

Food Engineering and Technology

Time Allowed :3 Hours	Maximum Marks :300	Total questions : 75
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General Instructions

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1. Question Paper contains 75 Questions .
2. Each correct answer will have +4 marks and wrong answer will lead to -1
3. Use of any electronic appliances is strictly prohibited.

1. Which equation is used for atmospheric air-steam mixtures, according to Gibbs Dalton Law?

- (1) $p_B = p_a + p_w$
 - (2) $p_w = p_a + p_B$
 - (3) $p_a = p_w + p_B$
 - (4) $p_T = p_a + p_w$
-

2. Bacteria that oxidize ethyl alcohol to acetic acid and cause spoilage in alcoholic beverages belong to the Genus.

- (1) Aeromonas
 - (2) Acetobacter
 - (3) Arthrobacter
 - (4) Campylobacter
-

3. Microorganism, commonly called as bread mold, and is involved in the spoilage of foods like berries, fruits, vegetables, bread, etc. is:

- (1) Rhizopus stolonifer
 - (2) Thamnidium
 - (3) Aspergillus
 - (4) Trichothecium
-

4. Bacteria like Coliform, *Enterococci*, intestinal bacteria, anaerobes and viruses are generally present in:

- (1) Soil
 - (2) Water
 - (3) Animals
 - (4) Sewage
-

5. *Thamnidium chaetocladioides* in meat produces:

- (1) Ropiness

- (2) Discoloration
 - (3) Phosphorescence
 - (4) Whiskers
-

6. Which one of the following process is used for the selection of good quality eggs for storage?

- (1) Candling
 - (2) Washing
 - (3) Oiling
 - (4) Waxing
-

7. Milk fat may be decomposed by various bacteria, yeasts, and molds, the changes that take place in the milk fat are:

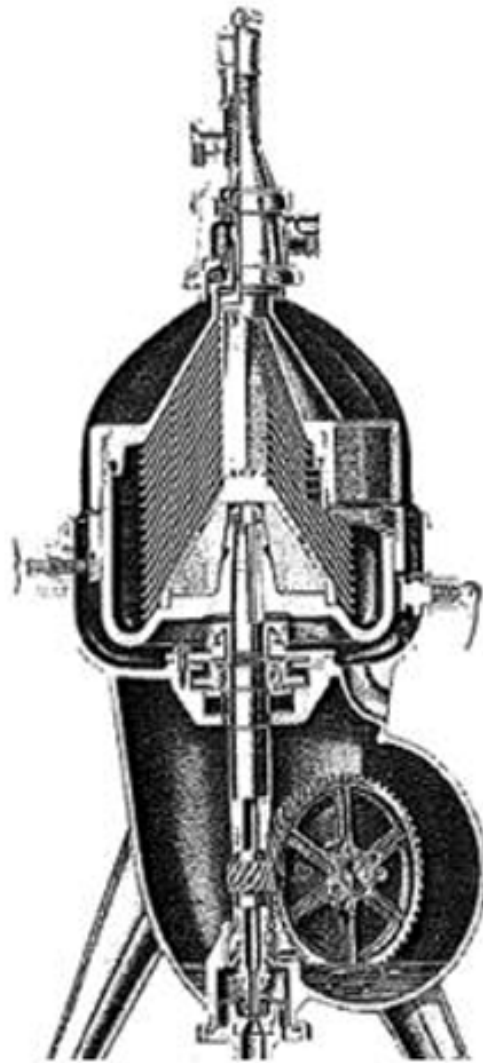
- A. Oxidation of the unsaturated fatty acids**
- B. Hydrolysis of the butterfat to fatty acids**
- C. Alkali production**
- D. Combined oxidation and hydrolysis to produce rancidity**

- (1) A, B and D only
 - (2) A, B and C only
 - (3) B, C and D only
 - (4) A, C and D only
-

8. A 4% commercially available acetic acid is known as.....

- (1) Salt
 - (2) Brine
 - (3) Tartar
 - (4) Vinegar
-

9. Identify the equipment in the image:



- (1) Homogeniser
 - (2) Clarifier
 - (3) Batch pasteurizer
 - (4) HTST pasteurizer
-
-

