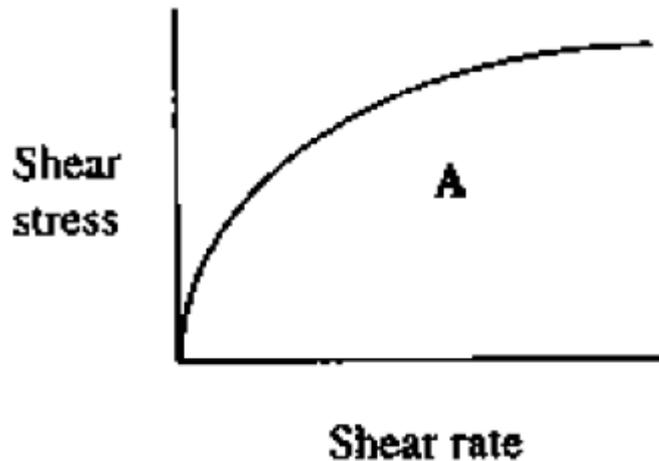


Q.1 A food material contains 70% moisture (wb). The food is dried for 3 hr at 80°C air temperature in a tray dryer such that 80% of its initial moisture is removed. Final moisture content (wb) of the dried food is

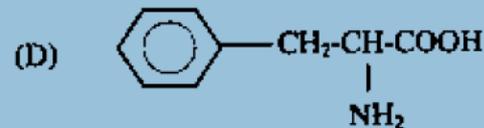
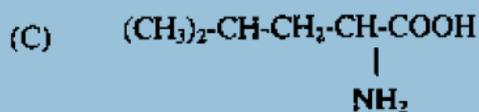
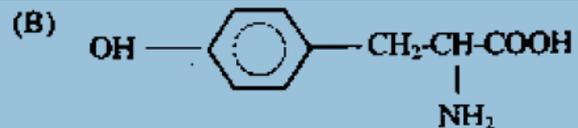
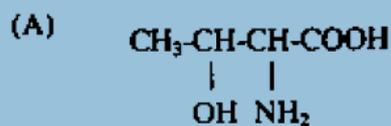
- A) 31.82%   B) 46.67%   C) 56.00%   D) 20.01%

Q.2 Liquid A obeys power law equation  $\sigma = k \cdot \dot{\gamma}^n$  (as shown in the figure). Where  $\sigma$  is shear stress,  $\dot{\gamma}$  is shear rate,  $k$  is consistency index and  $n$  is flow behaviour index. The correct unit of consistency index and nature of liquid are



- A) Pa.s and Shear thinning      B) Pa.s<sup>n</sup> and Shear thickening  
C) Pa.s and Shear thickening      D) Pa.s<sup>n</sup> and Shear thinning

Q.3 Identify the amino acid tyrosine from the following structures



Q.4 Saponification number of a fat is the milligrams of KOH required to saponify 1 g of fat. The correct statement on saponification is

- A) Fat with high amount of low molecular weight fatty acids will have high saponification number  
B) Butter has low saponification number  
C) Fatty acids with long carbon chains have high saponification number  
D) Fat with low Reichert-Meissl number has very high saponification number

Q.5 The expansion of term HACCP and GRAS are

- A) Hygienic Associated Critical Control Point; Grossly Recommended As Safe  
B) Hazard Analysis and Critical Control Point; Generally Recognized As Safe

C) Hygienic and Aesthetic Concept of Critical Products; Generally Recognized As Safe

D) Hazard Analysis and Critical Control Point; Grossly Recommended As Safe

Q.6 Which two of the following statement are NOT the objective of homogenization of milk?

