW
D. 320 W

70. Milk (density 1030 kg/m3, viscosity 0.0020 Pa s) flows at 1.5 m/s in a 0.050 m diameter pipe. What is the Reynolds number and flow regime?

A. About 3 860, transitional
B. About 386, laminar
C. About 1 930, laminar
D. About 38 600, turbulent

71. One hundred kilograms of grated coconut at 80% moisture (wet basis) is dried to 10% moisture (wet basis). What is the mass of the dried product?

A. 20.0 kg
B. 30.0 kg
C. 77.8 kg
D. 22.2 kg

72. Tomato ketchup flows more easily the faster it is stirred or squeezed. How is this flow behavior classified?

A. Shear-thickening (dilatant)
B. Newtonian
C. Rheopectic
D. Shear-thinning (pseudoplastic)

73. A pump moves 0.0020 m3/s of syrup against a pressure rise of 300 kPa. If pump efficiency is 60%, what shaft power is required?

A. 0.60 kW
B. 0.36 kW
C. 1.7 kW
D. 1.0 kW

74. A cold store has a total refrigeration load of 42.2 kW. Taking 1 ton of refrigeration as 3.517 kW, what is the load in tons?

A. 12.0 TR
B. 14.8 TR
C. 8.3 TR
D. 10.5 TR

75. In a counterflow heat exchanger, hot water cools from 90 to 50 degrees C while juice is heated from 20 to 40 degrees C. What is the log mean temperature difference?

A. 40.0 degrees C
B. 39.2 degrees C
C. 35.0 degrees C
D. 30.0 degrees C

76. Water flowing at 1.0 m/s in a 50 mm pipe enters a 25 mm section. What is the velocity in the smaller pipe?

A. 4.0 m/s
B. 2.0 m/s
C. 0.50 m/s
D. 8.0 m/s

77. Using Siebel's equation for foods above freezing, cp = 0.837 + 3.349 Xw kJ/kg K, what is the specific heat of a fruit with 80% water?

A. 3.35 kJ/kg K
B. 2.68 kJ/kg K
C. 4.19 kJ/kg K
D. 3.52 kJ/kg K

78. Where is the slowest heating point in a can of solid-pack food that heats mainly by conduction?

A. At the geometric center of the can
B. Near the inside of the can wall
C. Just below the headspace at the top
D. At the seam of the bottom end

79. In a multiple-effect evaporator, what is the main reason for using the vapor from one effect to heat the next?

A. To increase the mass of water evaporated per kilogram of steam
B. To increase the boiling point in each later effect
C. To avoid the need for vacuum in later effects
D. To raise the heat transfer coefficient in the first effect

80. Air entering a dryer is heated from 30 to 70 degrees C without adding moisture. What happens to its relative humidity and drying capacity?

A. Relative humidity rises and drying capacity rises
B. Relative humidity falls and drying capacity rises
C. Relative humidity falls and drying capacity falls
D. Relative humidity stays constant and drying capacity rises

Food Quality Assurance and Sensory Evaluation

81. In a triangle test, what is the probability that a panelist identifies the odd sample by chance alone?

A. 1/3
B. 1/2
C. 1/4
D. 2/3

82. Thirty panelists perform a triangle test to see if a reformulated polvoron differs from the original. Using a one-tailed binomial test at the 5% level, what is the minimum number of correct identifications needed to conclude a difference?

A. 11
B. 15
C. 20
D. 13

83. In a duo-trio test, what is presented to each panelist?

A. A reference followed by two coded samples, one matching it
B. Three coded samples, two of which are identical
C. Two coded samples to rank for a named attribute
D. One coded sample to rate on a nine-point scale

84. A company wants to know whether target consumers like a new ube spread. Which method is most appropriate?

A. Quantitative descriptive analysis with a trained panel
B. A triangle test with screened panelists
C. A 9-point hedonic scale with untrained consumers
D. A threshold test with ascending concentrations

85. Which panel is required to generate a detailed sensory profile of attributes such as sweetness, chewiness and coconut aroma intensity?

A. A large untrained consumer panel
B. A single expert taster
C. A panel of production workers
D. A trained descriptive panel

86. Sensory samples are labeled with random three-digit codes instead of letters such as A and B. What error does this mainly prevent?

