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King Saud University
College of Applied Medical Sciences
Department of Community Health Sciences

CHS226: Principles of Nutrition
Final Exam (Students' Model)

Time allowed: 2 hours Date: /1438

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Part I: Write True or False between brackets and correct the false question (s) by underlining the false word(s) and write it (them) under each question. Non corrected false question (s) will be given zero: **Carefully transfer your answers to the answer sheet that will be checked and marks will be given based on your answers in the answer sheet.**

(marks)

1. Malnutrition results from deficient food energy or nutrient intake **only** **(excess or deficient food energy or nutrient intake or by an imbalance of nutrients)**
2. Carbohydrates, fats, proteins, vitamins are **inorganic** (**organic**) nutrients
3. Primary nutrient deficiency can be assessed using dietary studies
4. During **mechanical** **(chemical) digestion,** enzymes break down macromolecules into smaller molecules to be efficiently absorbed.
5. Enzymes of the small intestine and pancreas work more effectively near **acidic** (**neutral)** pH
6. Without recycling bile acids, synthesis of new bile acids in the liver would not keep pace with needs for adequate fat digestion
7. Inside the intestinal villi, there are lacteals which absorb digested fat
8. Basal metabolic rate represents about **10**% (**60-70%)** of daily total energy expenditure
9. After early adulthood there is an **increase** (**decline**) in BMR
10. Fat-free mass and Lean Body Mass are metabolically **inactive** (**active**) tissues
11. **Non athletes** have higher water than **athletes** (Vise versa)
12. Drinking caffeine increases water demand
13. Starvation or carbohydrate-**rich** (restricted) diet leads to loss of body water
14. Major extracellular electrolytes are sodium, chloride, and **potassium** **(bicarbonate)**
15. **Complex** carbohydrates are digested more quickly than **simple** carbohydrates and do not contain enough essential nutrients (Vise versa)
16. **Polysaccharides** (oligosaccharides) are composed of 3-10 monosaccharide units and can not be digested by the human being
17. **Soluble** (Insoluble) dietary fibers increase stool weight and promote laxation
18. Foods with high glycemic index raise blood sugar quickly and provide energy for a **long** (short) period
19. **Increasing** (decreasing) the consumption of potatoes, white bread, candy, and soft-drinks lowers the dietary glycemic load
20. Glycogen is **suitable** (unsuitable) for long-term energy storage because it is stored hydrated with water.
21. **COOH** (R or side chain) group distinguishes one amino acid from another.
22. Nutrients with fewer than 50 amino acids are called **proteins** (peptides)
23. Conditionally essential amino acids are **essential** amino acids become **nonessential** under special circumstances (vise versa)
24. Methionine, tryptophan, lysine **and serine** are essential amino acids
25. **Incomplete** (partially complete) proteins can be combined to provide essential amino acids equivalent to high biological proteins from animal sources