1. Counteracting segregation for the most part of creaming thus avoiding sedimentation or phase separation
2. Arresting rancidity of fat globules in milk
3. Increasing fluidity of milk by lowering viscosity
4. Improving the colour of the milk (more whitish)
5. Improving milk stability by preventing partial coalescence fat globules

A) 1 and 2   B) 2 and 3   C) 3 and 4   D) 4 and 5

Q.7 Shelf life of fish can be extended by chilling as it

- A) Reduces chemical activity of food constituents and increases biochemical activity
- B) Reduces water activity and increases biochemical reaction rate
- C) Reduces chemical and biochemical reactions in fish cells
- D) Destroys pathogenic microbes

Q.8 Major spoilage organism of poultry meat at low temperatures are

- A) Candida and Staphylococcus      B) Torula and Clostridium
- C) Pseudomonas and Acinetobacter      D) Flavobacteria and Lactobacillus

Q.9 The appropriate explanation for spoilage of egg, stored at low temperature, might be due to

- A) Shell of egg is porous and only fungus hyphae can enter and contaminate the egg liquid
- B) Shell of egg is non-porous and the spoilage is mainly attributed to chemical decomposition
- C) Shell of egg is porous and microbes contamination the shell penetrate it and cause the spoilage
- D) Eggs are contaminated before they are laid by hen

Q.10 Two faces of a metal plate having thermal conductivity  $17 \text{ Wm}^{-1}\text{K}^{-1}$  and thickness 10mm are maintained at  $80^\circ\text{C}$  and  $100^\circ\text{C}$ . If the thickness of the plate is increased by 20% and the temperature of the hotter face is increased to  $120^\circ\text{C}$ , then the Percent increase in heat flux under steady state heat transfer is

A) 20.67   B) 40.00   C) 59.99   D) 66.67

Q.11 Match the following.

- |                         |                                |
|-------------------------|--------------------------------|
| Group 1                 | Group 11                       |
| P. Freeze concentration | 1. Triple point of water       |
| Q. Reverse osmosis      | 2. Heat transfer by conduction |
| R. Drum drying          | 3. Eutectic point              |
| S. Freeze drying        | 4. Radiation heat transfer     |
|                         | 5. Concentration polarization  |

A) P-4,Q-5,R-2,S-1 B) P-3,Q-2,R-5,S-1 C) P-3,Q-5,R-2,S-1 D) P-1,Q-2,R-4,S-3

Q.12 Match the following

Group 1

P. Calcium and Phosphorous

Q. Vitamin D

R. Manganese and Chromium

S. Vitamin K

Group 11

1. Elements not needed in diet

2. Promotes absorption of iron

3. Elements that are required in small quantities

4. Promotes the absorption of calcium

5. Essential for normal clotting of blood

6. Elements that are required in large quantities

A) P-6,Q-2,R-1,S-5 B) P-5,Q-2,R-6,S-4 C) P-6,Q-4,R-3,S-5 D) P-2,Q-5,R-1,S-4

Q.13 9.5 g of corn flakes containing 5% moisture(wb) is oxidized completely to  $\text{CO}_2$  and  $\text{H}_2\text{O}$  by ignition in a Bomb Calorimeter. The combustion increases the temperature of 2500g of water from  $15^\circ\text{C}$  to  $27^\circ\text{C}$ . Assume that the heat capacity and latent heat of vaporization of water are  $4.187 \text{ kJg}^{-1}\text{K}^{-1}$  and  $2257 \text{ kJkg}^{-1}$  respectively. Neglect any sensible heat gain by water vapour. The calorific value of the flake is

A)  $18.28 \text{ kJg}^{-1}$  ( $4.37 \text{ kcalg}^{-1}$ )

B)  $9.79 \text{ kJg}^{-1}$  ( $2.34 \text{ kcalg}^{-1}$ )

C)  $14.04 \text{ kJg}^{-1}$  ( $3.36 \text{ kcalg}^{-1}$ )

D)  $22.43 \text{ kJg}^{-1}$  ( $5.36 \text{ kcalg}^{-1}$ )

