

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2013.

Ph.D. (FOOD SCIENCE & TECHNOLOGY)

COURSE CODE : 158

Register Number :

*Signature of the Invigilator
(with date)*

COURSE CODE : 158

Time : 2 Hours

Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each of the question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you -1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. Which of the following is not an intrinsic parameter of food that affect microbial growth
- (A) Relative humidity of the environment
 - (B) Moisture content
 - (C) Oxidation-reduction
 - (D) pH

2. Vinegar is defined as the condiments made from
- (A) Juices of fruit eg : apple, Orange
 - (B) Vegetables eg : Potatoes
 - (C) Malted cereals such as barley Starchy
 - (D) All of the above

3. Match the following fermentation products with their explanations

GROUP-I

- a. Rum
- b. Whisky
- c. Brandy

Codes a b c

(A) 3 1 2

(C) 1 2 3

GROUP-II

- 1. Distilled from saccharified and fermented grain
- 2. Distillate from grape wine
- 3. Distillate from fermented sugarcane juice

Codes a b c

(B) 2 1 3

(D) 3 2 1

4. Growth-no-growth method is
- (A) A method of inoculation
 - (B) A method for obtaining data and plotting TDT curve
 - (C) A method to determine the heat process
 - (D) None of the above

5. _____ is the term used to lable foods treated with low level ionizing radiation

- (A) Picowaved
- (B) Irradiated
- (C) Radapertized
- (D) Grayed

6. Among the following fatty acids, which group is known as essential fatty acids
- (A) 9,11- octadecadienoic and 9, 11, 13-octa decatrienoic
 (B) 9,12- octadecadienoic and 9, 12, 15-octa decatrienoic
 (C) 9- octadecanoic and 9, 11-octa decadienoic
 (D) 9,11- octadecadienoic and 9- Eicosenoic
7. Cellulose the structural polysaccharide of plant is a polymer of
- (A) β -D-galactose (B) α -D-glucose
 (C) β -D-glucose (D) α -D-galacturonic acid
8. Which of the following microorganisms given below is not responsible for ropy or stinky fermentation of milk?
- (A) *Alkaligenes viscolactis* (B) *Streptococcus cremoris*
 (C) *Enterobacter aerogenes* (D) *Streptococcus lactis*
9. The glass transition temperature of chicken is
- (A) -11°C (B) 11°C
 (C) 16.63°C (D) -16.63°C
10. The most common and least expensive plastic film used for packaging of solid food material is
- (A) Polyethylene (B) Polypropylene
 (C) Polystyrene (D) Polyvinylchloride
11. The water soluble polymer is
- (A) Polyethylene (B) Polypropylene
 (C) Polyvinylalcohol (D) Polyvinylchloride
12. A mild heat treatment of foods that destroys pathogens and extends shelf life is called
- (A) Baking (B) Blanching
 (C) Sterilization (D) Pasteurization
13. Thermal destruction of microorganisms follows a kinetics of
- (A) Fractional order (B) First order
 (C) Zero order (D) Second order

14. 100 Kg tomato juice containing 5% total solids(w/w) is concentrated to 25% total solids (w/w). The total amount of water removed from tomato juice in Kg is
 (A) 80 (B) 75 (C) 70 (D) 65
15. Which of the following is not a correct statement
 (A) Meatiness is the taste produced by compounds such as glutamate in products like cheese soy sauce
 (B) Astrigency is a dry mouthfeel in the oral cavity that is most associated with phenolic compounds
 (C) Saltiness is the taste that is mainly produced by chloride ions
 (D) Sourness is related to acidity and is sensed by hydrogen ion channel in the human tongue
16. Which of the following statement is not correct?
 (A) Bromelin from pine apple can be used for tenderization of meat
 (B) Electrical stimulation of carcasses after slaughtering of animals can cause tenderization
 (C) Ficin is a proteolytic enzyme, obtained from Faba beans can be used for tenderization of meats
 (D) None of the above
17. Re-association of amylase and formation of crystalline structure up on cooling of cooked starch solution is termed as
 (A) Retrogradation (B) Gelatinization
 (C) Syneresis (D) Denaturation
18. Make the correct match of food constituents in Group-I with their nature given in Group-II and select the correct answer using the code given below

