

UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES
DIETETICS AND HUMAN NUTRITION
EXAMINATION: NOVEMBER 2015
SUBJECT, COURSE & CODE: NUTRITION 124 P2
LIFECYCLE AND MACRONUTRIENTS

STUDENT NUMBER: _____

SECTION A QUESTION AND ANSWER BOOKLET (11 pages) 70 MARKS

QUESTION 1

MULTIPLE CHOICE QUESTIONS MACRONUTRIENTS 20 MARKS

Indicate your answer to each question by placing a circle around the selected letter.

NEGATIVE MARKING APPLIES

1 mark for each correct answer

-1/2 mark for each incorrect answer

0 marks for no answer

Exchanges (1 X 3)

1. Which of the following foods does not belong to the lean meat exchange group?
 - A. Canned salmon
 - B. Egg whites
 - C. Low fat feta cheese
 - D. Extra lean beef mince

2. Which of the following foods has the highest protein content?
 - A. 100 g soya patty
 - B. 60 g fried hake
 - C. 1 cup soy milk
 - D. 90 g minced chicken

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3. A person consumes the following for breakfast.
1 cup All Bran Cereal; 250 ml low fat milk; 1 small apple
What is the carbohydrate content of this meal?

- A. 42 g
- B. 57 g
- C. 47 g
- D. 32 g

Energy (1 X 4)

4. Which of the following statements is true?
- A. When fat tissue increases leptin production increases indicating satiety.
 - B. Damage to the satiety centre can lead to weight loss.
 - C. Metabolism of proteins increases the secretion of ghrelin.
 - D. When fat tissue decreases leptin production decreases indicating satiety.
5. For which one of the following is the thermic effect of food value the lowest?
- A. Fat
 - B. Protein
 - C. Carbohydrates
 - D. Alcohol
6. Identify the incorrect statement?
- A. Brown adipose tissue releases much of the energy from energy-yielding nutrients as heat.
 - B. Brown adipose tissue does not form ATP from energy-yielding nutrients.
 - C. Brown adipose tissue is brown in colour due to a large number of capillaries.
 - D. Brown adipose tissue makes up 7% of the body weight in an infant.

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7. Which of the following does not increase food intake?

- A. Cortisol
- B. Endorphins
- C. Release of endorphins
- D. Leptin

Carbohydrates (1 X 4)

8. Identify the correct definition for the Glycaemic Index:

- A. A ratio/index used to measure the amount of glucose appearing in the blood after eating white bread /glucose (50g test/std food) compared to eating a specific food (50g CHO).
- B. A ratio/index used to measure the amount of glucose appearing in the food after eating a specific food (50g CHO) compared to eating white bread /glucose (50g test/std food).
- C. A ratio/index used to measure the amount of glucose appearing in the blood after eating a specific food (50g CHO) compared to eating glucose (50g CHO).
- D. A ratio/index used to measure the amount of glucose appearing in the blood after eating a specific food (50g CHO) compared to eating white bread /glucose (50g test/std food).

9. Which of the following is a nutritive sweetener?

- A. Sucralose
- B. Neotame
- C. Mannitol
- D. Tagatose

10. Which of the following does not happen during prolonged fasting/starvation?

- A. Body fat is broken down to fatty acids and glucose is produced for use by the body.
- B. Body protein is broken down into amino acids and then converted into glucose for use by the body.
- C. Body fat is broken down into fatty acids and forms ketone bodies which are used to supply energy to the body.
- D. Fat takes an alternative pathway and forms ketone bodies which act as an alternative fuel source.

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11. Identify the incorrect statement:

- A. Cells in the brain and nervous system have a limited ability to store glucose.
- B. After a meal insulin is released by beta cells in the pancreas.
- C. Cortisol and growth hormone reduce blood glucose levels through gluconeogenesis.
- D. Epinephrine is released when a person experiences stress and it increases release of glucose.

Protein (1 X 3)

12. Which of the following statements on protein digestion is incorrect?

- A. Protein digestion starts in the mouth where proteins are crushed and moistened.
- B. Hydrochloric acid from the stomach denatures and uncoils protein strands.
- C. The peptidase enzyme acts in the stomach and splits di and tripeptides into single amino acids.
- D. The pepsin enzyme acts in the stomach and cleaves large polypeptides into smaller polypeptides and some amino acids.

13. Identify the correct statement:

- A. Anemia may result from a protein deficiency.
- B. Protein makes up 16% of the weight of nitrogen.
- C. Soya bean protein has a protein digestibility corrected amino acid score (PDCAAS) of 92.
- D. Low doses of branched chain amino acids may be useful in the treatment of liver failure.