With my best wishes
Dr Mohamed Fawzi

Student NO in ILOs Excel Sheet:----------

26. Lactate, glucogenic amino acids, glycerol and propionyl CoA are sources for the gluconeogenesis
27. Lacto-ovo-vegetarians eat grains, vegetables, fruits, legumes, seeds, nuts, dairy products and eggs
28. **Positive nitrogen balance** (protein equilibrium) it's a normal state for healthy adult taking a balanced diet
29. Monounsaturated and polyunsaturated fatty acids differ in the number of double bonds they have
30. In the **saturated** (unsaturated) fatty acids, ω refers to the placement of the first double bond counting from the **carboxyl** (methyl) end
31. Micelles are formed in the intestinal lumen while chylomicrons are formed inside intestinal cells
32. **HDL** (LDL) favors lipid deposition in tissues including blood vessels
33. Vitamins do not provide calories but facilitate energy release from energy nutrients
34. Animal source vitamins are more bioavailable than plant source vitamins
35. The human body can make vit B3 from **lysine** (tryptophan)
36. **Retinoids** **(carotenoids)** are known as "provitamin A" and mainly found in foods of plant sources
37. Almost all animals, **human** and plants can synthesize their own needs for vit C
38. **Fruits and vegetables** (foods of animal origin) are rich sources of Cyanocobalamin
39. The daily need for **trace** (major – macro) minerals is more than 100 mg and are present in the body in quantities greater than 5 g
40. Phytates in wheat bran can reduce the absorption of certain minerals such as zinc, copper, iron, calcium
41. Milk contains both vitamin D and lactose that facilitate absorption
42. **Calcitonin** (Parathyroid) hormone releases Calcium from bones, increases its absorption from the gastrointestinal tract and its reabsorption from the kidney
43. Aldosterone is a steroid hormone that conserves sodium, secretes potassium and increases water retention that can lead to hypertension
44. Persistent excessive sodium intake **decreases** (increases) urinary calcium excretion and can lead to hypertension
45. Potassium may prevent increased calcium excretion caused by a high salt diet
46. The thirst developed due to sodium deficiency **can** (cannot) be alleviated by drinking fluid alone,
47. **Non heme** iron is absorbed more than twice as efficiently as **heme** iron (vise versa)
48. Excess iron **can** (cannot) be excreted in the urine
49. Hemosiderosis results from increase in iron storage without associated tissue damage while hemochromatosis results from increase in iron storage with tissue damage specially liver
50. DASH-sodium is more effective in controlling hypertension than DASH alone

Part II: Circle the correct answer: **Carefully transfer your answers to the answer sheet that will be checked and marks will be given based on your answers in the answer sheet.**

(marks)

1. The followings are nutrients giving energy ***EXCEPT:***
   a) carbohydrates,
   b) fats,
   c) proteins
   d) **vitamins**

2. The most potent lipid-digesting enzyme is the:
   a) **Pancreatic lipase**
   b) Gastric lipase
   c) Lingual lipase
   d) Pepsin

3. Using specific carrier to transport nutrients or the carrier changes the cell membrane in such a way that the nutrients can pass through: -
   a) chemical digestion
   b) simple diffusion
   c) **facilitated diffusion**
   d) active transport

4. They stimulate colonocyte proliferation and enhance absorption of electrolytes and water
   a) **Short Chain Fatty Acids**
   b) Pancreatic secretions
   c) Gastric secretions
   d) Salivary amylases

5. When the energy intake is lower than energy expenditure, the body will be in:
   a) isocaloric balance and its weight will be maintained
   b) positive caloric balance and its weight will increase
   c) positive caloric balance and its weight will be maintained
   d) **negative caloric balance and its weight will decrease**

6. Minimum amount of energy required to sustain the body's essential metabolic processes is:-
   a) **basal metabolic rate**
   b) thermic effect of food
   c) energy expended in physical activity
   d) carbohydrates, fats, and proteins

7. The followings are ***TRUE*** about basal metabolic rate ***EXCEPT***:-
   a) **Marasmus & kowasherkor increases the BMR**
   b) Starving, fasting, eating too few calories reduce the BMR
   c) Physical activities increases the BMR
   d) Very low or very high temperatures increases the BMR

8. It is a food group that healthy adults can consume 2-4 servings, and provides them with carbohydrates, Vit C and dietary fiber.
   a) Meat, Poultry, Fish, Dry Beans, Eggs & Nuts Group
   b) **Fruit Group**
   c) Vegetable Group
   d) Milk, Yogurt & Cheese Group

9. It means "**selection of foods within and among food groups"**
   a) Adequacy
   b) Balance
   c) **Variety**
   d) Moderation

10. According to the recommendations of the Institute of Medicine, the daily water intakes (L) for breastfeeding and pregnant women are :
   a) 3.0 for each
   b) 2.4 for each
   c) 2.2 and 3.0; respectively
   d) **3.0 and 2.4; respectively**

11. During periods of heavy sweating, fluid intake (liters /hour) should be limited to:
   a) **1-1.5**
   b) 5- 10
   c) 10- 20
   d) 15 - 30