A. Fatigue from tasting too many samples
B. Expectation bias from the meaning of labels
C. Contrast error from strong preceding samples
D. Halo effect from rating many attributes

87. Why should the order of sample presentation be balanced or randomized across panelists?

A. To cancel out positional and carry-over effects
B. To reduce the number of panelists needed
C. To make every sample appear more acceptable
D. To shorten the time needed for each session

88. Fill weights of a bottled sauce are monitored with an X-bar chart. The process mean is 250.0 g and the standard deviation of subgroup means is 1.2 g. What is the upper control limit?

A. 252.4 g
B. 253.6 g
C. 251.2 g
D. 256.0 g

89. A snack line has specification limits of 495 g and 515 g for bag weight, and the process standard deviation is 2.5 g. What is the process capability index Cp?

A. 0.67
B. 2.00
C. 1.00
D. 1.33

90. A packaged product has a shelf life of 60 days at 35 degrees C in an accelerated study. If its Q10 is 2, what is the estimated shelf life at 25 degrees C?

A. 30 days
B. 120 days
C. 90 days
D. 240 days

91. A quality team lists all causes of rejected bottles and wants to identify the few causes responsible for most rejects. Which tool is best suited?

A. Pareto chart
B. Scatter diagram
C. Run chart
D. Flow diagram

92. Which quality tool organizes the possible causes of a problem under headings such as materials, methods, machines and manpower?

A. Control chart
B. Histogram
C. Cause-and-effect (fishbone) diagram
D. Check sheet

93. On an X-bar chart, which observation most clearly shows that the process is out of statistical control?

A. Points scattered randomly about the center line
B. A single point beyond the upper 3-sigma limit
C. All points within the 2-sigma limits
D. Slight random variation between subgroups

94. In acceptance sampling, what does the acceptable quality limit (AQL) represent?

A. The defect rate at which every lot is rejected
B. The maximum number of samples per lot
C. The minimum shelf life required for release
D. The worst process average of defects considered acceptable

95. In CIE L*a*b* color measurement of a tomato paste, what does a high positive a* value indicate?

A. Strong redness
B. Strong yellowness
C. High lightness
D. Strong greenness

96. In instrumental texture profile analysis of a cooked rice cake, which parameter is read from the peak force of the first compression?

A. Hardness
B. Springiness
C. Cohesiveness
D. Adhesiveness

97. Which basic taste is associated with monosodium glutamate and with ribonucleotides such as IMP and GMP?

A. Salty
B. Umami
C. Bitter
D. Sour

98. A panelist can tell that a solution differs from water but cannot yet name the taste. Which threshold has been reached?

A. Recognition threshold
B. Difference threshold
C. Terminal threshold
D. Detection threshold

99. In a paired comparison test asking which of two samples is sweeter, what is the probability of a correct answer by chance?

A. 1/3
B. 1/4
C. 1/6
D. 1/2

100. Which international standard specifies requirements for a food safety management system that applies throughout the food chain?

A. ISO 14001
B. ISO 22000
C. ISO 45001
D. ISO 17025

Food Safety, Laws and Regulations

101. A team is developing a HACCP plan for bottled coconut water. Which principle must be carried out first?

A. Establish critical limits
B. Establish monitoring procedures
C. Conduct a hazard analysis
D. Establish record keeping

102. In a HACCP plan, what is a critical control point?

A. Any step where a quality defect may be noticed by consumers
B. A step where control is essential to prevent, eliminate or reduce a hazard to an acceptable level
C. A step where all cleaning and sanitation records are kept
D. The last inspection point before shipment of the product

103. For a cooked chicken product, which of the following is a proper critical limit at the cooking step?

A. A target golden-brown surface color
B. A cooking time chosen by the line supervisor
C. A taste test done by the production staff
D. A minimum core temperature held for a specified time

104. During monitoring, a pasteurizer's holding temperature falls below its critical limit for several minutes. What should happen first under the HACCP plan?

A. Carry out the predetermined corrective action
B. Record the event and continue production
C. Revise the hazard analysis before acting
D. Adjust the critical limit to the observed temperature

105. Which activity is an example of HACCP verification rather than monitoring?

A. An operator reading the cooking temperature each batch
B. A worker checking the metal detector at each shift start
C. A supervisor reviewing and calibrating thermometer records weekly
D. A line staff timing the holding tube each hour

106. A plant uses a metal detector after packing to reject products with fragments from worn equipment. What type of hazard is being controlled?