10. Match the LIST-I with LIST-II

	LIST-I	LIST-II
	(Constituents)	(Percentage %)
Average composition of Milk	A. Water	I. 5.0
	B. Protein	II. 12.9
	C. Lactose	III. 87
	D. Total solids	IV. 3.3

Choose the most appropriate answer from the options given below:

- (1) A - II, B - I, C - IV, D - III
- (2) A - I, B - III, C - II, D - IV
- (3) A - III, B - I, C - IV, D - II
- (4) A - III, B - IV, C - I, D - II

11. Casein is more resistant to heat than whey. Resistance of casein to heat is NOT because of the following which factor.

- (1) Calcium
- (2) Magnesium
- (3) Citrates
- (4) Nitrates

12. Pasteurized milk does not contain which of the following enzyme:

- (1) Plasma lipase
- (2) Alkaline phosphatase
- (3) Xanthine oxidase
- (4) Membrane lipase

13. Vitamin that is synthesized in the cow's rumen is

- (1) Vitamin K
- (2) Vitamin A
- (3) Vitamin D
- (4) Vitamin E

14. Amongst the following, choose a type of concentrated milk

- (1) Vitamin D milk
 - (2) Condensed milk
 - (3) Soft curd milk
 - (4) Standardized milk
-

15. Sequentially arrange the steps in manufacture of Roquefort cheese

A. Inoculation of *Penicillium roqueforti*

B. Addition of Lactic acid producing starter culture

C. Hopped and pressed

D. Formation of firm curd and cutting of curd

Choose the most appropriate answer from the options given below:

- (1) B, C, A, D
 - (2) B, D, A, C
 - (3) A, D, C, B
 - (4) C, B, D, A
-

16. Among the following, the egg yolk protein is.....

- (1) Livetin
 - (2) Ovalbumin
 - (3) Avidin
 - (4) Conalbumin
-

17. Ingredient added in egg proteins to decrease the temperature of coagulation is:

- (1) Water
 - (2) Lemon juice
 - (3) Sugar
 - (4) Milk
-

18. During production of egg powder, browning can be prevented by:

A. Glucose oxidase

B. Yeast

C. Lactic acid bacteria

D. Syringing

Choose the most appropriate answer from the options given below:

(1) C and D

(2) B and C

(3) A and B

(4) A and D

19. The energy required for size reduction is proportional to the change in surface area of the pieces of food and is determined by -----.

(1) Ideal law

(2) Kick's law

(3) Rittinger's law

(4) Bond's law

20. Among the following, which one is the perennial vegetable?

(1) Artichoke

(2) Celery

(3) Knol-khol

(4) Leek

21. Activity of which enzyme increases during germination of cereals?

(1) Protease

(2) Lipase

(3) Oxidoreductase

(4) β -amylase

22. Deterioration in cereals is attributed to

A. Moisture content

B. Temperature

C. pH

D. Presence of oxygen

Choose the most appropriate answer from the options given below:

(1) A, B and D only

(2) A, B and C only

(3) B, C and D only

(4) A, C and D only

23. Arrange the steps of modern wheat milling

A. Cleaning to remove various type of impurities

B. Separation of the endosperms from the bran and germ

C. Dry scouting

D. Conditioning

Choose the most appropriate answer from the options given below:

(1) A, D, C, B

(2) A, C, D, B

(3) A, B, D, C

(4) C, B, D, A

24. Storing the freshly milled flour for 1-2 months result in desirable changes known as maturation. The changes that take place are:

A. Hydrolysis of fat into fatty acids

B. Decrease in sulphhydryl groups

C. Reduction of disulphide bonds

D. Increase in sulphhydryl groups

(1) A, B and D only

(2) A, B and C only

- (3) A, C and D only
 - (4) B, C and D only
-

25. Parboiling of rice offers the following advantages:

- A. Greater resistance to insects and fungus infection**
- B. Grain becomes weak**
- C. Increase in nutritive value of rice**
- D. Dehusking of parboiled rice is easy**

