UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF AGRICULTURAL, EARTH & ENVIRONMENTAL SCIENCES
DIETETICS AND HUMAN NUTRITION
EXAMINATION: NOVEMBER 2014
SUBJECT, COURSE & CODE: NUTRITION 124 P2
LIFECYCLE AND MACRONUTRIENTS

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	**See separate booklet**	**(70 MARKS)**
SECTION B	**MACRONUTRIENTS**	**(30 MARKS)**
SECTION C	**LIFECYCLE NUTRITION**	**(60 MARKS)**

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

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
-½ mark for each incorrect answer
0 marks for no answer

Exchanges (1 X 3)

1. Which of the following foods is not classified as a starchy food prepared with fat?

   A. Pretzels
   B. Waffles
   C. Rusks
   D. Crumpets

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2. Which of the following foods has the lowest fat content?

   A. 30 g whole egg
   B. 30 g gouda cheese
   C. 30 g peanut butter
   D. 30 g prawns

3. A person consumes the following for lunch.

   1 cup pasta; 60 g fried fish; ½ cup cooked carrots

   What is the protein content of this meal?

   A. 20 g
   B. 17 g
   C. 22 g
   D. 15 g

Energy (1 X 4)

4. Identify the correct statement:

   A. Resting metabolic rate (RMR) is 8% higher than the Basal Metabolic Rate (BMR).
   B. Physical activity is the least variable and least changeable component of energy expenditure.
   C. Increased caffeine intake decreases BMR.
   D. Stable isotopes of oxygen and hydrogen can be used to measure energy expenditure using indirect calorimetry.

5. Which of the following shuts off hunger?

   A. Decreased secretion of ghrelin
   B. Decreased leptin production
   C. Release of endorphins
   D. Damage to the satiety centre

6. For which one of the following is the thermic effect of food value the highest?

   A. Fat
   B. Protein
   C. Carbohydrates
   D. Alcohol

7. Identify the incorrect statement?

   A. Urine energy is derived from incompletely oxidised protein.
   B. Digestible energy is the difference between gross energy and faecal energy.
   C. Metabolisable energy is the difference between gross energy and faecal energy.
   D. Metabolisable energy is the energy that is available for use by the body.

Carbohydrates (1 X 4)

8. Which of the following statements is true?

   A. The liver stores ⅔ of the body's total glycogen.
   B. Glycogenolysis occurs when there is a drop in blood glucose levels.
   C. Glycogen stores last more than a day when at rest.
   D. Glycogen does not hold water and is not bulky.

9. Which of the following statements on soluble fibre is correct?

   A. Can be fermented by bacteria in the colon.
   B. Prevents constipation by creating bulk.
   C. Does not dissolve or swell in water.
   D. Found in whole grains, bran and brown rice.

10. Which of the following is a nutritive sweetener?

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

11. In the case of high blood glucose levels the role of insulin is to:

    A. Enhance glycogen synthesis
    B. Increase gluconeogenesis
    C. Reduce glucose uptake by cells
    D. Enhance glycogenolysis

Protein (1 X 3)

12. In which part of the digestive system does hydrochloric acid convert pepsinogen (inactive) to pepsin?

    A. Mouth
    B. Large intestine
    C. Small intestine
    D. Stomach

13. Which of the following amino acids are likely to be limiting but can be obtained by making use of complementary proteins?

    A. Lysine; Methionine; Phenylalanine; Tryptophan
    B. Tyrosine; Tryptophan; Methionine; Lysine
    C. Lysine; Methionine; Threonine; Tryptophan
    D. Phenylalanine; Lysine; Tyrosine; Tryptophan

14. Identify the correct statement:

    A. High doses of branched chain amino acids may be useful in the treatment of liver failure.
    B. High levels of homocysteine may be protective against heart disease.
    C. Protein makes up 16% of the weight of nitrogen.
    D. Legumes have a protein digestibility corrected amino acid score (PDCAAS) of 94.

Fat (1 X 3)

15. Indicate the correct statement:

    A. During the formation of a triglyceride a hydroxyl group from the glycerol and a hydrogen from the fatty acid combine to form a water molecule.
    B. The structure of lecithin is similar to a triglyceride except that the 3rd fatty acid is replaced by a molecule of choline.
    C. Eicosanoids derived from linolenic acid have greater health benefits than those derived from linoleic acid.
    D. Leptin is not an example of an adipokine.

16. Which of the following fatty acids has two double bonds?

    A. Stearic acid
    B. Linolenic acid
    C. Oleic acid
    D. Linoleic acid

17. Which of the following lipoproteins is the least dense?

    A. Very low density lipoproteins
    B. Chylomicrons
    C. Low density lipoproteins
    D. Very low density lipoproteins

Alcohol (1 X 3)

18. In a fasting state peak alcohol levels are seen within ____ minutes of drinking alcohol.

    A. 20
    B. 30
    C. 40
    D. 60

19. A deficiency of ____ in alcoholics is associated with Wernicke Korsakoff syndrome.

    A. Vitamin B6
    B. Thiamin
    C. Riboflavin
    D. Folate

20. All of the following are effects of alcohol consumption except:

    A. Reduced production of antidiuretic hormone (ADH) by the pituitary gland.
    B. Uninhibited behaviour.
    C. Causes blood vessels to constrict thereby causing loss of body heat and an overall cooling effect on the body.
    D. Impaired psycho motor skills.

