UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016

COURSE NAME	:	FOOD CHEMISTRY
COURSE CODE	:	BWD 10603
PROGRAMME	:	BWD
EXAMINATION DATE	:	JUNE /JULY 2016
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

Q1 (a) Explain the purpose of adding food additives.

(2 marks)

(b) Discuss the advantages and disadvantages of using nutritional additives in food.

(8 marks)

Q2 (a) Explain the relationship between water activity and safety of a food. Give **one (1)** example of food to support the argument.

(4 marks)

(b) Describe

(i) how hydrogen bonds are created between water molecules.

(3 marks)

(ii) which property of water that directly responsible for the action of food coloring in food processing.

(2 marks)

(c) For the first order of enzymatic reaction, $\ln[A]_t - \ln[A]_0 = -kt$; it takes 42 minutes for the concentration of a substrate to drop from 0.45 M to 0.32 M at 25 °C. How long will it take for the reaction to be 90% complete?

(6 marks)

Q3 (a) Copy and complete the following sentences:

(i) The primary determinant of the secondary structure of polypeptide is .....
.....

(ii) Proteins possess quaternary structures only if.....
.....
.....

(4 marks)

(b) (i) Why is enzymatic browning activity usually pH-dependent?

(2 marks)

(ii) By using any of the structure (except glycine) shown in **Figure Q3(b)**, show the changes of its structure when dissolved in media at pH 5, pH 7 and pH 10.

(9 marks)

(c) (i) Illustrate the occurrence of protein denaturation.

(2 marks)

(ii) List **three (3)** protein denaturants.

(3 marks)

Q4 (a) (i) Based on the Fischer projection at **Figure Q4(a)**, show the structure of L-fructose.

(2 marks)

(ii) From **Q4(a)(i)**, illustrate the Haworth projections for β-D-fructopyranose.

(4 marks)

(b) State **three (3)** differences between caramelization and Maillard reaction.

(6 marks)

(c) Complete the reactions shown in **Figure Q4(c)** by providing the agent A and B and yield for reduction (P) and oxidation (Q).

(8 marks)

Q5 Fats and oils are not just a caloric powerhouse but they also serve many chemical, physical, and nutritional functions in the foods we eat.

(a) Describe **three (3)** main functions of fat in food production.

(6 marks)

(b) Discuss **four (4)** differences between animal and vegetable fats based on their physical properties.

(8 marks)

(c) Describe the structure differences between saturated, unsaturated and polyunsaturated lipids.

(6 marks)

Q6 (a) Describe the functions, properties and of fat-soluble and water-soluble vitamin. Give **one (1)** example for each type of vitamin.

(8 marks)

(b) Hip fracture due to osteoporosis incidence for those aged over 50 years was 90 per 100,000 individuals per year and has likely increased due to the ageing population. The Chinese portion of the population had the highest incidence of hip fractures compared to the Malays and Indians, accounting for 44.8% of hip fractures in women.

(i) Explain the main cause that lead to the current situation.

(3 marks)

(ii) Recommend the changes in our daily intake to overcome osteoporosis.

(4 marks)

-END OF QUESTIONS-

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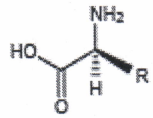
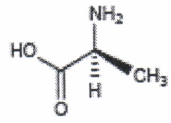
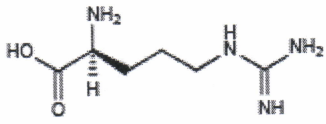
Amino Acids



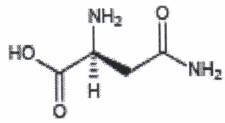
General Form



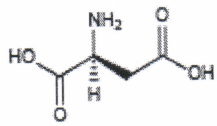
Alanine (Ala, A)



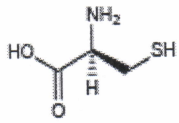
Arginine (Arg, R)



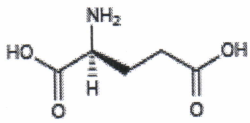
Asparagine (Asn, N)