Choose the most appropriate answer from the options given below:

- (1) A, B and D only
 - (2) A, B and C only
 - (3) A, C and D only
 - (4) B, C and D only
-

26. Solvent used in polishing of brown rice during solvent extraction milling is

- (1) Ether
 - (2) Hexane
 - (3) Toluene
 - (4) Methylene
-

27. The temperature at which the granules begin to swell rapidly and lose birefringence is called

- (1) Oxidation
 - (2) Reduction
 - (3) Gelatinization
 - (4) Freezing
-

28. Match the LIST-I with LIST-II

LIST-I (Saturated fatty acids found in food lipids)	LIST-II (Structure)
A. Heptanoic	I. $\text{CH}_3(\text{CH}_2)_{12}\text{COOH}$
B. Hexanoic	II. $\text{CH}_3(\text{CH}_2)_4\text{COOH}$
C. Pentanoic	III. $\text{CH}_3(\text{CH}_2)_3\text{COOH}$
D. Tetranic	IV. $\text{CH}_3(\text{CH}_2)_5\text{COOH}$

Choose the most appropriate answer from the options given below:

- (1) A - III, B - I, C - IV, D - II
- (2) A - I, B - III, C - IV, D - II
- (3) A - II, B - I, C - IV, D - II
- (4) A - IV, B - II, C - III, D - I

29. Heating of unsaturated fats and oils, as in frying operations, can produce changes in the color, molecular weight, viscosity or refractive index due to

- (1) Rancidity
- (2) Hydrogenation
- (3) Polymerization
- (4) Termination

30. Triple helical structure of protein is also called

- (1) Peptide bond
- (2) Collagen helix
- (3) Tropocollagen
- (4) Tertiary structure

31. Spirulina, when grown under controlled conditions, should contain _____ protein on dry-weight basis

- (1) 20 - 30 %
- (2) 30 - 40 %

(3) 50 - 60 %

(4) 70 - 80 %

32. Match the LIST-I with LIST-II

LIST-I	LIST-II
(B Complex Vitamin)	(Scientific Name)
A. Vitamin B-1	I. Pyridoxine
B. Vitamin B-2	II. Cobalamin
C. Vitamin B-6	III. Riboflavin
D. Vitamin B-12	IV. Thiamine

Choose the most appropriate answer from the options given below:

(1) A - IV, B - II, C - III, D - I

(2) A - I, B - III, C - II, D - IV

(3) A - I, B - II, C - IV, D - III

(4) A - IV, B - III, C - I, D - II

33. In a food processing plant, heating and cooling of foods are conducted in equipment called heat exchangers. Which among the following is NOT a type of non contact heat exchanger?

(1) Steam infusion

(2) Scraped surface

(3) Shell and tube

(4) Tubular

34. Most frequently employed techniques of enzyme inhibition in food are

A. Heat

B. Sugar

C. Variation of pH

D. Sulphur dioxide

Choose the most appropriate answer from the options given below:

(1) A, D and B only

- (2) A, B and C only
 - (3) A, B and D only
 - (4) A, C and D only
-

35. All amino acids have a chiral centre, except

- (1) Lysine
 - (2) Arginine
 - (3) Histidine
 - (4) Glycine
-

36. Arrange the proper sequence of oil processing

A. Refining

B. Pressing

C. Solvent Extraction

D. Rendering

- (1) D, B, C, A
 - (2) A, C, B, D
 - (3) D, C, B, A
 - (4) C, B, D, A
-

37. A biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect is known as

- (1) Food-borne illness
 - (2) Suitability
 - (3) Contaminant
 - (4) Hazard
-

38. Arrange the sequence of Jam preparation

A. Heating

B. Chopping

C. Addition of acid and pectin

D. Washing

- (1) D, B, A, C
 - (2) D, C, B, A
 - (3) D, B, C, A
 - (4) C, B, D, A
-

44. The difference between the initial and the final temperature divided by the freezing time is known as

- (A) Freezing Time
 - (B) Freezing Rate
 - (C) Thawing Time
 - (D) Thawing Rate
-