14. Which of the following amino acids becomes conditionally essential in people with phenylketonuria?

- A. Aspartic acid
- B. Tyrosine
- C. Methionine
- D. Phenylalanine

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Fat (1 X 3)

15. Which of the following statements on *trans* fatty acids is incorrect?
- A. Hydrogenation occurs when hydrogen is added to carbon single bonds.
 - B. The process of hydrogenation helps to convert liquid oils into solid fats.
 - C. Excessive intake of *trans* fatty acids increases risk for heart disease because it increases low density lipoproteins (LDL) and decreases high density lipoprotein (HDL).
 - D. *Trans* fatty acids are found in deep-fried foods, high fat baked goods and non-dairy creamers.
16. Indicate the correct statement on fatty acids:
- A. A fatty acid consists of a chain of linked carbons flanked by hydrogens with a carboxyl group at the omega end and a methyl group at the alpha end.
 - B. A fatty acid consists of a chain of linked hydrogens flanked by carbons with a methyl group at the omega end and a carboxyl group at the alpha end.
 - C. A fatty acid consists of a chain of linked carbons flanked by hydrogens with a methyl group at the omega end and an acid group at the alpha end.
 - D. A fatty acid consists of a chain of linked hydrogens flanked by carbons with a carboxyl group at the omega end and a methyl group at the alpha end.
17. All of the following are benefits of eicosapentaenoic acid (EPA) derived eicosanoids except:
- A. Lowers blood pressure
 - B. Reduces inflammation
 - C. Increased bleeding time
 - D. Prevents blood clot formation

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Alcohol (1 X 3)

18. Which of the following would give 30 g of alcohol?
- A. 360 ml regular beer
 - B. 300 ml wine
 - C. 150 ml wine cooler
 - D. 45 ml distilled liquor
19. Identify the incorrect statement:
- A. Alcohol causes stomach cells to over secrete gastric acid and histamine.
 - B. In moderate drinkers alcohol may stimulate appetite.
 - C. Alcohol reduces the production of antidiuretic hormone.
 - D. Alcohol dehydrogenase converts acetaldehyde to acetate.
20. Which of the following is not a long-term effect of alcohol intake?
- A. Skin rashes and sores
 - B. Uninhibited behaviour
 - C. Type 2 diabetes mellitus
 - D. Osteoporosis

END OF MULTIPLE CHOICE QUESTIONS

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2.5 A 24-hour recall was taken from Susan and it revealed the following:

Breakfast: 6:30 am

2 slices whole wheat bread, toasted
1 extra large egg, poached
4 tsp medium fat margarine on toast
1 cup of coffee with 3 tsp sugar (no milk)

Snack: 9:30 am

1 small packet Simba chips
½ cup mixed dried fruit

Lunch: 13:00 pm

1 packet 2-minute instant noodles
60 g grilled chicken strips, no skin
1 tsp chilli sauce
30 ml regular mayonnaise
1 cup salad (lettuce, cucumber, tomato, onion)



Chicken noodle salad

Snack: 3pm

50 g chocolate bar
1 cup guava juice

Supper: 7:30 pm

160 g French fried potatoes
1 cup steamed butternut
90 g grilled mutton sausage
½ cup bean salad (no oil, no green beans)

Snack: 9 pm

1 cup flavoured low fat yoghurt

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Analyse the 24 hour recall using exchanges and complete the table below. [26]

Exchange Group	No. of exchanges	CHO (g)	Protein (g)	Fat (g)	Energy (kJ)
Milk – skim/fat-free					
Milk – low fat (2%)					
Milk – full cream/whole					
Meat – lean					
Meat - medium fat					
Meat - high fat					
Starch					
Vegetables					
Fruit					
Fat					
Sugar					
TOTAL:					
Percentage contribution to total energy (%)					

END OF CALCULATIONS

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3.7 Explain how a deficiency of vitamin B6 affects amino acid synthesis. [1]

.....

3.8 Vitamin E is used as an antioxidant to prevent rancidity. Name two (2) other antioxidants used in the food industry to protect fat-containing products against rancidity. [$\frac{1}{2} \times 2 = 1$]

.....

3.9 Name the two (2) fatty acids that can be made in the body from linolenic acid. [$1 \times 2 = 2$]

.....

3.10 What is the name of the cluster of thiamin-deficiency symptoms seen in chronic alcoholism? [1]

.....

3.11 List two (2) facial characteristics seen in fetal alcohol syndrome, specifically related to the **forehead**. [$\frac{1}{2} \times 2 = 1$]

.....

