

UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF AGRICULTURAL SCIENCES & AGRIBUSINESS
DISCIPLINE OF DIETETICS & HUMAN NUTRITION
EXAMINATION: JUNE 2011
SUBJECT, COURSE & CODE: NUTRITION 224,
MICRONUTRIENTS, NUTRITIONAL ASSESSMENT, P1

DURATION: 3 HOURS

TOTAL MARKS: 170

External Examiner: Ms C Biggs
Internal Examiner: Mrs K Pillay

NOTE: THIS EXAM PAPER CONSISTS OF FIVE (5) PAGES PLUS A MULTIPLE CHOICE QUESTIONNAIRE (MCQ) ANSWER BOOKLET (7 PAGES), WHICH MUST BE HANDED IN. PLEASE MAKE SURE THAT YOU HAVE ALL PAGES. PLEASE ANSWER SECTIONS A, B AND C.

SECTION A	QUESTION 1 – MULTIPLE CHOICE QUESTIONS	
	See separate booklet	(30 MARKS)

SECTION B	SHORT QUESTIONS	(100 MARKS)
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PLEASE ANSWER ALL OF THE QUESTIONS BELOW AND START EACH QUESTION ON A NEW PAGE

QUESTION 2

- 2.1 Tabulate the differences between water soluble and fat soluble vitamins in terms of absorption, transport, storage, excretion and toxicity. [10]

- 2.2 Discuss the role of vitamin A in health and maintenance of cells and resistance to infection. [8]

- 2.3 List two (2) dietary sources of for both preformed and proformed vitamin A, respectively. [2]

TOTAL = 20 MARKS

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QUESTION 3

- 3.1 Explain why a person with haemochromatosis would want to avoid vitamin C supplements? [3]
- 3.2 Explain the cause of the neurological disorders observed in a biotin deficiency. [4]
- 3.3 List eight (8) factors which may reduce skin synthesis of vitamin D [1 X 8 = 8]
- 3.4 List five (5) functions of Vitamin C. [1 X 5 = 5]

TOTAL = 20 MARKS

QUESTION 4

- 4.1 Explain the difference between ferritin and haemosiderin. [3]
- 4.2 List six (6) factors that may interfere with the absorption of copper. [6 X ½ = 3]
- 4.3 Discuss the factors that affect the absorption of iron in the body. [10]
- 4.4 List the consequences of zinc deficiency in humans? [8 X ½ = 4]

TOTAL = 20 MARKS

QUESTION 5

- 5.1 For each of the following nutrients listed below, indicate one laboratory test that could be used to assess nutritional status. [1 X 5 = 5]
- Carbohydrate
 - Fat
 - Vitamin D
 - Vitamin K
 - Iron
- 5.2 Discuss the strengths and limitations of using the food frequency questionnaire method of dietary assessment. [9]
- 5.3 Explain the difference between a cross-sectional study and a longitudinal study. [4]

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5.4 List two (2) novel methods used to estimate body fat. [1 X 2 =2]

TOTAL = 20 MARKS

QUESTION 6

6.1 What was the aim of the National Food Consumption Survey (NFCS)-Fortification Baseline (2005)? [3]

6.2 Discuss the findings of the National Food Consumption Survey (NFCS) (1999) in terms of macronutrient intake only. [8]

6.3 Discuss the diurnal variation in weight. [7]

6.4 What is the requirement for water in humans? [2]

TOTAL = 20 MARKS

END OF SECTION B

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SECTION C

40 MARKS

QUESTION 7

Read the following case study carefully and answer the questions that follow.

Candy is a 28 year old female who is single and works full time. She has always felt that she is overweight and has tried many fad diets to lose weight. She saw an advert for a diet that involves consuming only fruit, vegetables and water. She has decided to start this diet. Her anthropometric values are as follows before she started on the diet:

Weight = 64 kg; Height = 160 cm.

After being on the diet for a period of 6 months she now weighs 52 kg and she is much happier with her weight. She has noticed that her palms and soles of her feet have become yellow in colour. She has been to the local clinic and was put onto an iron supplement. Her liver function is normal.

