



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017**

COURSE NAME : FOOD CHEMISTRY
COURSE CODE : BWD 10603
PROGRAMME CODE : BWD
EXAMINATION DATE : JUNE 2017
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

- Q1** (a) Define what food additives are and explain the type of food additives. (4 marks)
- (b) In an industrial internship program, Daniel was required to look into new food additives to enhance their new launched product, 'choco-pops'. List **SIX (6)** food additives in confectionaries. List out their chemical names and function descriptions. (12 marks)
- Q2** (a) Discuss the relationship between water activity, the safety and wholesomeness of a food. Give **ONE (1)** example of food to support the argument. (4 marks)
- (b) Draw **TWO (2)** conclusions from the relationship in **Figure Q2**. (4 marks)
- (c) The inversion of sucrose according to the reaction, $C_{12}H_{22}O_{11} + H_2O \rightarrow 2C_6H_{12}O_6$ was observed at 25 °C and the initial concentration of sucrose was 1.0023 moles per liter, Calculate the time taken when the concentration has been reduced to 18%. Rate constant = $1.8 \times 10^{-4} s^{-1}$. (8 marks)
- Q3** (a) (i) Draw phenylalanine (phe) structure in acid, base and neutral medium. (6 marks)
- (ii) Create a dipeptide bond when phenylalanine are linked to form phe-phe-phe protein. (4 marks)
- (b) Evaluate the data in **Table Q3** and discuss at least **TWO (2)** important conclusions. (5 marks)
- Q4** (a) (i) Describe the difference between aldose and ketose sugars. Use 6-C sugar structure to aid the description. (4 marks)
- (ii) From **Q4(a)(i)**, show the chiral-carbon on both aldose and ketose sugar structures. (4 marks)
- (b) Explain the brief mechanism in Benedict test for reducing sugar. (6 marks)
- (c) Differentiate Maillard Browning and caramelization occurring in sugar. (6 marks)

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- Q5** (a) Describe the differences between saturated and conjugated unsaturated fat. (3 marks)
- (b) Malaysia vegetable cooking oil suppliers are exporting Palm Olein to all over Africa, Far East and Middle East. The vegetable cooking oil from Malaysia must follow certain specifications. Discuss **FIVE (5)** properties (physical and chemical) of any vegetable oil available in Malaysia. (10 marks)
- Q6** (a) Discuss the fat and water soluble vitamin and describe their
- (i) functions in our body. (6 marks)
- (ii) food sources. (6 marks)
- (b) Some minerals are needed in our body in large quantities and some are needed in trace amount.
- (i) Discuss the type of minerals that your body needs in relatively small amounts (4 marks)
- (ii) Discover the effect of deficiencies of (b)(i). (4 marks)

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-END OF QUESTIONS-

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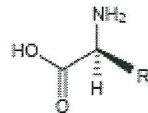
SEMESTER / SESSION: SEM II / 2016/2017

PROGRAMME: BWD

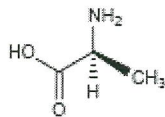
COURSE : FOOD CHEMISTRY

COURSE CODE: BWD 10603

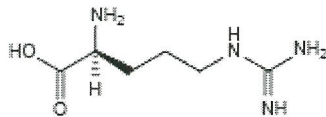
Amino Acids



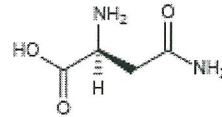
General Form



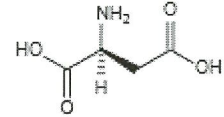
Alanine (Ala, A)



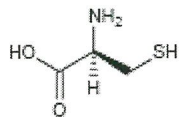
Arginine (Arg, R)



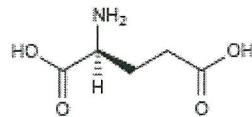
Asparagine (Asn, N)



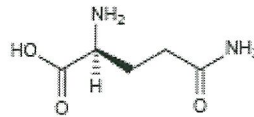
Aspartic Acid (Asp, D)



