

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF  
ASST. PROFESSOR OF FOOD PROCESS ENGINEERING**

1. Conventional freezing reduces the temperature of the food product to below its freezing point.
  - A.  $-5$  to  $0^{\circ}\text{C}$
  - B.  $-12^{\circ}\text{C}$  to  $-40^{\circ}\text{C}$
  - C.  $0^{\circ}\text{C}$  to  $5^{\circ}\text{C}$
  - D.  $-78.5^{\circ}\text{C}$  to  $-196^{\circ}\text{C}$
2. Work is produced by the refrigeration system is.
  - A. Adiabatic expansion
  - B. Adiabatic compression
  - C. Isothermal expansion
  - D. Isothermal compression
3. \_\_\_\_\_ is the ratio of heat absorbed by the refrigerant in the evaporator to the heat equivalent work done by the compressor.
  - A. Refrigeration effect
  - B. Coefficient of performance
  - C. Work done
  - D. Power per unit ton of refrigeration capacity
4. The specific heat and latent heat of water are \_\_\_ and \_\_\_ respectively.
  - A.  $1000\text{ J/kg K}$  and  $400\text{ kJ/kg}$
  - B.  $335\text{ J/kg K}$  and  $4200\text{ kJ/kg}$
  - C.  $800\text{ J/kg K}$  and  $200\text{ kJ/kg}$
  - D.  $4200\text{ J/kg K}$  and  $335\text{ kJ/kg}$
5. One ton of refrigeration is equal to the refrigeration effect corresponding to melting of  $1000\text{ kg}$  of ice in.
  - A.  $1\text{ h}$
  - B.  $1\text{ min}$
  - C.  $24\text{ h}$
  - D.  $12\text{ h}$
6. According to Plank's equation of freezing time, freezing time is.
  - A. directly proportional to the square of product thickness.
  - B. inversely proportional to the square of product thickness
  - C. inversely proportional to density of the product
  - D. directly proportional to thermal conductivity of the product
7. To reduce the freezing time, product thickness should be\_\_\_\_, and the temperature gradient should be \_\_\_\_.
  - A. Maximum, low
  - B. Minimum, low
  - C. Maximum, high
  - D. Minimum, high
8. In air blast freezers
  - A. cold air at high velocity is used
  - B. liquid refrigerant is used
  - C. plate heat exchanger is used
  - D. still air is used
9. The portion of water in a food which does not freeze is.
  - A. Unbound water
  - B. Bound water
  - C. Free water
  - D. None of the above
10. The refrigerant with the lowest freezing point is.
  - A. R12
  - B. R22
  - C. R11
  - D. R21

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11. Cryogenic freezing results in frozen products with.
- A. Large ice crystals
  - B. Small ice crystals
  - C. Combination of both large and small ice crystals
  - D. Large or small ice crystals
12. An example of continuous-type filter is
- A. Plate and frame
  - B. Spiral wound membrane
  - C. Rotary drum vacuum
  - D. Tubular membrane
13. Ribbon mixer is generally used for the blending of.
- A. Solid–solid
  - B. Liquids
  - C. Solid–liquid
  - D. Dough
14. The processes by which specific deteriorative enzymes gets inactivated in vegetables or fruits is called
- A. Pasteurization
  - B. Canning
  - C. Blanching
  - D. Drying
15. \_\_\_\_\_ is the major target microorganism in the commercial sterilization process.
- A. *C. botulinum*
  - B. *Bacillus subtilis*
  - C. *C. sporogenes*
  - D. *C. histolyticum*
16. The marker enzyme that is indicative of an efficient milk pasteurization is.
- A. PPO
  - B. POD
  - C. alkaline phosphatase
  - D. LOX
17. The D value is the time required at a specific temperature to.
- A. increase the microbial population by 10%
  - B. decrease the microbial population by 90%
  - C. decrease the z value by 90%
  - D. decrease the F value by 90%
18. Generally, the reference temperature for a commercial sterilization process is.
- A. 150°C
  - B. 100°C
  - C. 273.15°C
  - D. 121.1°C
19. \_\_\_\_\_ is defined as the increase in temperature to achieve a ten-fold or one log reduction in D value.
- A. F value
  - B. Z value
  - C. D value
  - D. Q10
20. The total time required to achieve a defined reduction in the population of vegetative cells or spores.
- A. F value
  - B. Z value
  - C. D value
  - D. Q10