Q.14 Match the following

Group 1

P. Jelly

Q. Edible oil

R. Meat flavour enhancer

S. Bread

Group 11

1. Calcium propionate

2. Monosodium glutamate

3. Sodium benzoate

4. Butylated hydroxyl anisole

5. Tricalcium silicate

A) P-3,Q-4,R-2,S-1 B) P-5,Q-3,R-2,S-4 C) P-1,Q-3,R-4,S-5 D) P-2,Q-3,R-1,S-5

Q.15 Preparation of sweet coated breakfast cereals like corn flakes includes several major processing steps like

P: Soaking in water followed by steaming of corn grils

Q: Coating of sugar followed by drying of flakes

R: Breaking the whole corn into large grils

S: Flaking of cooked grils

T: Packaging of finished product

U: Toasting of flakes

V: Cleaning of whole corn

The correct sequence for the preparation of sugar coated corn flakes is

A) V-U-Q-P-S-R-T B) V-R-S-P-U-Q-T

C) V-U-P-Q-S-R-T

D) V-R-P-S-U-Q-T

Q.16 A bacterial strain isolated from meat is inoculated in a growth medium at a cell density of  $2 \times 10^5$  cells/ml. Then 0.2 ml of the culture broth is withdrawn immediately and mixed with 0.8 ml of sterile saline. This sample is diluted by mixing 0.1 ml of it with 99.9 ml sterile water. Then 0.1 ml of this diluted solution is spread on appropriate nutrient agar plate. The number of colonies expected in the agar plate is

- A) 4                      B) 40                      C) 400                      D) 4000

Q.17 & 18 Water at  $20^\circ\text{C}$  is pumped from a base tank to an elevated tank. 15m above the base tank. Water flows at a rate of  $5.0 \times 10^{-3} \text{ m}^3\text{s}^{-1}$  through a pipe having internal diameter of 0.1023m. Frictional energy loss in the pipe is  $6.837 \text{ Jkg}^{-1}$ . The pump has an efficiency of 65%. Density and viscosity of water are  $998.2 \text{ kgm}^{-3}$  and  $1.005 \times 10^{-3} \text{ Pa.s}$  respectively

A) Reynolds number for water flowing through the pipe is

- 1)  $5.286 \times 10^4$    2)  $6.180 \times 10^4$    3)  $2.285 \times 10^4$    4)  $1.252 \times 10^5$

B) Power needed for pumping water in kW is

- 1) 1.182   2) 3.334   3) 0.985   4) 2.226

Q.19 & 20 True density and bulk density of rice grain are  $1230 \text{ kgm}^{-3}$  and  $740 \text{ kgm}^{-3}$ , respectively and that of wheat grain are  $1360 \text{ kgm}^{-3}$  and  $650 \text{ kgm}^{-3}$  respectively.

A) The void fraction of a bed of rice and that of wheat are respectively

- 1) 0.331 and 0.546   2) 0.662 and 0.261   3) 0.398 and 0.480   4) 0.398 and 0.522

B) Assume the bulk volume for the mixture of two grains follows additive rule. If the bulk density of a mixture of rice and wheat is  $700 \text{ kgm}^{-3}$ , weight percentage of wheat in the mixture is nearly

- 1) 41   2) 50   3) 24   4) 36

Q.21 & 22  $D_0$  value of a bacterium is determined by using two thin walled glass capillary tubes filled with same bacterial suspension in distilled water. The sealed capillaries are dipped in an oil bath maintained at  $121^\circ\text{C}$  and kept for 60s and 135 s respectively. These capillaries are cooled immediately in ice water. Number of survival remained in the respective tubes are 2000 and 300.

A)  $D_0$  value(min) of the bacterium is

- 1) 1.32   2) 0.52   3) 1.52   4) 2.52

B) The processing time(min) to kill 99.999% of the bacteria in any foods at  $121^\circ\text{C}$  will be

- 1) 7.60   2) 6.60   3) 12.62   4) 2.60