GROUP-I

- P. Ascorbic acid
 Q. Phenyl alanine
 R. Dextrose
 S. Haemoglobin

P Q R S

- (A) 4 3 1 2
 (C) 3 4 2 1

GROUP-II

1. Sugar
 2. Chelate
 3. Aminoacid
 4. Antioxidant

P Q R S

- (B) 4 1 3 2
 (D) 4 2 1 3

19. Make the correct match between specific food processing operation Group-I with their mechanism of action given in Group-II and select the correct answer using the code given below

GROUP-I					GROUP-II				
P.	Ball mill				1.	Compression and shear			
Q.	Roller mill				2.	Pressure bursting			
R.	Flash peeling				3.	Friction and shear			
S.	Abrasive peeling				4.	Impact and shear			
	P	Q	R	S		P	Q	R	S
(A)	4	2	1	3	(B)	4	1	2	3
(C)	4	3	2	1	(D)	3	1	4	2

20. Make the correct match between specific food processing operation Group-I with their mechanism of action given in Group-II and select the correct answer using the code given below

GROUP-I					GROUP-II				
P.	Yoghurt				1.	Lactobacillus acidophilus and Lactobacillus delbrueckii			
Q.	Cheese				2.	Lactobacillus mesenteroids and Lactobacillus plantarum			
R.	Sauerkraut				3.	Lactobacillus delbrueckii and Streptococcus thermophilus			
S.	Kefir				4.	Lactobacillus casei and Streptococcus thermophilus			
	P	Q	R	S		P	Q	R	S
(A)	1	4	2	3	(B)	4	3	1	2
(C)	3	4	2	1	(D)	3	2	4	1

21. 650 g of wet food containing 405 g of water is dried in a tray drier to a final moisture content of 6.8%(db). It is observed that the drying process occurs under constant rate period and it takes 8h. The rate of drying (in Kg/h) is
 (A) 128.79 (B) 126.35 (C) 77.81 (D) 0.0485
22. The total solid content in a milk sample is 18% . It is desired to produce 1000kg of sweetened condensed milk(SCM) having 40% sugar , 25% moisture and rest milk solids. What is the 'sugar ratio'(in percentage) in the SCM in terms of sugar and water content in the final product?
 (A) 48.19 (B) 54.16 (C) 61.54 (D) 56.14
23. Thermal Death Time(TDT) of *Clostridium botulinum* at 121.1 0C is 2.78 min with a Z- value of 10°C . The TDT of microorganism at 116 0C (in min) is
 (A) 8.791 (B) 1.390 (C) 5.270 (D) 0.712

24. The protein responsible for spongy structure of bread is
 (A) Albumin (B) Gluten (C) Zein (D) Gliadin
25. The factors responsible for making a good ice cream is
 (A) Water content (B) Emulsifying agent
 (C) Homogenization (D) Mixing Index
26. Listed below are some of the functions of fats in the human nutrition, Identify the incorrect function
 (A) Concentrated source of energy
 (B) Absorption of fat soluble vitamins
 (C) Transport of oxygen to various organs
 (D) Synthesis of cell membrane and hormones
27. Which of the following act as prooxidants?
 (A) Divalent metals (B) Monovalent gases
 (C) Trivalent metals (D) All of the above
28. Bonds found in alginates is
 (A) α -1,4 and β -1,4 (B) α -1,4 and β -1,6
 (C) α -1,6 and β -1,4 (D) α -1,6 and β -1,6
29. Gelatinization of starch is
 (A) Endothermic process (B) Exothermic process
 (C) Reversible (D) Responsible for staling of bread
30. Maltodextrin has DE value
 (A) Less than 5 (B) Less than 20
 (C) less than 50 (D) More than 50
31. The central dogma of molecular genetics states that genetic information flows from
 (A) DNA to RNA to Protein (B) RNA to DNA to Protein
 (C) Protein to RNA to DNA (D) Protein to DNA to RNA
32. Which of the following is bioavailability enhancer
 (A) Lactose (B) Vitamin D
 (C) Prebiotics (D) All of the above

