



Previous Year Solved Question Paper  
of

**G.A.T.E. (XL) 2012**

**LIFE SCIENCES**

**XL: M Food Technology**

**Examination**

*(Original Question Paper with Answer Key)*

**GRADUATE APTITUDE TEST IN ENGINEERING**



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## GATE XL 2012

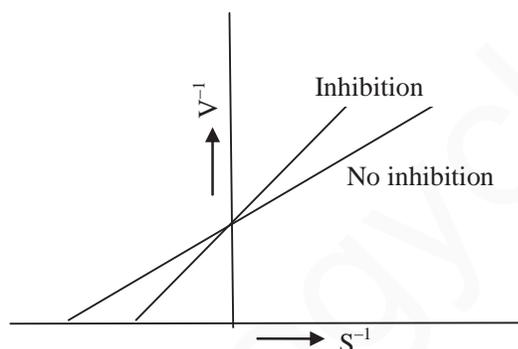
## M : FOOD TECHNOLOGY

## Q. 1 – Q. 10 carry one mark each.

- Q.1 Among the following fatty acids, which group is known as essential fatty acids?  
(A) 9,11-Octadecadienoic and 9,11,13-Octadecatrienoic  
(B) 9,12-Octadecadienoic and 9,12,15-Octadecatrienoic  
(C) 9-Octadecenoic and 9,11-Octadecadienoic  
(D) 9,11-Octadecadienoic and 9-Eicosenoic **B**
- Q.2 Cellulose, the structural polysaccharide of plant, is a polymer of  
(A)  $\beta$ -D-Glucose  
(B)  $\alpha$ -D-Glucose  
(C)  $\beta$ -D-Galactose  
(D)  $\alpha$ -D-Galcturonic acid **A**
- Q.3 The important role of carotenoids in the human diet is their ability to serve as precursors of  
(A) Vitamin C (B) Vitamin D (C) Vitamin A (D) Vitamin K **C**
- Q.4 Which one of the following microorganisms is used in the preparation of bread?  
(A) *Candida utilis* (B) *Saccharomyces cerevisiae*  
(C) *Saccharomyces cevarum* (D) *Aspergillus niger* **B**
- Q.5 Which one of the microorganisms given below is NOT RESPONSIBLE for ropy or stringy fermentation of milk?  
(A) *Alcaligenes viscolactis*  
(B) *Enterobacter aerogenes*  
(C) *Streptococcus cremoris*  
(D) *Streptococcus lactis* **D**
- Q.6 A mild heat treatment of foods that destroys pathogens and extends its shelf life is called  
(A) Baking (B) Blanching  
(C) Sterilization (D) Pasteurization **D**
- Q.7 The most common and least expensive plastic film used for packaging of solid food materials is  
(A) Polyethylene (B) Polystyrene  
(C) Polypropylene (D) Polyvinylchloride **A**
- Q.8 Reassociation of amylose and formation of crystalline structure upon cooling of cooked starch solution is termed as  
(A) Syneresis (B) Gelatinization  
(C) Retrogradation (D) Denaturation **C**
- Q.9 Thermal destruction of microorganisms follows a kinetics of  
(A) Zero order (B) First order (C) Second order (D) Fractional order **B**
- Q.10 100 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) 65 (B) 70 (C) 75 (D) 80 **D**

**Q. 11 - Q. 20 carry two marks each.**

- Q.11 Which one 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) Astringency is a dry mouth feel in the oral cavity that is most associated with phenolic compounds.
- (C) Saltiness is a taste that is mainly produced by chloride ions.
- (D) Sourness is related to acidity and is sensed by hydrogen ion channels in the human tongue.
- Q.12 The following plot represents the *Lineweaver-Burk* equation of an enzymatic reaction both in the presence and the absence of inhibitor. Here,  $V$  is the velocity of reaction and  $S$  is the substrate concentration.



The nature of inhibition shown in the plot is

- (A) Non-competitive
- (B) Anti-competitive
- (C) Competitive
- (D) Mixed type
- Q.13 Make the correct match of the food constituents in **Group I** with their nature given in **Group II**.

**Group I**

- P) Ascorbic Acid  
Q) Phenyl alanine  
R) Dextrose  
S) Haemoglobin

**Group II**

- 1) Sugar  
2) Chelate  
3) Amino Acid  
4) Antioxidant

- (A) P-4, Q-3, R-1, S-2
- (B) P-4, Q-1, R-3, S-2
- (C) P-3, Q-4, R-2, S-1
- (D) P-4, Q-2, R-1, S-3
- Q.14 Make the correct match of the fermented food products in **Group I** with the microorganisms in **Group II**.

**Group I**

- P) Yoghurt  
Q) Cheese  
R) Sauerkraut  
S) Kefir

**Group II**

- 1) *Lactobacillus acidophilus* and *Lactobacillus delbrueckii*  
2) *Leuconostoc mesenteroides* and *Lactobacillus plantarum*  
3) *Lactobacillus delbrueckii* and *Streptococcus thermophilus*  
4) *Lactobacillus casei* and *Streptococcus thermophilus*

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

- Q.15 Match the following between organelle or cellular components of a bacterium cell in **Group I** with the constituents and functionalities in **Group II**.

**Group I**

- P) Cytoplasmic membrane  
Q) Flagellum  
R) Cell wall  
S) Ribosome

**Group II**

- 1) Protein synthesis  
2) Peptidoglycan  
3) Phospholipid bilayer  
4) Motility of cell

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

C

- Q.16 Thermal death time (TDT) of *Clostridium botulinum* at 121°C is 2.78 min with a z-value of 10°C. The TDT of the microorganism at 116°C (in min) is

- (A) 5.270 (B) 8.791 (C) 1.390 (D) 0.712

B

- Q.17 Make the correct match between specific food processing operations in **Group I** with their mechanism of action in **Group II**.

**Group I**

- P) Ball Mill  
Q) Roller Mill  
R) Flash Peeling  
S) Abrasive Peeling

**Group II**

- 1) Compression and shear  
2) Pressure bursting  
3) Friction and shear  
4) Impact and shear

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

B

- Q.18 650 g of a wet food containing 405 g water is dried in a tray dryer to a final moisture content of 6.8 % (dry basis). It is observed that the drying process occurs under constant rate period and it takes 8 h. The rate of drying (in kg/h) is

- (A) 128.79 (B) 126.35 (C) 77.81 (D) 0.0485

D

- Q.19 Air at 1 atmospheric pressure (101.325 kPa) and 30°C with absolute humidity of 0.0218 kg/kg of dry air is flowing in a drying chamber. The saturated vapor pressure of water ( $p_w^0$ , in kPa) is related to temperature (T, in °C) as given below

$$\ln p_w^0 = 18.6556 - \frac{5217.635}{T + 273}$$

The relative humidity of air (in percentage) is

- (A) 62.82 (B) 68.22 (C) 86.62 (D) 81.80

D

- Q.20 The total solids content in a milk sample is 18 %. It is desired to produce 1000 kg 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) 61.54 (C) 54.16 (D) 56.14

B

**END OF THE QUESTION PAPER**

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