END OF MULTIPLE CHOICE QUESTIONS

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2. CALCULATIONS — 35 MARKS

This question is based on the following information:

Name:	Jack	Physical Activity Level (PAL):	1.3
Gender:	Male		
Age:	52 years old		
Weight:	98 kg		
Height:	1.86 m		

2.1 Calculate the daily energy requirement for Jack in kJ using the Schofield Equation for Basal Metabolic Rate (BMR) as follows: **[3]**

BMR = (11.5 W + 873) X 4.186 Where W = weight in kg

2.2 Calculate the daily energy requirement for Jack in kJ using the following equation for basal metabolic rate: 4.2 kJ/kg BW/hr where BW=body weight in Kg **[3]**

2.3 Calculate Jack's protein requirement using the Recommended Dietary Allowance (RDA). **[1½]**

2.4 Calculate Jack's nitrogen requirement using the protein requirement calculated in 2.3. **[1½]**

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

Breakfast: 7 am
1 cup low fat muesli with
½ cup flavoured yoghurt

Snack: 10 am
3 cream crackers
2 tsp medium fat margarine on crackers
30 g grated Gouda cheese on crackers
125 ml apple juice

Lunch: 12:30 pm
2 slices whole wheat bread
60 g low fat cheese spread on bread
1 cup salad (lettuce, cucumber, tomato, onion)
50 g black olives in salad
25 ml reduced-fat salad dressing

Snack: 3pm
1 medium muffin
1 cup of tea with 2 tsp sugar (no milk)

Supper: 7:30 pm
1 cup cooked white rice
½ cup cooked lentils mixed in rice
90 g fried chicken
1 cup cooked green peas
½ cup cooked carrots
240 ml dry wine

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. SHORT QUESTIONS: MACRONUTRIENTS 15 MARKS

Please write answers in the spaces provided. No marks for incorrect spelling

3.1 Explain the difference between **hunger** and **appetite**. **[2]**

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.....

3.2 Name the site in the brain that is responsible for the regulation of satiety. **[1]**

.....

3.3 List two (2) examples of sugar alcohols. **[½ X 2 = 1]**

.....

3.4 Give the definition for **Glycaemic Load**. **[2]**

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.....

.....

3.5 Which amino acid may be protective against heart disease? **[1]**

.....

3.6 What biological value can support growth as long as energy intake is adequate? **[1]**

.....

3.7 Name the hormone that signals the gallbladder to release bile during fat digestion. **[1]**

.....

3.8 Give the systemic name for linoleic acid. **[2]**

.....

3.9 List two (2) examples of saturated fats that are liquid at room temperature. **[½ X 2= 1]**

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3.10 Give the reaction that takes place in step 1 of the breakdown of alcohol by alcohol dehydrogenase. **[1]**

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3.11 List two (2) causes of a hangover from drinking alcohol. **[½ X 2 = 1]**

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3.12 What volume of wine cooler is equivalent to 30 g of alcohol? **[1]**

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END OF SHORT QUESTIONS

END OF SECTION A

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SECTION B **MACRONUTRIENTS** **30 MARKS**

ANSWER ALL OF THE FOLLOWING THREE (3) QUESTIONS.

PLEASE START EACH QUESTION ON A NEW PAGE

QUESTION 1

1.1 Explain how heavy alcohol intake affects the liver by explaining the progression in liver deterioration. **[10]**

TOTAL MARKS = 10

QUESTION 2

A fellow classmate has decided to go onto a low carbohydrate diet in order to achieve quick weight loss.

2.1 Explain how the body responds when there is less carbohydrate available to supply glucose to the body and the brain. **[5]**

2.2 Your classmate has read that carbohydrates are important as they have a "protein-sparing action". Explain what is meant by "protein-sparing action". **[2]**

2.3 Your classmate believes that it is fine to cut down his carbohydrate intake as he is taking in more dietary fat which can be converted into glucose.

2.3.1 Is he correct? **[1]**

2.3.2 Explain why. **[2]**

TOTAL MARKS = 10

QUESTION 3

3.1 Explain the process of lipid absorption in humans. **[10]**

TOTAL MARKS = 10

SECTION C LIFECYCLE NUTRITION 60 MARKS

ANSWER ALL OF THE FOLLOWING THREE (3) QUESTIONS.

PLEASE START EACH QUESTION ON A NEW PAGE

QUESTION 4

4.1 Identify and discuss the common **complications** of pregnancy. **[½ X 40=20]**

TOTAL MARKS = 20

QUESTION 5

5.1 You have been asked to deliver a talk to the elderly living in an old-age home. You have been specifically asked to cover the benefits of good nutrition. Give an outline of the points that you will cover. **[7]**

5.2 The nursing staff at the old-age home are concerned that an increasing number of the elderly residents are being treated for dehydration.

5.2.1 Explain why the elderly are at increased risk for dehydration. **[3]**

5.2.2 Outline some of the practical approaches that you could take to improve fluid intake in the elderly. **[8]**

5.2.3 The elderly that are dehydrated are at increased risk for developing certain medical conditions. Name four (4) of these conditions. **[½ X 4 = 2]**

TOTAL MARKS = 20

QUESTION 6

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 solids.

6.1 Explain to the mother how solids should be introduced in terms of rate and sequence. **[20]**

TOTAL MARKS = 20

END OF SECTION C