40. Factors that determine the effectiveness of size reduction and influence the selection of an equipment are

- A. Friability of the food
- B. Bulk density
- C. Moisture content
- D. Heat sensitivity of the food

Choose the most appropriate answer from the options given below:

- (A) A, C and D only
 - (B) A, B and C only
 - (C) A, B and D only
 - (D) B, C and D only
-

41. The system that detects or senses changes within the package environment, followed by modification of package properties in response to the detected change is known as

- (A) Aseptic Packaging
- (B) Passive Packaging
- (C) Active Packaging
- (D) Intelligent Packaging

	LIST-I (Diffusion Coefficients of Gases in Water at 20°C)	LIST-II D ($10^{-9} \text{ m}^2 \text{ s}^{-1}$)
42. Match the LIST-I with LIST-II	A Chlorine	I 2.1
	B Carbon dioxide	II 1.9
	C Nitrogen	III 1.6
	D Oxygen	IV 1.8

(A) A - I, B - IV, C - II, D - III

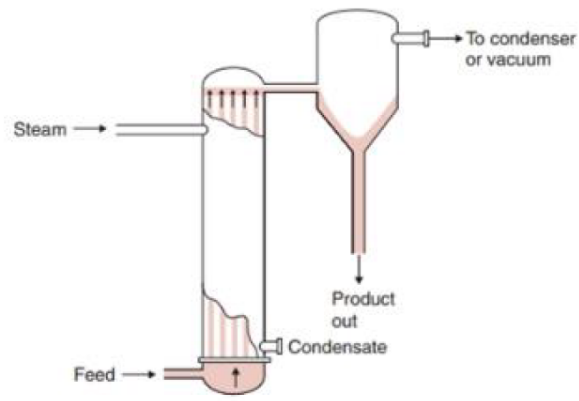
(B) A - III, B - II, C - IV, D - I

(C) A - I, B - II, C - IV, D - III

(D) A - III, B - IV, C - I, D - II

- 43. The ratio of mole fraction of water vapor in a given moist air sample to the mole fraction in an air sample saturated at the same temperature and pressure is known as**
- (A) Relative Humidity
 - (B) Specific Volume
 - (C) Wet Bulb Temperature
 - (D) Dew-Point Temperature
-

44. Identify the evaporator



- (A) Batch-type pan evaporator
 - (B) Falling-film evaporator
 - (C) Natural-circulation evaporator
 - (D) Rising-film evaporator
-

45. A typical microwave oven consists of the following major components

- A. Wave guide
- B. Magnetron
- C. Channel
- D. Stirrer

Choose the most appropriate answer from the options given below:

- (A) A, B and D only
 - (B) A, B and C only
 - (C) B, C and D only
 - (D) A, C and D only
-

46. Match the LIST-I with LIST-II

LIST-I (Type of Fouling)	LIST-II (Fouling Mechanism)
A Precipitation	I Accumulation of fine particles suspended...
B Freezing	II Heat transfer surface reacts with ambient...
C Particulate	III Solidification of Liquid components...
D Corrosion	IV Precipitation of dissolved substances...

(A) A - II, B - I, C - III, D - IV
 (B) A - I, B - III, C - I, D - II
 (C) A - IV, B - III, C - I, D - II
 (D) A - III, B - IV, C - I, D - II

47. Match the LIST-I with LIST-II

LIST-I (Fluid)	LIST-II (Typical example)
A Shear-thinning	I Tomato ketchup
B Newtonian	II Milk
C Shear-thickening	III Whipped cream
D Bingham plastic	IV 40% raw corn starch solution

(A) A - I, B - IV, C - II, D - III
 (B) A - I, B - II, C - IV, D - III
 (C) A - III, B - II, C - IV, D - I
 (D) A - I, B - II, C - III, D - IV