33. Which of the following is chemical method for moisture analysis?
 (A) Karl Fischer Titration (B) Hydrometry
 (C) Conductivity method (D) Dielectric method
34. IDT stands for
 (A) Isomeric and Dimeric Techniques (B) Impedence detection time
 (C) Instant Diabetic Test (D) Isolation and Detection Techniques
35. Koettsstorfer number is also called
 (A) Iodine value (B) Saponification value
 (C) Hohner value (D) Kirschner value
36. In case of TBA test for determination of rancidity in fat or oil the compound formed during rancidity that react with thiobarbituric acid is
 (A) Salicylaldehyde (B) Ketone
 (C) Hydroperoxide (D) Malonaldehyde
37. You are provided with two samples of sugars in different test tubes. One contains pentose's and other hexoses. Which of the following test would you prefer to distinguish between the two?
 (A) Bial's test (B) Molish test
 (C) Barfoed's test (D) None of the above
38. Xanthoproteic test will give positive result with
 (A) Arginine (B) Tyrosine
 (C) Lysine (D) All of the above
39. ANSA is
 (A) 1-amino, 3-nitro-sulphurous acid (B) 2-amino, 3-naphtyl-sulphurous acid
 (C) 1-amino, 2-naphtyl, 4-Sulphanic acid (D) 1-acryl, 2-nitro-sulphanic acid
40. Fiske and Rao method is used for the estimation of
 (A) Phosphorous (B) Pentathonic acid
 (C) Pectin (D) Phytates
41. Which of the following is most suitable for transportation of sticky material
 (A) Screw Conveyor (B) Pneumatic conveyor
 (C) Belt conveyor (D) Apron conveyor

42. 100 Kg of orange juice to be dried from 60% to 20% moisture (by weight) .The mass of moisture removed in Kg is
 (A) 52 (B) 20 (C) 40 (D) 50
43. Match the following dimensionless number with field of use
 a. Grashof Number 1. Compressive flow
 b. Froude Number 2. Free convection
 c. Euler Number 3. Free surface flow
 d. Mach Number 4. Pressure variation in flow
- a b c d
 (A) 2 1 4 3
 (B) 4 3 2 1
 (C) 2 3 4 2
 (D) 4 1 2 3
44. Tooth paste is
 (A) Bingham plastic (B) Pseudoplastic
 (C) Newtonian fluid (D) Dilatent
45. Mixing of two fluid is
 (A) Reversible process (B) Irreversible process
 (C) Isothermal process (D) None of these
46. The thermal conductivity is minimum for
 (A) Silver (B) Chrome nickel steel
 (C) Aluminium (D) Carbon steel
47. Marinades are prepared from
 (A) Egg (B) Meat (C) Fish (D) Cereals
48. Nitrate and Nitrite is helpful in meat processing as it
 (A) Increases tenderness
 (B) Increase juiciness
 (C) Improves color
 (D) Prevent from microbial contamination
49. Veal is obtained from
 (A) Sheep (B) Buffalo (C) Goat (D) Calf
50. Function of casing in sausage is/are
 (A) Packing
 (B) Tenderization of meat
 (C) Prevention of fat and moisture loss during smoking and cooking
 (D) All of the above

51. Both extracellular and intracellular crystallization takes place in
(A) Slow freezing only
(B) Fast freezing only
(C) Both fast as well as slow freezing
(D) Neither slow freezing nor fast freezing
52. Marine products export development authority rules was formulated in
(A) 1941 (B) 1951 (C) 1961 (D) 1971
53. Which of the following comes under non mandatory regulations?
(A) PFA act (B) Codex Alimentarius
(C) Environmental protection act (D) Consumer protection act
54. Which rules of PFA deals with the obligatory conditions of packaging?
(A) 12 (B) 36 (C) 49 (D) 69
55. Which of the following statement is correct?
(A) HACCP is a certification for the food industries
(B) ISO standards are valid for only industries
(C) OHSAS is a mandatory government regulation
(D) All organisms
56. How many central food laboratories are there in India?
(A) 4 (B) 8 (C) 16 (D) 20
57. Dunnett test is
(A) A test for monitoring the quality of imported grains in terms of its pesticide content
(B) Applied to compare the treatment against a pre-determined control
(C) For the test of GM foods
(D) To decide whether a company has followed PFA standards.
58. Casein present in milk is found in the form of
(A) Magnesium caseinate -phosphate complex
(B) Calcium caseinate phosphate complex
(C) Potassium caseinate phosphate complex
(D) None of the above
59. _____ is the basis for checking pasteurization efficiency of milk
(A) Peroxidase and catalase test (B) Phosphatase test
(C) Analase test (D) None of the above

