Q.1 The systematic name of sucrose is

(A) α-D-Fructofuranosyl (1-2) β -D-Glucopyranoside

(B) α-D-Glucopyranosyl (1-2) β-D-Fructofuranoside

(C) α-D-Glucopyranosyl (2-1) β-D-Fructofuranoside

(D) α-D-Fructofuranosyl ((2-1) β-D-Glucopyranoside

Q.2 A non-hydrolyzable lipid is

(A) Lecithin (B) Arachidic acid (C) Tocopherol (D) Tristearin

Q.3 The respiratory quotient (RQ) for the reaction 2 C57H110O6 + 163 O2 114 CO2 + 110 H2O is

(A) 0.70 (B) 1.14 (C) 1.43 (D) 0.14

Q.4 Liver necrosis may be caused by the deficiency of

(A) Vitamin A (B) Vitamin D (C) Vitamin K (D) Vitamin E

Q.5 Which of the following non-nutritive sweeteners contains similar calories per gram as that of sucrose?

(A) Saccharin (B) Aspartame (C) Sucralose (D) Cyclamate

Q.6 The objective of heating milk to about 65°C before homogenization is to inactivate

(A) Glucose oxidase (B) Lipases (C) Lactases (D) Invertases

Q.7 Make the correct match of the processes in C**olumn I** with the suitable materials/products in **Column II**

C**olumn I**	C**olumn II**
1) Rendering	P) Lecithin
2) Hydrogenation	Q) Fullers' earth
3) Degumming	R) Lard
4) Bleaching	S) Margarine

(A) 1-R, 2-P, 3-Q, 4-S (B) 1-P, 2-Q, 3-S, 4-R

(C) 1-R, 2-P, 3-S, 4-Q (D) 1-R, 2-S, 3-P, 4-Q

Q.8 A fruit juice of viscosity μ and density ρ is agitated using an impeller of diameter D at a speed of N revolutions per minute. The terms $X = \frac{P}{\rho N^3 D^5}, Y = \frac{D^2 N \rho}{\mu}, Z = \frac{N^2 D}{g}$ represent three process related numbers, where P is power imparted by impeller and g is acceleration due to gravity. Which of the following is correct representation of these numbers?

(A) X = Power, Y= Froude, Z = Reynolds (B) X = Power, Y = Reynolds, Z = Froude

(C) X = Froude, Y= Reynolds, Z = Power (D) X = Reynolds, Y = Power, Z = Froude

Q.9 The energy required to reduce the size of a food material from a mean diameter of 12 mm to 4 mm is 10 kJ kg^{-1}. From Rittingers' law, the energy needed to reduce the same material from a diameter of 1.2 mm to 0.4 mm in kJ kg^{-1} is _____

Q.10 *Saccharomyces cerevisiae* (mean doubling time 3.2 h) is grown in a batch fermenter with an operating volume of 12 m^3. A 2% (v/v) inoculum, which contains 5 kg cells per 100 m^3 is mixed with the substrate. The residence time in the fermenter is 24 h and the density of broth is 1010 kg m^{-3}. The mass of *S. cerevisiae* obtained from the fermenter, in kg, is _____

Q.11 Make the correct combination of operations in C**olumn I** with the machines in **Column II**

C**olumn I**	C**olumn II**
1) Rice milling	P) Pin mill
2) Wheat milling	Q) Rubber rolls
3) Mustard oil expelling	R) Break rolls
4) Pepper grinding	S) Screw press

(A) 1-Q, 2-R, 3-S, 4-P (B) 1-R, 2- Q, 3-S, 4-P

(C) 1-Q, 2-P, 3-S, 4-R (D) 1-Q, 2-R, 3- P, 4- S

Q.12 The correct order for D121 values of the spores of food spoilage bacteria in aqueous medium is

(A) B. stearothermophilus > C. sporogenes > C. botulinum type A > *B. coagulans*

(B) *C. sporogenes > B. stearothermophilus > C. botulinum* type A > *B .coagulans*

(C) *C. botulinum* type A > *B. stearothermophilus > C. sporogenes > B. coagulans*

(D) *B. stearothermophilus > C. botulinum* type A > *C. sporogenes > B. coagulans*

Q.13 Make the correct combination of pigments/microorganisms in C**olumn I** with the process/ products in **Column II**

C**olumn I**	C**olumn II**
1) Anthocyanin	P) Ropiness
2) Chlorophyll	Q) Koji
3) *Bacillus subtilis*	R) Glycosides
4) *Aspergillus oryzae*	S) Porphyrins

(A) 1-S, 2- R, 3-P, 4-Q (B) 1-R, 2-S, 3-Q, 4- P

(C) 1-Q, 2-S, 3-P, 4-R (D) 1-R, 2-S, 3-P, 4-Q

Q.14 Make the correct combination of underlying principles in C**olumn I** with the processes in **Column II**

C**olumn I**	C**olumn II**
P) Gelatinization	1) Carbonyl derivatives react with free amino acids to yield aldehydes
Q) Strecker degradation	2) Starch aggregates and forms micro-crystals
R) Caramelization	3) Starch granules swell and leach amylose
S) Retrogradation	4) Pyranose or furanose rings open up by pyrolytic reactions to form furfural derivatives

(A) 1-Q, 2-R, 3-P, 4- S (B) 1-Q, 2-S, 3-P, 4-R

(C) 1-R, 2-S, 3-P, 4- Q (D) 1-Q, 2-P, 3- S, 4-R

Q.15 Which one of the following statements is **FASLE**?