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21. The range of pressure during High Pressure Processing (HPP)
- A. 1000-10000 MPa
  - B. 50-90 MPa
  - C. 1-50 MPa
  - D. 100-900MPa
22. The separation technique which is based on densities of materials.
- A. Grading
  - B. Sorting
  - C. Centrifugation
  - D. Extraction
23. The preservation technique using radiation is known as.
- A. Cold sterilization
  - B. Dry sterilization
  - C. Heat sterilization
  - D. Uperization
24. \_\_\_ uses electrostatic force to separate the solid particles from the gas stream
- A. Nebulizer
  - B. Blower
  - C. Doctor blade
  - D. Electrostatic precipitator
25. Storage of food under reduced pressure is called.
- A. Aseptic packaging
  - B. Hyperbaric storage
  - C. Hypobaric storage
  - D. Gas packaging
26. The term BOPP in packaging stands for.
- A. Biaxially Oriented Polypropylene
  - B. Biaxially Oriented Polypropyl alcohol
  - C. Biaxially Oriented Patented Polypropylene
  - D. Biaxially Operated Packaging Printing
27. The acronym ASTM stands for.
- A. Asian Society for Testing and Materials Standards.
  - B. American Society for Trade and Marketing Standards
  - C. African Society for Traceability and Manufacturing Standards
  - D. American Society for Testing and Materials Standards
28. A widely used material for packaging of juices and water is.
- A. HDPE
  - B. PET
  - C. PP
  - D. PC
29. \_\_\_\_\_ is a commonly used ethylene scavenger which oxidizes ethylene to acetate and ethanol.
- A. CO<sub>2</sub> absorbers
  - B. Ethyl alcohol
  - C. Allyl isothiocyanate
  - D. Potassium permanganate

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30. The packaging system used to package ultra-heat-treated milk is
- MAP
  - Intelligent packaging
  - Aseptic packaging
  - Active packaging
31. \_\_\_\_\_ is an active system which continuously maintains the desired atmosphere within a package throughout the shelf-life of a product by the use of agents to bind or scavenge oxygen or a sachet containing compounds to emit a gas.
- Controlled atmosphere packaging (CAP)
  - Intelligent packaging
  - Modified atmosphere packaging (MAP)
  - None of these
32. The chemically inert packaging material among the following is.
- Glass
  - Metal
  - Paper
  - Plastics
33. The most appropriate type of active packaging for fruits is.
- Oxygen absorbers
  - Moisture absorbers
  - Ethylene absorber
  - Carbon dioxide absorbers
34. The test for water penetration of packaging materials in.
- Elmendorf test
  - Cobb test
  - Static test
  - Peel test
35. The separation of solids from suspension in liquid by gravity alone is called as.
- Centrifugation
  - Flocculation
  - Sedimentation
  - None of the above
36. In case of mixing operation baffles are used to.
- to improve the rate of mixing
  - to minimize vortex formation
  - Both A and B
  - Neither A and B
37. In distillation \_\_\_\_ takes place in both the direction.
- Heat transfer
  - Evaporation
  - Mass transfer
  - None of the above
38. Load of refrigeration is expressed in.
- Grams
  - Pound
  - Ton
  - All of these
39. The value of mixing index for a complete mixing is.
- 6
  - 1
  - Less than 1
  - Greater than 6
40. SI unit of kinematic viscosity is.
- $m^2s^{-1}$
  - $ms^{-1}$
  - $ms^{-2}$
  - $kg m^{-1}s^{-1}$

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41. One kcal is how many kJ?  
A. 4.185  
B. 418.5  
C. 4185  
D. 41.85
42. One atmospheric pressure is equal to  
A. 1 kg/m<sup>2</sup>  
B. 1 kg/cm<sup>2</sup>  
C. 1 g/m<sup>3</sup>  
D. 1 g/cm<sup>3</sup>
43. The amount of dry sugar that must be added in 10 kg of aqueous sugar solution in order to increase its concentration from 10% to 40% is.  
A. 5 kg  
B. 10 kg  
C. 2.5 kg  
D. 4 kg
44. The tie material in a process involving the drying of potatoes is.  
A. moisture content  
B. solid content  
C. fresh product mass  
D. dried product mass
45. A 150 kg batch of raw honey has a moisture content of 25%. How much of water needs to be removed to obtain a final moisture content of 20% in the processed honey?  
A. 9.4 kg  
B. 7.5 kg  
C. 6.8 kg  
D. 10 kg
46. The predominant form of energy in microwave heating of foods is.  
A. electromagnetic energy  
B. electrical energy  
C. chemical energy  
D. mechanical energy
47. The amount of heat lost by the ice during melting is termed as  
A. latent heat of fusion  
B. sensible heat  
C. heat of supersaturation  
D. none of the above
48. With increase in temperature, viscosity of a liquid.  
A. Increases  
B. Decreases  
C. does not change  
D. depending on fluid
49. Manometer is used for the measurement of.  
A. Force  
B. Pressure  
C. Density  
D. Temperature
50. The example of a shear thinning fluid is.  
A. Condensed milk  
B. Dairy cream  
C. Mayonnaise  
D. all the above
51. When heat transfer occurs in the absence of a medium, it is referred to as.  
A. Conductive  
B. Convective  
C. Radiative  
D. both A and B