A. Chemical
B. Physical
C. Biological
D. Allergenic

107. A line producing peanut butter cookies is switched to plain cookies. What is the main purpose of thorough cleaning between runs?

A. To prevent flat sour spoilage
B. To prevent lipid oxidation
C. To prevent starch retrogradation
D. To prevent allergen cross-contact

108. What are good manufacturing practices (GMP) and sanitation standard operating procedures (SSOP) called in relation to a HACCP system?

A. Critical control points
B. Prerequisite programs
C. Corrective actions
D. Validation studies

109. What is the correct order when cleaning a food-contact surface?

A. Sanitize, wash with detergent, rinse, then dry
B. Wash with detergent, sanitize, then remove soil
C. Remove soil, wash with detergent, rinse, then sanitize
D. Rinse, sanitize, then wash with detergent

110. How much 5.0% (50 000 ppm) sodium hypochlorite solution is needed to prepare 10 L of a 200 ppm sanitizing solution?

A. 4.0 mL
B. 400 mL
C. 40 mL
D. 25 mL

111. Which temperature range is generally regarded as the danger zone in which pathogens grow rapidly in food?

A. 0 to 10 degrees C
B. 60 to 100 degrees C
C. -18 to 0 degrees C
D. 5 to 60 degrees C

112. Which stock rotation practice helps ensure ingredients are used before they expire?

A. Last in, first out (LIFO)
B. First in, first out (FIFO)
C. Highest cost, first out
D. Largest lot, first out

113. During a recall, a company must identify its immediate suppliers and immediate customers for the affected lot. What capability does this describe?

A. Full chain verification by third parties
B. One step back, one step forward traceability
C. Environmental pathogen monitoring
D. Statistical acceptance sampling

114. Which Philippine law is known as the Food Safety Act of 2013?

A. Republic Act No. 8976
B. Republic Act No. 11052
C. Republic Act No. 10611
D. Republic Act No. 8172

115. Which Philippine law regulates the practice of food technology and governs the licensure of food technologists?

A. Republic Act No. 10611
B. Republic Act No. 11052
C. Republic Act No. 9711
D. Republic Act No. 8976

116. Under the Philippine Food Fortification Act of 2000 (RA 8976), which nutrient is required to be added to refined cooking oil?

A. Iron
B. Iodine
C. Vitamin D
D. Vitamin A

117. Which Philippine law requires the iodization of salt for human consumption?

A. Republic Act No. 8172
B. Republic Act No. 8976
C. Republic Act No. 10611
D. Republic Act No. 7394

118. Which international body develops the Codex Alimentarius food standards?

A. The World Trade Organization
B. The International Organization for Standardization
C. A joint FAO/WHO commission
D. The United Nations Children's Fund

119. A warehouse uses inspection, exclusion, sanitation and targeted chemical treatment together to control rodents and insects. What is this approach called?

A. Hazard analysis and critical control points
B. Good laboratory practice
C. Total quality management
D. Integrated pest management

120. Residues of organophosphate insecticide are found on vegetables received for processing. What type of hazard is this?

A. Chemical
B. Physical
C. Biological
D. Allergenic

Answer key

Food Technology

1. C. 0.71

Water activity is the ratio of the sample's vapor pressure to that of pure water: 2.24 / 3.17 = 0.71.

2. C. 42.0%

%N = (12.4 - 0.4) x 0.1000 x 14.007 / 250 mg x 100 = 6.72%; crude protein = 6.72 x 6.25 = 42.0%.

3. A. 20.5%

Water lost = 0.850 g; dry basis moisture = 0.850 / 4.150 x 100 = 20.5% (the 17.0% figure is the wet basis value).

4. D. 0.51 g citric acid per 100 mL

Acidity = 8.0 x 0.100 x 0.064 / 10.0 x 100 = 0.512 g citric acid per 100 mL.

5. D. Oxidation of phenolic compounds by polyphenol oxidase

Cut fruit browning is enzymatic: polyphenol oxidase oxidizes phenolics to quinones that polymerize into brown melanins.