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END OF SHORT QUESTIONS

END OF SECTION A

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DURATION: 3 HOURS

TOTAL MARKS: 160

External Examiner: Prof FJ Veldman
Internal Examiner: Dr K Pillay

NOTE: THIS EXAM PAPER CONSISTS OF FOUR (4) PAGES PLUS A QUESTION AND ANSWER BOOKLET (11 PAGES).

PLEASE MAKE SURE THAT YOU HAVE ALL THE PAGES.

PLEASE ANSWER SECTION A, B and C.

PLEASE WRITE LEGIBLY AND ANSWER ALL QUESTIONS IN INK.

ANSWERS WRITTEN IN PENCIL WILL NOT BE MARKED.

SECTION A	BOOKLET (Questions 1-3)	(70 MARKS)
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SECTION B	MACRONUTRIENTS (Questions 4-6)	(30 MARKS)
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SECTION C	LIFECYCLE NUTRITION (Questions 7-9)	(60 MARKS)
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SECTION B	MACRONUTRIENTS	30 MARKS
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ANSWER ALL OF THE FOLLOWING THREE (3) QUESTIONS.

PLEASE START EACH QUESTION ON A NEW PAGE

QUESTION 4

- 4.1 Give the Recommended Dietary Allowance (RDA) for protein for adults. [1]
- 4.2 Explain the assumptions that were made when setting the RDA for protein. [5]
- 4.3 Explain the “all or none law” in terms of protein. [3]
- 4.4 How many amino acids are found in human insulin? [1]

TOTAL MARKS = 10

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QUESTION 5

5.1 Discuss the physiological factors that indicate satiety. [10]

TOTAL MARKS = 10

QUESTION 6

6.1 Explain the differences between eicosanoids and hormones. [4]

6.2 How does obesity influence the release of **resistin** and **adiponectin** and how does this influence the risk for **heart disease** and **diabetes**. [4]

6.3 Explain why linolenic acid and linoleic acid are regarded as essential fatty acids. [2]

TOTAL MARKS = 10

END OF SECTION B

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SECTION C

LIFECYCLE NUTRITION

60 MARKS

ANSWER ALL OF THE FOLLOWING THREE (3) QUESTIONS.

PLEASE START EACH QUESTION ON A NEW PAGE

QUESTION 7

Mrs A is 33 years old and is pregnant for the first time. She is currently in her 2nd trimester of pregnancy. Mrs A had a pre-pregnancy Body Mass Index (BMI) of 28.9 kg/m². A blood test for haemoglobin was carried out at her last visit to the Doctor. The result of the blood test is as follows:

Hb 10.0 g/dl (reference: 12.3 g/dl-17 g/dl).

- 7.1 What is the recommended total weight gain for Mrs A if she was overweight at the start of the pregnancy? [1]
- 7.2 After looking at her haemoglobin blood test result the doctor diagnosed Mrs A with iron deficiency anaemia. Explain why. [1]
- 7.3 Before pregnancy Mrs A was taking a vitamin and mineral supplement which gave 15 mg of iron per day. She would like to know if she should continue with this dose of iron. Give her a response and justify your answer. [3]
- 7.4 Mrs A is looking forward to breastfeeding her baby and has been reading about breastfeeding in a pregnancy magazine. She has read that colostrum is very beneficial for the baby.
 - 7.4.1 Explain what colostrum is and why it is beneficial for the baby. [6]
 - 7.4.2 Mrs A is also concerned about how she will know if the baby is getting enough breastmilk. Give Mrs A four (4) indicators that she can look out for to determine if the baby is getting enough breastmilk. [4]
 - 7.4.3 Explain what the “let down” reflex is. [1]

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7.5 Now that Mrs A is expecting her first child she and her husband have decided to take out a new life insurance policy. The insurance company requires her to have a lipid profile done. The insurance broker had advised that she should have the lipid profile after the baby is born.

Explain why the insurance broker has given her this advice. [4]

TOTAL MARKS = 20

QUESTION 8

A mother with her 6 month old baby is referred to you for dietary advice. The baby has been exclusively breastfed for 6 months and is now ready to be weaned onto solid foods.

8.1 She specifically wants to know what foods should be avoided when introducing solids to her baby. Discuss this with the mother. [20]

TOTAL MARKS = 20

QUESTION 9

9.1 Explain how **psychosocial** and **economic** factors can affect dietary intake in the elderly. [12]

9.2 Discuss the **iron**, **zinc** and **magnesium** requirements in the elderly. [8]

TOTAL MARKS = 20

END OF SECTION C