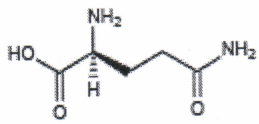
Aspartic Acid (Asp, D)



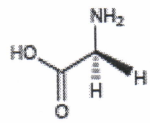
Cysteine (Cys, C)



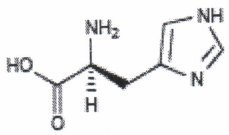
Glutamic Acid (Glu, E)



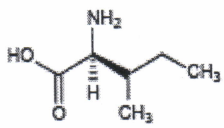
Glutamine (Gln, Q)



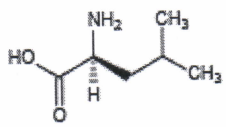
Glycine (Gly, G)



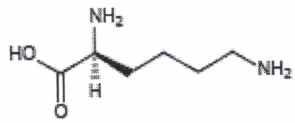
Histidine (His, H)



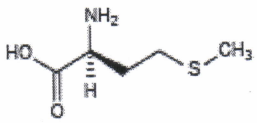
Isoleucine (Ile, I)



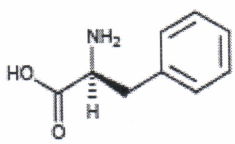
Leucine (Leu, L)



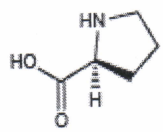
Lysine (Lys, K)



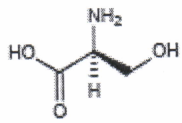
Methionine (Met, M)



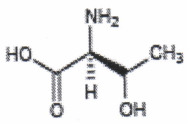
Phenylanaline (Phe, F)



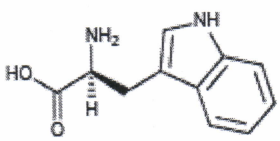
Proline (Pro, P)



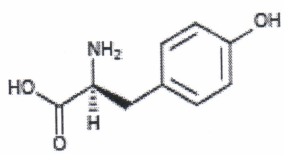
Serine (Ser, S)



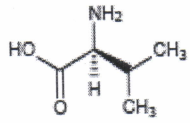
Threonine (Thr, T)



Tryptophan (Trp, W)



Tyrosine (Tyr, Y)



Valine (Val, V)

Figure Q3(b)

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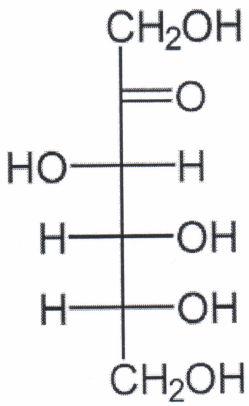

Figure Q4(a)

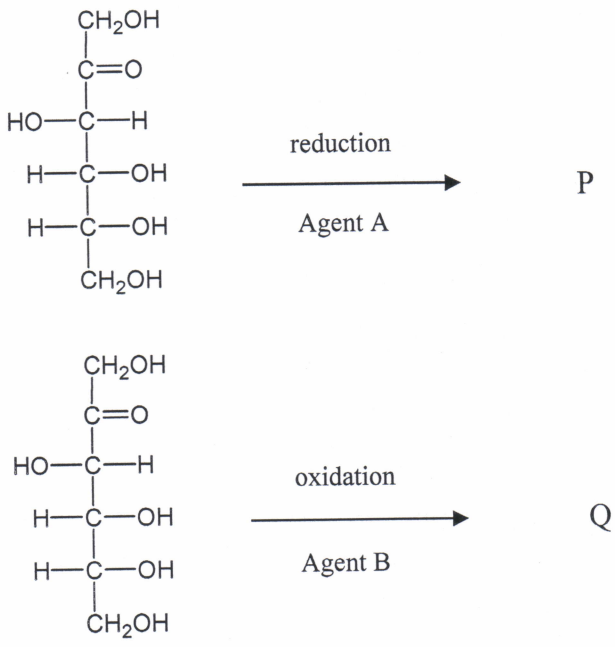

Figure Q4(c)