6. C. A reducing sugar and a free amino group

Maillard browning begins with condensation of the carbonyl group of a reducing sugar with a free amino group of an amino acid or protein.

7. C. Recrystallization of amylopectin in the crumb

Crumb staling is mainly starch retrogradation, chiefly the slow recrystallization of amylopectin after baking.

8. C. Iodine value

The iodine value measures the grams of iodine absorbed by 100 g of fat, which reflects the number of double bonds.

9. B. Peroxide value

Primary lipid oxidation produces hydroperoxides, which are quantified by the peroxide value.

10. C. Their average chain length is shorter

Saponification value is inversely related to mean molecular weight; more milligrams of KOH per gram means shorter fatty acid chains.

11. B. Low methoxyl pectin with added calcium ions

Low methoxyl pectin forms gels through calcium bridging between carboxyl groups, so it does not need high sugar.

12. D. Replacement of magnesium by hydrogen to form pheophytin

Acid and heat displace the central magnesium ion with hydrogen, converting green chlorophyll to olive-brown pheophytin.

13. C. Oxymyoglobin

Oxygenation of myoglobin with iron in the ferrous state gives bright red oxymyoglobin; oxidation to the ferric state gives brown metmyoglobin.

14. C. Gliadin and glutenin

Gliadins contribute extensibility and glutenins contribute elasticity; together they form gluten.

15. A. Vitamin C

Ascorbic acid is water soluble and readily oxidized, so it is the usual index of processing and storage losses.

16. C. About 14

Oil-in-water emulsions are favored by hydrophilic emulsifiers with HLB roughly 8 to 18; low HLB values (3 to 6) favor water-in-oil systems.

17. C. The inorganic mineral content

Dry ashing burns off organic matter, leaving the inorganic residue taken as total minerals.

18. B. Formation of trans fatty acids

Partial hydrogenation isomerizes some cis double bonds to the trans form while raising the melting point.

19. D. Caramelization

Browning of sugars heated alone, without amino compounds, is caramelization.

20. A. Refractometer

A refractometer relates the refractive index of the solution to its soluble solids, read as degrees Brix.

21. A. 3.0 min

Four log cycles are destroyed in 12 min, so D = 12 / 4 = 3.0 min.

22. D. 6.4 x 10^4 CFU/mL

Two hours equals 6 generations, so N = 1.0 x 10^3 x 2^6 = 6.4 x 10^4 CFU/mL.

23. B. 1.6 x 10^7 CFU/g

CFU/g = 156 / (0.1 mL x 10^-4) = 1.56 x 10^7, reported as about 1.6 x 10^7 CFU/g.

24. D. Clostridium botulinum spores cannot germinate and produce toxin below it

Proteolytic C. botulinum does not grow or form toxin at pH 4.6 or below, so acid foods need only milder processes.

25. A. Staphylococcus aureus

Short onset and survival of reheating point to preformed, heat-stable staphylococcal enterotoxin from handler contamination.

26. D. Bacillus cereus

Bacillus cereus spores survive cooking and, in rice held warm, produce a heat-stable emetic toxin.

27. D. Listeria monocytogenes

Listeria monocytogenes is psychrotrophic and can grow slowly at about 4 degrees C.

28. C. Clostridium perfringens

Large volumes of meat cooled slowly allow surviving C. perfringens spores to germinate; the toxin is released in the gut after 8 to 16 hours.

29. B. Escherichia coli

E. coli lives in the intestines of warm-blooded animals and does not persist long outside, so it signals recent fecal contamination.

30. A. Molds and osmotolerant yeasts

Most bacteria need aw above about 0.90, while many molds and yeasts can still grow near 0.85.

31. A. Komagataeibacter xylinus (formerly Acetobacter xylinum)

This acetic acid bacterium synthesizes extracellular bacterial cellulose that forms the nata gel.

32. A. Aflatoxin from Aspergillus flavus

Aspergillus flavus on peanuts and corn produces aflatoxins, which are potent liver carcinogens.

33. C. Geobacillus stearothermophilus

Flat sour spoilage is caused by thermophilic spore formers such as G. stearothermophilus that produce acid without gas.