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52. Which of the following has the highest thermal conductivity?  
A. Steam  
B. Solid ice  
C. Melting ice  
D. Water
53. A non-dimensional number generally associated with natural convection heat transfer is.  
A. Grashof number  
B. Nusselt number  
C. Reynolds number  
D. Prandtl number
54. The ratio of energy transferred by convection to that by conduction is termed as.  
A. Stanton number  
B. Graetz number  
C. Biot number  
D. Peclet number
55. Convective heat transfer is explained by  
A. Newton's law of cooling  
B. Fourier's law of heat transfer  
C. Stefan-Boltzmann law  
D. Kirchhoff's law
56. The rate of heat transfer per unit area from a metal plate is  $1700 \text{ W/m}^2$ . The surface temperature of the plate is  $200^\circ\text{C}$ , and the ambient temperature is  $30^\circ\text{C}$ . What is the value of convective heat transfer coefficient?  
A.  $10 \text{ W/m}^2\text{C}$   
B.  $7.39 \text{ W/m}^2\text{C}$   
C.  $10 \text{ W/m}^\circ\text{C}$   
D.  $7.39 \text{ W/m}^\circ\text{C}$
57. A thermal boundary layer is formed between fluid stream and surface due to.  
A. Temperature gradient  
B. Velocity gradient  
C. Viscous drag  
D. None of the above
58. Which of the following heat exchanger is commonly used in dairy industry?  
A. Shell and tube  
B. Plate  
C. Scraped surface  
D. Tube in tube
59. The value of Wien's displacement constant is.  
A.  $2.898 \times 10^{-3} \text{ m K}$   
B.  $2.898 \times 10^{-3} \text{ m}^2 \text{ K}$   
C.  $2.898 \times 10^{-6} \text{ m}^4 \text{ K}$   
D.  $2.898 \times 10^{-6} \text{ m K}$
60. In order to cool the food product by radiation, a food industry paints its walls white but not black. The abovementioned approach is based on  
A. Newton's law of cooling  
B. Wien's displacement law  
C. Kirchhoff's law  
D. Fourier's law
61. Thermal diffusivity is inversely proportional to.  
A. Density  
B. Specific heat  
C. Thermal conductivity  
D. Both A and B

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62. \_\_\_\_ is the ratio of thermal and mass diffusivity.
- A. Sherwood number
  - B. Lewis number
  - C. Schmidt number
  - D. None of the above
63. The resistance to mass transfer is offered by.
- A. Concentration gradient
  - B. Distance between the components
  - C. Temperature
  - D. All of the above
64. In case of mass transfer, if Biot number is less than 0.1, then which of the following is true.
- A. Internal resistance to mass transfer is negligible
  - B. External resistance to mass transfer is negligible
  - C. Mass transfer is dependent on diffusivity
  - D. None of the above
65. \_\_\_\_ law represents the inverse relationship between pressure and volume of gas at constant temperature.
- A. Avogadro's law
  - B. Charles's law
  - C. Boyle's law
  - D. Roul't's law
66. Which of the following properties of moist air is independent of the temperature.
- A. Humidity ratio
  - B. Percent saturation
  - C. Relative humidity
  - D. All are dependent on temperature
67. At what percentage saturation the dew point temperature is equal to the wet bulb temperature of air.
- A. 0%
  - B. 100%
  - C. 50%
  - D. 33.33%
68. The cooling of air below its dew point temperature which results in drop in humidity ratio is represented by which of the following psychrometric processes.
- A. Cooling with dehumidification
  - B. Heating with humidification
  - C. Sensible heating
  - D. Sensible cooling
69. Specific humidity is the mass of water vapor present in.
- A. 1 m<sup>3</sup> of dry air
  - B. 1kg of moist air
  - C. 1 kg of dry air
  - D. All of above
70. When the moisture evaporation no longer occurs the relative humidity of air is.
- A. 100%
  - B. 0%
  - C. 50%
  - D. 33.33%
71. The half life time of a reaction is constant if the order of the reaction is .
- A. Zero
  - B. One
  - C. Two
  - D. Three