- 7.1 Calculate and comment on her Body Mass Index (BMI) before she went onto the diet. [3]
- 7.2 Calculate and comment on her percentage weight loss. [3]
- 7.3.1 Explain what is causing the yellow/orange colour on her palms and feet. [3]
- 7.3.2 Is the yellow/orange colouring of her palms and feet harmful? [1]
- 7.3.3 Justify your answer. [6]
- 7.4 Why do you think she was put onto an iron supplement? [1]
- 7.5 What are some of the clinical symptoms you could look out for to confirm iron deficiency anaemia? [4]
- 7.6 List four (4) gastrointestinal side effects of oral iron supplementation. [4 X ½ = 2]

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7.7 Candy has decided to stop the diet because she has not been feeling very well. She has decided to follow a healthy eating pattern planned by a Dietitian. Using the following information, complete a **diet plan** for Candy.
Please do not include a sample menu [17]

Total energy requirement = 7400 kJ
 CHO - 50% of total energy
 Protein - 15% of total energy
 Fat - 30% of total energy

PLEASE COPY THE TABLE WITH YOUR ANSWER INTO YOUR ANSWER BOOKLET.

Exchange group	Number of exchanges	CHO (g)	Protein (g)	Fat (g)	Energy (kJ)
Milk (low fat)					
Vegetable					
Fruit					
Starch					
Medium fat meat					
Fat					
Sugar					
TOTAL					
% Contribution					

TOTAL = 40 MARKS

END OF SECTION C

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STUDENT NUMBER: _____

SECTION A:
MULTIPLE CHOICE QUESTIONS (7 Pages) (1 X 30 = 30 MARKS)

QUESTION 1

Indicate your answer to each question by placing a circle over the appropriate letter.

Mark allocation as follows:

0 marks of no answer is given

1 mark for each correct answer

- ½ mark for each incorrect answer

Vitamins (1 X 10)

1. Which vitamin is also known as the anti-scorbutic vitamin?
 - A. Vitamin E
 - B. Vitamin C
 - C. Folate
 - D. Riboflavin

2. Which of the vitamins listed below is the most stable?
 - A. Thiamin
 - B. Niacin
 - C. Riboflavin
 - D. Folate

3. ____ is an important component of Co-enzyme A which is needed for metabolism of carbohydrate, fat and protein.
 - A. Vitamin B6
 - B. Niacin
 - C. Pantothenic acid
 - D. Biotin

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4. Which of the following is not a function of vitamin B6?
- A. Participates in the conversion of tryptophan to niacin.
 - B. Facilitates the conversion of linolenic acid to arachidonic acid.
 - C. Required for the production of hydrochloric acid.
 - D. Required for the synthesis of key neurotransmitters.
5. Irreversible nerve damage can be caused by intakes of ____ at levels of 2-6 g/day for a period of over 2 months.
- A. Vitamin B6
 - B. Folate
 - C. Vitamin C
 - D. Riboflavin
6. A deficiency of ____ is unlikely to result in high levels of homocysteine.
- A. Niacin
 - B. Folate
 - C. Vitamin B6
 - D. Vitamin B12
7. According to the WHO stages of development of xerophthalmia, stage 4 is characterised by:
- A. Corneal ulceration
 - B. Bitot's spots
 - C. Corneal xerosis
 - D. Conjunctival xerosis
8. Side effects associated with the anticancer drug, methotrexate is also seen with a deficiency of:
- A. Vitamin B12
 - B. Folate
 - C. Vitamin B6
 - D. Vitamin D

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9. Which of the vitamins below is most likely to be associated with toxicity when consumed as a supplement?
- A. Vitamin A
 - B. Vitamin D
 - C. Vitamin E
 - D. Vitamin K
10. Which of the following statements on vitamin C is false?
- A. Vitamin C is the most easily destroyed vitamin.
 - B. Oxidation of vitamin C is inhibited by an acid environment.
 - C. Ascorbic acid is the reduced active form of vitamin C and dehydroascorbic acid is the oxidised active form of vitamin C.
 - D. Vitamin C is able to donate electrons to oxidising agents thus becoming reduced and hereby prevents oxidation.