48. Arachidonic acid is composed of how many carbon atoms in its chain?

- (A) 20
 (B) 18
 (C) 16
 (D) 12
-

	LIST-I (Liquid)	LIST-II (Viscosity at room temperature. Approximate) (Pa . s)
49. Match the LIST-I with LIST-II	A Air	I 10^{-5}
	B Water	II 10^{-3}
	C Olive Oil	III 10^{-1}
	D Liquid Honey	IV 10^1

(A) A - III, B - IV, C - I, D - II

(B) A - I, B - II, C - III, D - IV

(C) A - II, B - III, C - I, D - IV

(D) A - I, B - IV, C - I, D - III

50. Instrument used for measuring the humidity is

(A) Thermometer

(B) Hygrometer

(C) Pyrometer

(D) Penetrometer

51. Saturated air has a relative humidity (RH) of

(A) 0%

(B) 75%

(C) 50%

(D) 100%

52. The topmost curve in the psychrometric chart represents the saturation line with _____ % relative humidity.

(A) 100

(B) 75

(C) 50

(D) 0

53. Potatoes with 85% moisture content on a wet basis are dried to a final moisture content of 10%. If we dry 100 kg of potatoes, what is the final weight of the product?

- (A) 15.66 kg
- (B) 16.66 kg
- (C) 17.66 kg
- (D) 18.66 kg

54. Freeze drying is also known as

- (A) Crystallization
- (B) Gelatinization
- (C) Homogenization
- (D) Lyophilization

55. The appearance, size, shape, density, and solubility of the final spray dried particle can be affected by

- A. Nozzle pressure
- B. Liquid viscosity
- C. Surface tension
- D. Nature of the solids

Choose the most appropriate answer from the options given below:

- (A) A, B, and D only
- (B) A, B, and C only
- (C) A, B, C, and D
- (D) B, C, and D only

56. The energy required for size reduction is proportional to the logarithm of size reduction ratio, is given by _____ law.

- (A) Kicks' Law
 - (B) Bonds' Law
 - (C) Ricks' Law
 - (D) Rittingers' Law
-

57. In hammer mill operations, the dominant force is

- (A) Compressive force
 - (B) Shear force
 - (C) Impact force
 - (D) Centrifugal force
-

58. Find the "Centrifuge effect" of the centrifuge, which spins at the angular velocity ($\omega=523.6$ /sec) at a maximum radius of 10 cm.

- (A) 2794.6
 - (B) 2694.6
 - (C) 2594.6
 - (D) 2494.6
-

59. In the sedimentation process, the rate of settling (moving) particles is affected by

- A. Gravitational pull
- B. Density of the particle
- C. Buoyancy force
- D. Size of the particle

Choose the most appropriate answer from the options given below:

- (A) A, B, C and D
- (B) A, B and C only
- (C) A, B and D only
- (D) B, C and D only

60. Arrange the steps involved in the gas transfer from gas bubble into bulk liquid

- A. The gaseous component diffused through the quiescent liquid film into the bulk liquid.
- B. The gaseous component enters into the liquid film.
- C. Transportation of the gaseous component into the well mixed bulk liquid.
- D. The aeseous component transported from the bulk gas to gas-liquid interphase.

Choose the most appropriate answer from the options given below:

- (A) D, B, A, C
- (B) D, C, B, A
- (C) C, D, B, A
- (D) D, B, C, A

61. Ficks' law of diffusion states that mass flux per unit area of a component is directly proportional to its -----.

- (A) Velocity gradient
- (B) Temperature gradient
- (C) Concentration gradient
- (D) pH gradient

62. Sherwood number is a function of

- (A) Reynolds' number and Rayleigh number
- (B) Rayleigh number and Grashof number
- (C) Reynolds' number and Grashof number
- (D) Reynolds' number and Schmidt number

63. Sequentially arrange the processing steps of coffee

- A. Brewing
- B. Roasting

C. Grinding

D. Blending

Choose the most appropriate answer from the options given below:

(A) D, B, C, A

(B) D, C, B, A

(C) B, A, D, C

(D) B, D, C, A

64. Lecithin is structurally like fat but contain

(A) Amino acid

(B) Hydrochloric acid

(C) Phosphoric acid

(D) Sugar

65. The process which permits the formation of the polymorphic form in fats is known as

(A) Conditioning

(B) Hydrogenation

(C) Tempering

(D) Shortening

66. On treatment with alkali, chlorophyll changes to

(A) Pheophytin

(B) Chlorophyllin

(C) Xanthophyll

(D) Vitamin A

67. Arrange the sequence of steps involved in the production of sauerkraut

A. Pasteurization

- B. Salting
- C. Fermentation
- D. Shredding

Choose the most appropriate answer from the options given below:

- (A) D, B, C, A
- (B) D, B, A, C
- (C) C, A, B, D
- (D) C, B, D, A

68. Match the LIST I (Enzyme) with LIST II (Catabolic Products)

LIST-I (Enzyme)	LIST-II (Catabolic Products)
A β -galactosidase	I Choline + H_3PO_4 + fat
B Lecithinase	II Glycerol + fatty acids
C Urease	III Galactose + glucose
D Lipase	IV CO_2 + NH_3

- (A) A - III, B - IV, C - I, D - II
- (B) A - III, B - I, C - IV, D - II
- (C) A - III, B - II, C - IV, D - I
- (D) A - II, B - I, C - IV, D - III

69. Bitterness is exhibited by alkaloids such as _____

- (A) Quinine
- (B) Beryllinm salts
- (C) Lead acetate
- (D) Cyclamate

70. Match the LIST I (Stage of Egg White foam) with LIST II (Uses)

LIST-I	LIST-II
(Stage of Egg White foam)	(Uses)
A Slightly beaten	I Shirred egg
B Stiff foam	II Ice cream
C Stiff	III Thickening
D Dry	IV Meringues

(A) A - I, B - II, C - III, D - IV

(B) A - IV, B - III, C - I, D - II

(C) A - III, B - II, C - IV, D - I

(D) A - III, B - IV, C - II, D - I

71. Match the LIST-I (Class of Meat) with LIST-II (Description)

LIST-I	LIST-II
(Class of Meat)	(Description)
A Veal	I Flesh of a young ovine animal...
B Beef	II Carcasses of young sheep...
C Mutton	III Meat from cattle slaughtered 3 to 4 weeks...
D Yearling mutton	IV Meat of cattle over 1 year old

(A) A - III, B - IV, C - I, D - II

(B) A - IV, B - III, C - II, D - I

(C) A - I, B - II, C - IV, D - III

(D) A - III, B - IV, C - II, D - I

72. Arrange the steps involved in alkali processing of maity (maize)

- Washing with fresh water
- Steeping in water for 14 hours
- Milling to obtain "masa"
- Mixing with water and lime at 90°C for 50 minutes

Choose the most appropriate answer from the options given below:

- (A) D, B, C, A
 - (B) D, B, A, C
 - (C) B, A, D, C
 - (D) C, B, D, A
-

73. Arrange the sequence of steps involved in the reaction of enzymatic browning

- A. Formation of DOPA
- B. Action of PPO enzyme on cut fruits
- C. Polymerization of ortho-quinones to form melanins
- D. Formation of ortho-quinones

Choose the most appropriate answer from the options given below:

- (A) C, B, A, D
 - (B) B, D, C, A
 - (C) B, A, D, C
 - (D) B, A, C, D
-

74. Arrange the steps involved in the production of soy sauce

- A. Roasting of wheat
- B. Moromi stage
- C. Lactic/ethanolic fermentation
- D. Fermentation at 25-30 °C for 2-3 days

Choose the most appropriate answer from the options given below:

- (A) A, D, B, C
 - (B) A, C, B, D
 - (C) A, D, C, B
 - (D) C, B, D, A
-

75. The bacteria most commonly associated with the soft rotting of carrots is

- (A) *Corynebacterium* spp.
 - (B) *Lactobacillus* spp.
 - (C) *Pectobacterium* spp.
 - (D) *Xanthomonas* spp.
-