60. Clot on boiling test carried out to
 (A) Determine both heat stability and pH of milk
 (B) Determine the heat stability of the milk
 (C) Determine the extent of bacterial contamination and growth in milk
 (D) None
61. The solubility of sodium bicarbonate in water is 9.6 g/100g at 20°C and 16.4 g/100g at 60°C. If a saturated solution of sodium bicarbonate at 60°C is cooled to 20°C, the percentage of dissolved salt crystallized out will be
 (A) 20.5 (B) 25.4 (C) 41.5 (D) 45.2
62. Which of the following statement is correct?
 (A) Rigor mortis is hastened by struggling of fish, lack of oxygen, high pH and warm temperature
 (B) Rigor mortis is hastened by struggling of fish, lack of oxygen, low pH and warm temperature
 (C) Rigor mortis is hastened by struggling of fish, lack of oxygen, high pH and low temperature
 (D) Rigor mortis is not affected by oxygen pH and temperature
63. Sharp smell of onion is due to
 (A) Ammonia (B) Sulphur
 (C) Chlorine (D) Combined effect of the above
64. Lard is obtained from
 (A) Sheep (B) Buffalo
 (C) Goat (D) Hogs
65. White deposition on the surface of the chocolate is due to faulty
 (A) Winterization (B) Plasticization
 (C) Tempering (D) None of the above
66. Which of the following oil do you expect to have more free fatty acids
 (A) Sunflower oil (B) Rice bran oil
 (C) Mustard oil (D) All of the above
67. Polystyrene is used for
 (A) Acid foods (B) Neutral foods
 (C) Basic foods (D) All of the above

68. Which of the following statement is correct?
 (A) Nylon can be steam sterilized at 140° C
 (B) Vinyl chloride monomer in PVC is carcinogenic
 (C) Diastatic activity is the combined activity of alpha and beta amylase
 (D) All of the above
69. Instant coffee is packed in flexible laminates of
 (A) LDPE/Al foil/PET (B) PET/Al foil/LDPE
 (C) Metallized PET/LDPE (D) Both (B) and (C)
70. In recent years, biscuits, cookies and crackers are packed in
 (A) RCF coated with LDPE/PVE (B) RCF coated with HDPE/PVC
 (C) OPP either plane or coextruded (D) RCF coated with acrylic
71. Cherry coffee is obtained by
 (A) Wet processing (B) Vacuum processing
 (C) Dry processing (D) Chemical treatment
72. Roasting temperature of coffee varies from
 (A) 100-110°C (B) 200-250°C (C) 350-475°C (D) 120-140°C
73. Chicory is obtained from
 (A) Leaf (B) Stem (C) Flower (D) Root
74. High quality tea with good color, strength, briskness can be used as the indicator of quality
 (A) High (B) Low
 (C) Unity (D) Any of the above
75. Tisanes are
 (A) Herbal tea
 (B) Type of beverage made from semi-fermented tea leaves
 (C) Method of incorporation of flavor to tea
 (D) None of the above
76. Which of the following containers should not be used in microwave oven
 (A) Glass (B) China ware (C) Silver (D) Plastic
77. ISO standards are
 (A) Mandatory orders (B) Mandatory regulations
 (C) Non mandatory regulations (D) Non mandatory orders