34. D. Histamine formed by bacterial decarboxylation of histidine

Scombroid poisoning results from bacterial histidine decarboxylase activity in temperature-abused tuna and related fish.

35. D. Vibrio parahaemolyticus

Vibrio parahaemolyticus is a halophilic marine bacterium associated with raw or undercooked seafood.

36. B. Psychrotrophic Gram-negative rods such as Pseudomonas

Aerobic psychrotrophs, especially Pseudomonas and Shewanella, dominate the spoilage of chilled fresh fish.

37. A. Leuconostoc mesenteroides

Heterofermentative Leuconostoc mesenteroides grows quickly at first, lowering pH and producing CO_2, then is succeeded by more acid-tolerant lactobacilli.

38. A. Fermenting sugars to carbon dioxide and ethanol

Saccharomyces cerevisiae ferments sugars into CO_2, which leavens the dough, and ethanol, which evaporates during baking.

39. C. Hurdle technology

Hurdle technology combines several sub-lethal barriers so that together they keep microorganisms from growing.

40. C. Salmonella Enteritidis

Salmonella Enteritidis can contaminate egg contents and poultry, making them classic vehicles for salmonellosis.

41. D. To inactivate enzymes that cause quality loss in storage

Blanching inactivates enzymes such as peroxidase and lipoxygenase that would otherwise cause off-flavors and color loss during frozen storage.

42. C. 800 kg

Solids balance: 1000 x 0.12 = 0.60 P, so P = 200 kg; water removed = 1000 - 200 = 800 kg.

43. A. 571 kg

Sugar balance: 0.70 S = 0.40 x 1000, so S = 571.4 kg of syrup and 428.6 kg of water.

44. B. 2.00 kg salt and 23.0 kg water

Salt = 0.080 x 25.0 = 2.00 kg; water = 25.0 - 2.00 = 23.0 kg.

45. D. 64%

Yield = 320 / 500 x 100 = 64%.

46. B. It forms many small ice crystals that cause less cell damage

Rapid passage through the zone of maximum ice crystal formation produces small intracellular crystals, reducing drip loss on thawing.

47. C. Water is removed by sublimation from the frozen state

In freeze drying, ice sublimes under vacuum so the rigid frozen structure is retained and leaves a porous product.

48. C. To remove air so a vacuum forms after cooling

Removing headspace air reduces internal pressure during retorting, limits oxidation and can corrosion, and produces a vacuum after cooling.

49. C. It lowers water activity and draws water from the tissue

Salt binds water and draws moisture out by osmosis, lowering water activity below the limits for most spoilage bacteria.

50. D. Phenolic compounds

Wood smoke phenolics deposit on the surface, acting as antioxidants and antimicrobials and contributing smoky flavor.

51. D. Gray (Gy)

Absorbed dose is energy absorbed per unit mass, expressed in gray, where 1 Gy = 1 J/kg.

52. D. To inhibit aerobic Gram-negative spoilage bacteria

Carbon dioxide dissolves in the product and slows the growth of aerobic spoilage organisms such as Pseudomonas.

53. B. 72 degrees C for 15 seconds

HTST pasteurization of milk is classically 72 degrees C for 15 s; 63 degrees C for 30 min is batch holding, and 140 degrees C for 2 s is UHT.

54. A. Aspergillus oryzae

Aspergillus oryzae produces the proteases and amylases that break down soybean protein and wheat starch during brine fermentation.

55. B. Heat is generated within the food as electric current passes through it

In ohmic heating, the food acts as an electrical resistor, so heat is generated volumetrically and particles heat quickly.

56. A. Internal movement of moisture to the surface

Once the surface is no longer saturated, drying is limited by internal diffusion and capillary flow of water.

57. B. Extrusion cooking

In an extruder, starch is cooked under high temperature and pressure; flashing of water at the die causes expansion.

58. C. The high sugar lowers water activity and aids pectin gel formation

High soluble solids bind water, lowering aw to resist spoilage, and with acid help high methoxyl pectin set.

59. A. Osmotic dehydration

Soaking in a hypertonic syrup removes part of the water by osmosis and introduces sugar, before final drying.

60. C. Its thin profile shortens the heating time to sterility

The thin cross section shortens heat penetration time, so less overcooking occurs for the same lethality.