12. A polysaccharide that can not be digested by human:
   a) Glucose
   b) Lactose
   c) Starch
   d) **Cellulose**

13. Maltose (malt sugar) is composed of:
   a) glucose + fructose
   b) galactose + glucose
   c) **glucose + glucose**
   d) galactose + Galactose

14. They are complex carbohydrates that yield more than one type of monosaccharides on hydrolysis:
   a) Oligosaccharides
   b) Homopolysaccharides
   c) **Heteropolysaccharides**
   d) Triglycerides

15. The recommended daily dietary fiber intake is
   a) 20-35 mg
   b) **20-35 g**
   c) 50-100 g
   d) 150-200 g

16. The only dietary fiber that is **not a carbohydrate** is:
   a) cellulose
   b) **lignin**
   c) pectin
   d) gum

17. A large piece of banana has a glycemic index of 52 and glycemic load of 14; so it has a:
   a) High glycemic index and high glycemic load
   b) High glycemic index and intermediate glycemic load
   c) Low glycemic index and high glycemic load
   d) **Low glycemic index and intermediate glycemic load**

18. A non-caloric sweetener obtained from the leaves of permanent shrub and has been used for many years in traditional medicine for the treatment of diabetes.
    a) Trans fats
    b) Polyols
    c) Aspartame
    d) **Stevia**

19. Proteins containing sufficient amounts of amino acids to maintain life but fail to promote growth are called
    a) complete,
    b) **partially complete**
    c) incomplete
    d) Conditionally essential

20. The recommended daily protein intake (g) for lactating women is:
    a) **0.8 g /Kg BW + (25 g during the first 6 months and 18 g later on)**
    b) 0.8 g /Kg BW + (15 g during the first 6 months and 8 g later on)
    c) 0.8 g /Kg BW
    d) 8 g /Kg BW

21. The followings are essential fatty acids ***except***;
    a) linolenic acid
    b) linoleic acid
    c) Arachidonic acid
    d) **Plamitic acid**

22. It is a monounsaturated non-essential fatty acid found in olive, peanut oil and canola oils:
    a) **oleic acid**
    b) linoleic acid
    c) linolenic acid
    d) Arachidonic acid

23. The fatty acid “20:4 ω-6” has:
    a) **20 carbons, 4 double bonds; the first one is at the 6th carbon from the terminal methyl group.**
    b) 20 carbons, 6 double bonds; the first one is at the 4th carbon from the terminal methyl group.
    c) 20 carbons, the 4th and 6th carbons are with double bonds
    d) 20 carbons, the 4th carbon replaces the and 6th carbon

24. Fatty acids with 16- 22 carbon atoms are:
    a) short chain fatty acids
    b) medium chain fatty acids
    c) **long chain fatty acids**
    d) Very long chain fatty acids

25. Coating of large fat globules in duodenum with bile to form small emulsions where lipases can act upon
    a) **Emulsification**
    b) Micelles
    c) chylomicrons
    d) medium chain fatty acids

26. Omega 3 and Omega 6 are
    a) **Essential polyunsaturated fatty acids**
    b) Non essential polyunsaturated fatty acids
    c) Essential monounsaturated fatty acids
    d) Non essential monounsaturated fatty acids

27. Formed during hydrogenation of vegetable oil and raise LDL but lower HDL
a) Omega 3
b) Omega 6
c) Omega 9
d) **Trans fatty acids**

51. It is a fat- soluble vitamin known as "sunshine vitamin" which promotes bone and tooth development and normal growth
a) Vit A
b) **Vit D**
c) Vit E
d) Vit K

52. An antioxidant vitamin necessary for collagen formation, absorption of iron and folic acid, and its deficiency leads to scurvy
a) Vit A
b) Vit D
c) Vit E
d) Vit C

53. It is a water soluble vitamin, its sources are only foods of animal origin and pernicious anemia is the disease that results from its deficiency
a) B1
b) B2
c) B9
d) B12