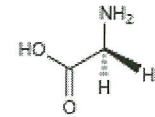
Cysteine (Cys, C)



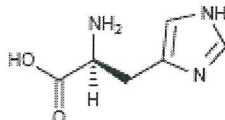
Glutamic Acid (Glu, E)



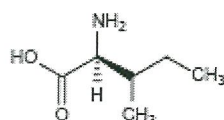
Glutamine (Gln, Q)



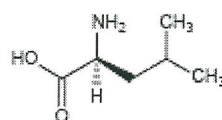
Glycine (Gly, G)



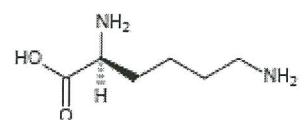
Histidine (His, H)



Isoleucine (Ile, I)

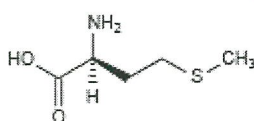


Leucine (Leu, L)

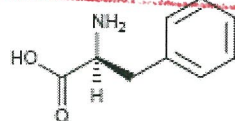


Lysine (Lys, K)

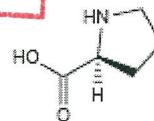
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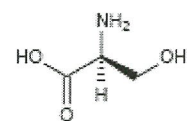
Methionine (Met, M)



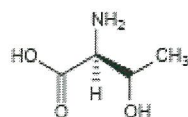
Phenylalanine (Phe, F)



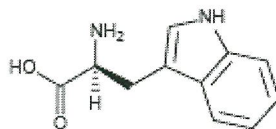
Proline (Pro, P)



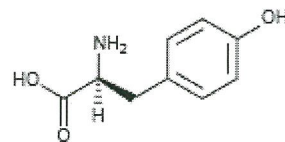
Serine (Ser, S)



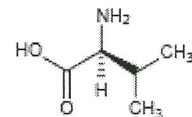
Threonine (Thr, T)



Tryptophan (Trp, W)



Tyrosine (Tyr, Y)



Valine (Val, V)

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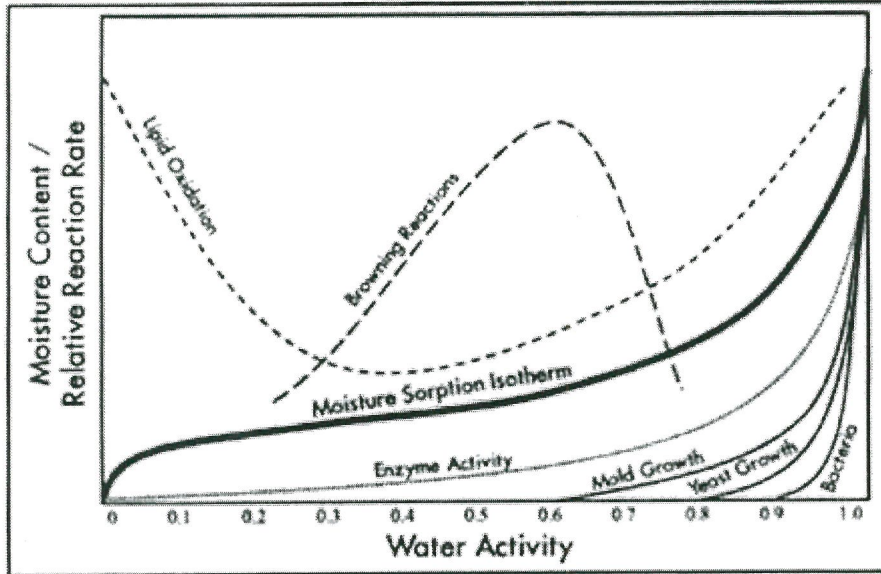


Figure Q2

Table Q3

| Product | Protein (g/100 g) |
|-----------------|-------------------|
| Meat: beef | 16.5 |
| Fish: cod | 17.6 |
| Peas | 6.3 |
| Beans: dry, raw | 22.3 |
| Beans: cooked | 7.8 |

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