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72. The SI unit of rate constant in a zero order reaction is .
- L mol/s
  - mol/Ls
  - dimensionless
  - s<sup>-1</sup>
73. The rate constant of the reaction depends on.
- Concentration of reactants
  - Concentration of products
  - Time
  - Temperature
74. If the rate of the reaction doubles with 10 °C change in temperature, then Q<sub>10</sub> is.
- 2
  - 3
  - 1
  - 4
75. Generally, the rate of reaction is.
- Directly proportional to temperature.
  - Inversely proportional to temperature
  - May increase or decrease
  - Remains constant
76. \_\_\_ expresses the change in temperature which can produce a 10-fold increase in reaction rate.
- Q<sub>10</sub> value
  - Z-value
  - Rate constant
  - Activation energy (E<sub>a</sub>)
77. Rate of evaporation is
- Directly proportional to the temperature of the liquid.
  - Directly proportional to the humidity of the surrounding air
  - Independent of the temperature of the liquid
  - Inversely proportional to the temperature of the liquid
78. In case of calandria-type evaporator, the solution to be evaporated is \_\_\_\_\_ the tube and steam flows \_\_\_\_\_ the tubes in steam chest.
- Outside, outside
  - Inside, inside
  - Outside, inside
  - Inside, outside
79. During the process of boiling, \_\_\_\_\_
- Vapor pressure = total pressure = atmospheric pressure.
  - Vapor pressure < total pressure < atmospheric pressure
  - Vapor pressure > total pressure > atmospheric pressure
  - Vapor pressure < total pressure > atmospheric pressure
80. Elevation of boiling point of a solution and its relationship with the boiling point of water is explained by.
- Duhring's rule
  - Herring's rule
  - Herring's rule
  - Boyle's law



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81. Steam economy is more in
- Backward feed evaporator
  - Forward feed evaporator
  - Parallel feed evaporator
  - Mixed feed evaporator
82. Evaporators are normally operated under vacuum in order to.
- Reduce the wall thickness of the evaporator body
  - Enable the use of low-pressure steam as heating medium
  - Prevent thermal degradation of the solute
  - Increase the steam economy
83. Moisture content of an agricultural produce, when expressed on wet basis is 75%. The corresponding moisture content on dry basis will be.
- 30%
  - 3%
  - 300%
  - 150%
84. 100 kg of orange juice is dried from 70% to 20% moisture (by weight). The mass of moisture removed is
- 50 kg
  - 37.5 kg
  - 62.5 kg
  - 33.33 kg
85. The most commonly used dryer for production of milk powder is.
- Tray dryer
  - Spray dryer
  - Fluidized bed dryer
  - Drum dryer
86. The method of drying which uses water as the tool to evaporate water from the product is.
- Spray freeze drying
  - Refractance window drying
  - Supercritical drying
  - Cyclic pressure drying
87. The longest phase of freeze drying is.
- Secondary drying
  - Primary drying
  - Freezing
  - All phases take same duration
88. Which configuration of spray dryer is most suitable for drying of heat-sensitive materials.
- Co-current
  - Counter current
  - Mixed flow
  - Any configuration can be used
89. \_\_\_ separates the constant rate period from falling rate period.
- Equilibrium moisture content
  - Critical moisture content
  - Initial moisture content
  - None of the above
90. Which of the following atomizer uses high velocity air or gases for generating the spray.
- Two-fluid nozzle
  - Pressure
  - Centrifugal
  - None of the above

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91. On a psychrometric chart, the humidification process is represented by.
- A. Inclined line
  - B. Horizontal line
  - C. Vertical line
  - D. None of the above
92. Microbial inactivation kinetics follow \_\_\_ order reaction
- A. Zero
  - B. First
  - C. Second
  - D. Third
93. Which of the following is correct?
- A. Rate = driving force  $\times$  resistance.
  - B. Driving force = rate  $\times$  resistance
  - C. Rate = resistance/driving force
  - D. None of the above
94. Which of these is an example of an exploding food in microwave processing?
- A. Onion
  - B. Green Beans
  - C. Bell Pepper
  - D. Egg
95. Typical HPP systems operate in the pressure range of.
- A. 400 to 800 kPa
  - B. 400 to 800 MPa
  - C. 400 to 800 psi
  - D. 400 to 800 kg/cm<sup>2</sup>
96. Which of these is a common anti-softening pre-treatment agent?
- A. Nitrous oxide
  - B. Benzoic acid
  - C. Calcium chloride
  - D. Ascorbic acid
97. Which of these is a classic example of a protein based extruded product?
- A. Potato snack foods
  - B. TVP
  - C. Liquorice
  - D. Pasta
98. Domestic microwave ovens operate at \_\_\_\_\_ frequency.
- A. 2450 MHz
  - B. 915 MHz
  - C. 2045 MHz
  - D. 950 MHz
99. Which of these incidents of crystallization is undesirable?
- A. Recovery of citric acid
  - B. Winterization of edible oils
  - C. Recrystallization of cocoa butter in chocolate
  - D. Candying of fruit
100. Which of these is double distilled?
- A. Beer
  - B. Wine
  - C. Scotch malt whisky
  - D. Vodka