61. B. 46 800 kJ

Q = m cp delta T = 200 x 3.9 x 60 = 46 800 kJ.

62. A. 7.4 min

F0 = 30 x 10^((115 - 121.1)/10) = 30 x 0.245 = 7.4 min.

63. A. 0.49

Lethal rate = 10^((118 - 121.1)/10) = 10^-0.31 = 0.49 min of F0 per minute of heating.

64. A. 7.5 degrees C

z = (118 - 112) / log(5.0/0.80) = 6 / 0.796 = 7.5 degrees C.

65. B. 2.52 min

F0 = 12 x D = 12 x 0.21 = 2.52 min.

66. B. 1 can in 10 000

Log reduction = 9 / 1.5 = 6; survivors = 10^2 x 10^-6 = 10^-4 per can, or 1 in 10 000.

67. C. 112 725 kJ

Ice formed = 500 x 0.75 x 0.90 = 337.5 kg; latent heat = 337.5 x 334 = 112 725 kJ.

68. B. 121 kg

Heat = 1000 x 3.8 x 70 = 266 000 kJ; steam = 266 000 / 2200 = 121 kg.

69. C. 107 kW

q = k A delta T / x = 16 x 2.0 x 10 / 0.003 = 106 700 W, about 107 kW.

70. D. About 38 600, turbulent

Re = 1030 x 1.5 x 0.050 / 0.0020 = 38 625, well above 4000, so the flow is turbulent.

71. D. 22.2 kg

Dry solids = 20 kg; final mass = 20 / 0.90 = 22.2 kg, so 77.8 kg of water is removed.

72. D. Shear-thinning (pseudoplastic)

Apparent viscosity that decreases as shear rate increases is shear-thinning, or pseudoplastic, behavior.

73. D. 1.0 kW

Hydraulic power = 0.0020 x 300 000 = 600 W; shaft power = 600 / 0.60 = 1000 W.

74. A. 12.0 TR

42.2 / 3.517 = 12.0 tons of refrigeration.

75. B. 39.2 degrees C

Terminal differences are 90 - 40 = 50 and 50 - 20 = 30; LMTD = (50 - 30) / ln(50/30) = 39.2 degrees C.

76. A. 4.0 m/s

By continuity, velocity varies inversely with area; halving the diameter quarters the area, so v = 1.0 x 4 = 4.0 m/s.

77. D. 3.52 kJ/kg K

cp = 0.837 + 3.349 x 0.80 = 0.837 + 2.679 = 3.52 kJ/kg K.

78. A. At the geometric center of the can

In conduction-heating products, heat moves inward from all surfaces, so the cold spot is at the geometric center.

79. A. To increase the mass of water evaporated per kilogram of steam

Reusing vapor as the heating medium improves steam economy, giving more evaporation per kilogram of live steam.

80. B. Relative humidity falls and drying capacity rises

Sensible heating keeps the humidity ratio constant but raises the saturation pressure, so relative humidity drops and the air can take up more water.

81. A. 1/3

Each set has three samples, one of which is different, so a guess is correct with probability 1/3.

82. B. 15

With p = 1/3 and n = 30, the probability of 15 or more correct by chance is about 0.043, while 14 or more exceeds 0.05.

83. A. A reference followed by two coded samples, one matching it

The duo-trio test gives a marked reference and asks which of two coded samples matches it.

84. C. A 9-point hedonic scale with untrained consumers

Liking is an affective question best answered by a hedonic test with a sufficiently large group of target consumers.

85. D. A trained descriptive panel

Descriptive analysis requires panelists trained on attribute terms and reference standards so that intensity ratings are reliable.

86. B. Expectation bias from the meaning of labels

Codes like A or 1 carry implied meaning (best, first), so random three-digit codes reduce expectation and stimulus errors.

87. A. To cancel out positional and carry-over effects

Panelists tend to rate the first sample or one following a strong sample differently, so balancing order distributes these effects.

88. B. 253.6 g

UCL = mean + 3 sigma = 250.0 + 3 x 1.2 = 253.6 g.

89. D. 1.33

Cp = (USL - LSL) / 6 sigma = 20 / 15 = 1.33.

90. B. 120 days

Lowering temperature by 10 degrees C slows deterioration by a factor of Q10 = 2, so shelf life is 60 x 2 = 120 days.