(A) The peptide bond is planar offering restricted rotation around its axis.

(B) Full range of water activity is $0 \leq aw \leq 1$ and it has well defined unit.

(C) The autooxidation of lipids proceeds via free radical mechanism.

(D) The carbonyl group of sugar reacts with nucleophilic amino group of amino acids in Amadori rearrangement.

Q.16 Which one of the following statements is **TRUE**?

(A) Pectate lyase hydrolyzes methyl ester bond of pectin.

(B) α-Solanine is a non-toxic compound found in solanaceae plants.

(C) Egg proteins have lower digestibility than pea proteins.

(D) Lipoxygenase catalyses the conversion of cis, cis-1,4-pentadiene to hydroperoxides.

Q.17 Fish fillet having 84% moisture (wet basis) is frozen from top using an air blast freezer maintained at −32°C. The initial temperature of the fillet (density 1050 kg m-3) is −2°C (freezing point).Convective heat transfer coefficient of air is 25 Wm^{-2} K^{-1}, thermal conductivity of frozen fish is 1.0$Wm^{-1}K^{-1}$ and latent heat of crystallization is 340 kJ kg^{-1}. The freezing time, in min, for a 20 mm thick block of fish fillet weighing 1 kg is _____

Q.18 Make the correct combination of properties in **Column I** with their dimensions in **Column II**

Column I	**Column II**
1) Dynamic viscosity	P) $m^2 s^{-2}K^{-1}$
2) Thermal conductivity	Q) kg m s^{-2}
3) Specific heat	R) kg m-1 s^{-1}
4) Force	S) kg m s^{-3} K^{-1}

(A) 1-R, 2-S, 3-Q, 4- P (B) 1- Q, 2-S, 3-P, 4- R

(C) 1-R, 2-S, 3-P, 4-Q (D) 1- S, 2-R, 3-P, 4-Q

Q.19 The viscosity and density of a fruit juice at 21°C are 6.3 x 10-3 Pa s and 1029 kg m^{-3}, respectively. The juice flows at the rate of 0.12 m3 min^{-1} in a 2.54 cm inner diameter steel pipe. Correct combination of the Reynolds number (NRe) and the nature of flow of juice is

(A) NRe = 1048, Laminar (B) NRe = 2056, Laminar

(C) NRe = 16375, Turbulent (D) NRe = 28656, Turbulent

Q.20 For a typical food sorption isotherm curve (Figure 1), which one of the following statements is **CORRECT ?**

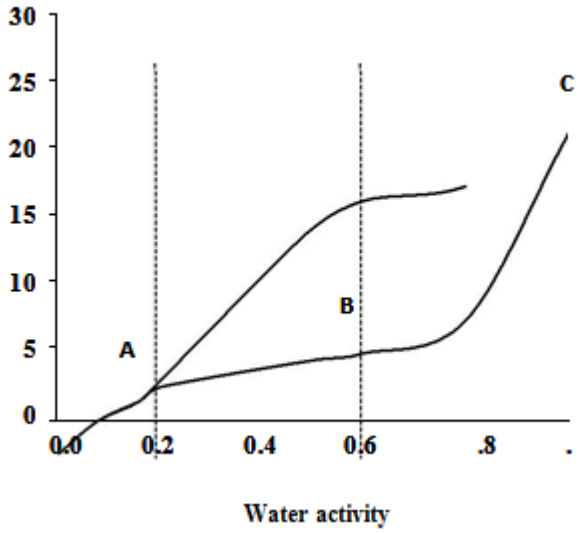

Figure 1: Food sorption isotherm curve

(A) Y-coordinate of A represents monolayer water content of food, A-B represents water absorbed in the multilayer within the food and B-C represents free water within the capillary network of the food.

(B) Y-coordinate of B represents monolayer water content of food, A-B represents water absorbed in the multilayer within the food and B-C represents free water within the capillary network of the food.

(C) Y-coordinate of A represents monolayer water content of food, Y-coordinate of B represents water absorbed in the multilayer within the food and B-C represents free water within the capillary network of the food.

(D) Y-coordinate of A represents monolayer water content of food, A-C represents water absorbed in the multilayer within the food and Y-coordinate of C represents free water within the capillary network of the food.

Q.21 10,000 kg milk (7% fat) is passed through a cream separator to obtain cream (40% fat) and skim milk (0.1 % fat). The cream, thus obtained, is churned to make butter of 80.5% fat. If a loss of 0.5% of initial milk fat occurs during the manufacturing process, the % overrun is _____

Q.22 A 50 mm thick pack of farm fresh berries is cooled at one side from 24°C to 7°C. The relevant properties of berries are: density 1025 kg m^{-3}, specific heat 3.78 kJ $kg^{-1}K^{-1}$, convective heat transfer coefficient 30 $Wm^{-2}K^{-1}$, and thermal conductivity 0.3 Wm^{-1} K^{-1}. The Fourier number for a cooling span of 30 min is _____