

## SECTION A

## ANSWER ALL QUESTIONS

1. (a) Define 'Food Additives.' [2 marks]
- (b) From the following list of additives, choose ANY THREE and write notes on them; [15 marks]
- (i) Nitrites and nitrates.
  - (ii) Sulfur and its derivatives.
  - (iii) Sugar alcohol.
  - (iv) Aspartame.
  - (v) Flavors.
  - (vi) Chelating agents.
- (c) State the function of the following food additives: [3 marks]
- (i) Binder.
  - (ii) Stabilizer.
  - (iii) Firming agents.
- (d) *Clostridium botulinum* is one of the microorganisms of concern in food. What would be the concentration of nitrates and nitrites required to inhibit its growth and also at what pH range? [1 mark]
- (e) Name and give an example of a Food color trouble . [2 marks]
- (Total = 23 Marks)
2. (a) What are 'Phytochemicals?' [2 marks]
- (b) Certain foods contain phytochemicals as the main component. Name two foods for each of the phytochemicals listed below: [2 marks]
- (i) Chlorophyll.
  - (ii) Phenolic compounds.
  - (iii) Capsaicinoid.
  - (iv) Allium compounds.
- (c) Write short notes on ANY THREE of the following: [9 marks]
- (i) Phenolic compounds.
  - (ii) Dietary fiber.
  - (iii) Carotenoids.
  - (iv) Alkaloids.

- (d) Describe the importance of including food with bran in the diet. [3 marks]
- (e) What are the benefits of having nuts and grains in a diet? [3 marks]

(Total = 19 Marks)

3. (a) Draw a diagram of a nucleic acid molecule and describe the different types of bonds between them. [3 marks]
- (b) Define the following terms: [2 marks]
- (i) Nucleotide.
  - (ii) Nucleoside.
  - (iii) Nitrogenous base.
  - (iv) Nucleic acid.
- (c) Differentiate between RNA and DNA. Give at least THREE differences. [3 marks]

(Total = 8 marks)

## SECTION B

## ANSWER ALL QUESTIONS

4. (a) Select ANY ONE of the following hydrocolloids: guar gum and locust bean gum, pectin, alginate, xanthan, carrageenan and agarose/agar and discuss its source, structure and functions or usage. [4 marks]
- (b) Name and describe with an aid of a relevant sketch ANY ONE bonding pattern of an ordered structure of polysaccharide. [3 marks]
- (c) Explain why short chain polysaccharides are not able to produce ordered structures in solution? [2 marks]
- (d) With regards to structure breakers, explain what they are and name a structure breaker and describe it with an aid of a relevant sketch. [3 marks]
- (e) State and describe ANY ONE way or mechanism in which the gelation process can be induced and include in your answer the relevant sketch. [3 marks]
- (f) How do you differentiate the viscosity behaviour of linear polymers that have ribbon-like structures to linear polymers that have helical and buckled structures? [4 marks]
- (g) Explain the main reason for many unusual properties of water and state TWO examples of such properties. [3 marks]
- (h) Describe what a gel is and explain the importance of junction zones in gel formation. [3 marks]

(Total = 25 marks)

5. (a) With regards to enzyme specificity, explain its importance and the models that depict the concept of specificity. [3 marks]
- (b) State and describe the two main types of non-enzymatic browning. Include in your description, how they occur and the ways in which one can control or stop these browning reactions. [6 marks]
- (c) With regards to enzymatic browning, answer the following:
- (i) State and describe ANY TWO ways of controlling enzymatic browning. [3 marks]
- (ii) Describe enzymatic browning; what it is, how it occurs and its effects on food products. [4 marks]

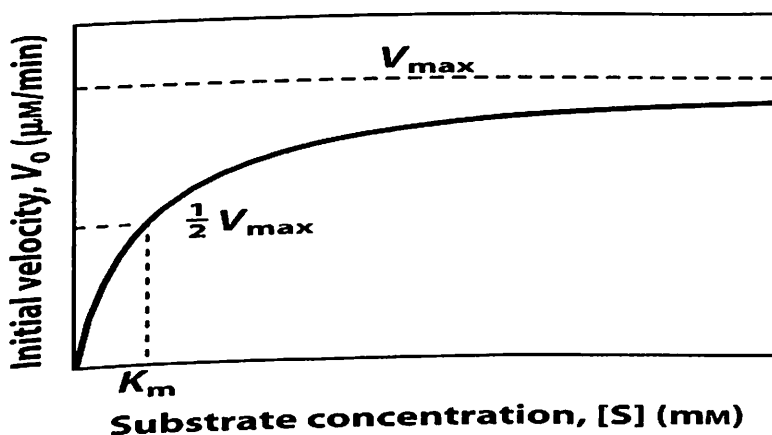
(Total = 16 marks)

Select either Question 6 or Question 7 and answer:

6. (a) Name any one food industry and state what enzymes are used for in that industry. [2 marks]
- (b) What are the merits of using enzymes in the food industry. [2 marks]
- (c) Name and describe any two mechanisms of enzyme catalysis. [3 marks]
- (d) Describe enzyme catalysis with regards to activation energy or energy needed for reaction to occur. [2 marks]

(Total = 9 marks)

7. (a) Describe the following modes of inhibition: [3 marks]
- (i) Non-competitive.
- (ii) Competitive.
- (b) Describe the effect of the following environmental factors on enzyme activity: [3 marks]
- (i) Temperature.
- (ii) pH.
- (c) For the diagram below, explain the variables and describe what is happening. [3 marks]



(Total = 9 marks)