91. A. Pareto chart

A Pareto chart ranks causes by frequency so the vital few can be targeted first.

92. C. Cause-and-effect (fishbone) diagram

The Ishikawa or fishbone diagram groups potential causes by category to guide root cause analysis.

93. B. A single point beyond the upper 3-sigma limit

A point outside the 3-sigma control limits signals an assignable cause that should be investigated.

94. D. The worst process average of defects considered acceptable

AQL is the quality level that, as a process average, is considered satisfactory for sampling plans to accept most of the time.

95. A. Strong redness

The a* axis runs from green (negative) to red (positive); b* runs from blue to yellow, and L* is lightness.

96. A. Hardness

Hardness is defined as the peak force during the first compression cycle.

97. B. Umami

Glutamate and the 5'-ribonucleotides elicit the savory umami taste.

98. D. Detection threshold

The detection threshold is the lowest level at which a stimulus is perceived; the recognition threshold is where it can be identified.

99. D. 1/2

With only two samples, a guess is correct half the time.

100. B. ISO 22000

ISO 22000 covers food safety management systems; ISO 14001 is environmental, ISO 45001 is occupational safety and ISO 17025 is laboratory competence.

101. C. Conduct a hazard analysis

The first HACCP principle is hazard analysis; critical control points and limits are set afterward.

102. B. A step where control is essential to prevent, eliminate or reduce a hazard to an acceptable level

A CCP is a step at which control can be applied and is essential to manage a significant food safety hazard.

103. D. A minimum core temperature held for a specified time

Critical limits must be measurable criteria, such as a core temperature and time, that separate safe from unsafe product.

104. A. Carry out the predetermined corrective action

A deviation triggers the corrective action in the plan, which restores control and deals with affected product.

105. C. A supervisor reviewing and calibrating thermometer records weekly

Monitoring is the routine measurement at the CCP; verification includes record review and calibration to confirm the system works.

106. B. Physical

Metal fragments are foreign objects, a physical hazard.

107. D. To prevent allergen cross-contact

Peanut residue left on shared equipment can contaminate the next product and cause allergic reactions in sensitive consumers.

108. B. Prerequisite programs

GMP and SSOP form the foundation of basic hygienic conditions on which a HACCP plan is built.

109. C. Remove soil, wash with detergent, rinse, then sanitize

Soil inactivates sanitizers, so surfaces must be cleaned and rinsed before a sanitizer is applied.

110. C. 40 mL

C1V1 = C2V2: V1 = 10 L x 200 / 50 000 = 0.040 L = 40 mL.

111. D. 5 to 60 degrees C

Holding food between about 5 and 60 degrees C allows rapid growth of most foodborne pathogens.

112. B. First in, first out (FIFO)

FIFO uses older stock first so materials are consumed within their shelf life.

113. B. One step back, one step forward traceability

One step back and one step forward traceability links each lot to its direct source and direct recipient.

114. C. Republic Act No. 10611

RA 10611 is the Food Safety Act of 2013; RA 8976 covers food fortification, RA 11052 food technology practice and RA 8172 salt iodization.

115. B. Republic Act No. 11052

RA 11052, the Philippine Food Technology Act, regulates the practice and licensure of food technology.

116. D. Vitamin A

RA 8976 mandates vitamin A fortification of cooking oil and refined sugar, iron for rice, and vitamin A and iron for wheat flour.

117. A. Republic Act No. 8172

RA 8172, the ASIN Law of 1995, requires salt intended for human consumption to be iodized.

118. C. A joint FAO/WHO commission

The Codex Alimentarius Commission was established by FAO and WHO to develop international food standards.

119. D. Integrated pest management

Integrated pest management combines prevention, monitoring and control methods to limit pests with minimal pesticide use.

120. A. Chemical

Pesticide residues are chemical hazards that are usually controlled through supplier approval and testing.

Topics to review

- Food chemistry and microbiology
- Processing and preservation methods
- Sanitation, quality assurance and food safety systems
- Packaging, shelf life and sensory evaluation

Online question banks and study resources

Food Technology - Pass Harbor (Question bank)

Official PRC board information

Current PRC exam programs

Independent study material prepared by Board Exam Desk.