78. Which of the following is a self carbonated beverage
 (A) Kumiss (B) Kefir
 (C) Yoghurt (D) Bulgarian buttermilk
79. Operation flood-1 was launched in
 (A) 1969 (B) 1970 (C) 1972 (D) 1971
80. A churn used for manufacturing of butter contains 950 Kg of cream. While manufacturing 2 % of fat is lost. Calculate the amount of butter formed and the % of overrun in butter
 (A) 22.52 Kg (B) 22.50 Kg (C) 22.55 Kg (D) 22.53 Kg
81. Choose the word from the options given below that is most nearly opposite in meaning to the given word
 "Amalgamate"
 (A) Merge (B) Split (C) Collect (D) Separate
82. If $\log P = \{1/2\} \log q = \{1/3\} \log R$, then which of the following options is right
 (A) $P^2 = Q^3 R^2$ (B) $Q^2 = PR$ (C) $Q^2 = R^3 P$ (D) $R = P^2 Q^2$
83. The question below consists of a pair of related words followed by four pair of words. Select the pair that best expresses the relation in original pair
 Gladiator: Arena
 (A) Cancer : Stage (B) Commuter: Train
 (C) Teacher : Classroom (D) Lawyer : Courtroom
84. The question below consists of a pair of related words followed by four pair of words. Select the pair that best expresses the relation in original pair
 Unemployed: Worker
 (A) Fallow : Land (B) Unaware : Sleeper
 (C) Wit : Jester (D) Renovated : House
85. If $137+276= 435$, how much is $731+672$?
 (A) 534 (B) 1403 (C) 1623 (D) 1513
86. Choose the most appropriate word from the option given below to complete the following sentence
 If we manage to _____ Our natural resources, we would leave a better planet for our children's
 (A) Uphold (B) Restrain (C) Cherish (D) Conserve

Direction (Q Nos. 87-90)

Each of these questions consists of a pair of related words followed by four pair of words. Select the pair which best expresses the relation in original pair

87. Day: Week
(A) Week: Year (B) Second: Time (C) Time: Duration (D) Week: Month
88. Arc : Curve
(A) Triangle: Base (B) Rectangle: Square
(C) Revolution: Distance (D) Square: Polygon
89. Jackel: Dog
(A) Cow : Bat (B) Orange : Lemon
(C) Tiger : Wolf (D) Ant : Antepol
90. Error: Mistake
(A) Connection: Retaliation
(B) Literature: Poetry
(C) Doubt: Suspicion
(D) Music: Art
91. The greatest number of four digits which is divisible by 15, 25, 40 and 75 is:
(A) 9000 (B) 9400 (C) 9600 (D) 9800
92. 39 persons can repair a road in 12 days, working 5 hours a day. In how many days will 30 persons, working 6 hours a day, complete the work?
(A) 10 (B) 13 (C) 14 (D) 15
93. A can contains a mixture of two liquids A and B in the ratio 7 : 5. When 9 litres of mixture are drawn off and the can is filled with B, the ratio of A and B becomes 7 : 9. How many litres of liquid A was contained by the can initially?
(A) 10 (B) 20 (C) 21 (D) 25
94. The banker's gain of a certain sum due 2 years hence at 10% per annum is Rs. 24. The present worth is:
(A) Rs.480 (B) Rs.520 (C) Rs.600 (D) Rs.960

95. A train can travel 50% faster than a car. Both start from point A at the same time and reach point B 75 kms away from A at the same time. On the way, however, the train lost about 12.5 minutes while stopping at the stations. The speed of the car is:
 (A) 100 kmph (B) 110 kmph (C) 120 kmph (D) 130 kmph
96. Mr. Thomas invested an amount of Rs. 13,900 divided in two different schemes A and B at the simple interest rate of 14% p.a. and 11% p.a. respectively. If the total amount of simple interest earned in 2 years be Rs. 3508, what was the amount invested in Scheme B?
 (A) Rs. 6400 (B) Rs.6500 (C) Rs. 7200 (D) Rs. 7500
97. A, B, C subscribe Rs. 50,000 for a business. A subscribes Rs. 4000 more than B and B Rs. 5000 more than C. Out of a total profit of Rs. 35,000, A receives:
 (A) Rs. 8400 (B) Rs.11900
 (C) Rs. 13600 (D) Rs. 14700
98. Three partners shared the profit in a business in the ratio 5 : 7 : 8. They had partnered for 14 months, 8 months and 7 months respectively. What was the ratio of their investments?
 (A) 5 : 7 : 8 (B) 20 : 49 : 64
 (C) 38 : 28 : 21 (D) None of the above
99. What was the day of the week on 28th May, 2006?
 (A) Thursday (B) Friday (C) Saturday (D) Sunday
100. A colony of bacteria in a container grows by each bacterium splitting in to eight next generation bacteria; However, because of environmental conditions only 50% of the bacteria in a generation can split as above. A colony of first generation was put in a container and it was found that the number of seventh generation bacteria was 4096 million. What was the size of first generation population initially put in the container?
 (A) 2 million (B) 8 million (C) 1 million (D) 4 million