Minerals (1X10)

11. Which of the following is not a major mineral?
- A. Chloride
 - B. Magnesium
 - C. Zinc
 - D. Sulfur
12. Which of the following does not limit calcium absorption?
- A. Phytic acid
 - B. Dietary glucose and lactose
 - C. Polyphenols
 - D. Excess phosphorus

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13. Which of the following nutrients is a major source of dietary sulfur?
- A. Fat
 - B. Carbohydrate
 - C. Protein
 - D. Mineral salts
14. Which is the major intracellular cation?
- A. Potassium
 - B. Sodium
 - C. Phosphorus
 - D. Chloride
15. Which of the following is not involved in retaining fluid in the body?
- A. Renin
 - B. Parathyroid hormone
 - C. Aldosterone
 - D. Antidiuretic hormone
16. Hyperkalaemia is most likely to be seen in:
- A. Kidney failure
 - B. Alcoholism
 - C. Athletes
 - D. Anorexia nervosa
17. A reduction in stomach acid production in the elderly can result in a deficiency of:
- A. Zinc
 - B. Iron
 - C. Sodium
 - D. Chloride

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18. High intakes of ___ can inhibit copper absorption.
- A. Manganese
 - B. Chromium
 - C. Selenium
 - D. Molybdenum
19. Individuals with the condition haemochromatosis will show high blood levels of ___?
- A. Zinc
 - B. Sodium
 - C. Calcium
 - D. Iron
20. A deficiency of ___ can inhibit the functioning of superoxide dismutase?
- A. Selenium
 - B. Copper
 - C. Magnesium
 - D. Iron

Nutritional assessment (1X5)

21. Which of the following statements on weight is false?
- A. Weight is the sum of lean tissue, bone and fat.
 - B. Weight can be influenced by genetics and the environment.
 - C. Weight indicates current nutritional status and recent nutritional intake.
 - D. It is best to carry out a weight measurement in the morning after voiding.
22. Which set of indices does the Gomez Classification use?
- A. Height for age
 - B. Weight for age
 - C. Weight for height
 - D. B and C

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23. A child with a low weight for height can be considered to be:
- A. Stunted
 - B. Overweight
 - C. Wasted
 - D. Underweight
24. Which of the following is not a clinical/physical sign of malnutrition?
- A. Magenta tongue
 - B. Angular cheilosis
 - C. Alopecia
 - D. Corneal xerosis
25. Which of the following dietary assessment methods does not involve using a recall?
- A. 24 hour recall
 - B. Food frequency questionnaire
 - C. Food record
 - D. Diet history

Nutrition in South Africa (1 X 5)

26. Which of the following statements on breastfeeding from the South African Vitamin A Consultative Group (SAVACG) study of 1994 is false?
- A. Rural children were breastfed less than urban children.
 - B. An average of 88% of children aged 3 years were breastfed for varying periods of time.
 - C. Rural children were breastfed for a longer period of time.
 - D. There was a tendency to breastfeed for a shorter period by urban, well educated mothers.

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27. According to the South African National Nutrition Survey Study (SANNSS) of 1995, which statement on macronutrient intake in Black South African adults is false?
- A. Rural Blacks obtained 2/3 of their protein from plant sources
 - B. Rural Blacks had the highest intake of carbohydrates
 - C. Rural Blacks had the highest intake of sugar
 - D. Rural Blacks had a fat intake of < 30%
28. Which method was used to assess dietary intake in the National Food Consumption Survey (NFCS) of 1999?
- A. Food records and 24 hour recall
 - B. Food diary and food frequency questionnaire
 - C. 24 hour recall and food frequency questionnaire
 - D. Food record and food frequency questionnaire
29. According to the NFCS Fortification Baseline 2005 the number of children with poor vitamin A status was:
- A. 1 in 3
 - B. 2 in 3
 - C. 1 in 4
 - D. 2 in 5
30. According to the NFCS Fortification Baseline 2005 the number of women with poor iron status was:
- A. 1 in 3
 - B. 1 in 10
 - C. 1 in 5
 - D. 1 in 4

END OF MULTIPLE CHOICE QUESTIONS