54. They are water soluble inorganic antioxidants
a) Vit E and beta-carotene
b) Ascorbic acids
c) Selenium, manganese and zinc
d) Vit B1, B2 and B3

28. The following vitamins are necessary for healthy bones:
a) B1, B2 and B3
b) B6, B9 and B12
c) **C, D and K**
d) Calcium, phosphorus and magnesium

29. Sodium, Chloride, Magnesium, Fluoride, Copper and Iodine
a) All of them are Macro minerals
b) All of them are Micro minerals
c) The first three are Micro minerals and the last three are Macro minerals
d) **The first three are Macro minerals and the last three are Micro minerals**

30. Calcium absorption can be decreased by:
a) **Excess fibers**
b) ascorbic acid and lactose
c) Estrogen
d) Vitamin D

31. All of the followings are true about sources of sodium**; *except;***
a) Table salt is the major source
b) Food of animal origin contain more sodium than plant foods
c) Fruits contain little
d) **Processed foods contain little**

32. All of the followings decrease iron absorption; ***except;***
   a) phytic acid in fiber
   b) polyphenols in tea and coffee.
   c) full body stores of iron
   d) **animal proteins**
33. DASH is an approach to control:
   a) **Hypertension**
   b) Diabetes
   c) Goiter
   d) Hemochromatosis

Part III: writing the question number from column (A) beside its correct answer in column (B). **Carefully transfer your answers to the answer sheet that will be checked and marks will be given based on your answers in the answer sheet.**

(marks)

#	Column (A)
1.	**Malnutrition**
2.	**Bolus**
3.	**Sodium bicarbonate**
4.	**Lean Body Mass**
5.	**Thermic effect of food**
6.	***Metabolic water***
7.	***Gluconeogenesis***
8.	***Free radicals***
9.	***Salt sensitivity***
10.	***Goitrogens***

#	Column (B)
	any condition caused by excess or deficient food energy or nutrient intake or by an imbalance of nutrients
	a mouthful of food that has been swallowed
	alkaline solution secreted from the pancreas to neutralize the acidic chyme providing proper pH for enzymes of both intestine and pancreas
	includes fat that acts as fuel for energy production but does not include storage fat (S/C fat or fats surrounding internal organs)
	energy expenditure associated with the consumption, digestion, and absorption of food
	water produced during metabolism of the energy nutrients
	formation of glucose from non-carbohydrate sources
	highly reactive toxic substances that lack electrons and try to take them from other molecules to regain balance
	a characteristic of individuals who respond to high sodium chloride intake with increasing blood pressure *OR* low intake with decreasing blood pressure
	substances that block the transport and utilization of iodine by thyroid gland

Part IV: Fill the following blanks with the correct word (s)**:** **(marks)**

2. The main functions of foods are: **(1) Physiological, (2) Social and (3)Psychological functions**
3. Major intracellular electrolytes are; **(1) Potassium, (2) magnesium, and (3) phosphate**
4. Fatty acids are either**: (1) saturated or (2) unsaturated**

5.	**calculate the followings for a healthy sedentary female; height (cm)=**	**190**	
1	Ideal body weight=	(height in cm -100) – {(height in cm) -150)/2}	70.0
2	Basal Metabolic rate (BMR) =	0.9 kcal x BW (kg) x 24 hrs	1512.0
3	BMR and energy expended in physical activity (PA)= BMR X	1.2	1814.4
4	Thermic effect of food (TEF) =	10% of BMR+ energy expended in Physical activity	181.4
5	Total Energy Expenditure (TEE)=	BMR+ energy in PA+ TEF	1995.8
6	The total energy requirement to keep the body weight ideal=		1995.8
7	Distribute total energy expenditure among the following nutrients;		
	Protein 15%=	299.4	
	Carbohydrates (60%)=	1197.5	
	Fat (25%)=	499.0	
8	Calculate the amount needed from each of the above nutrients in grams:		
	Protein =	74.8	
	Carbohydrates=	299.4	
	Fat =	55.4	
9	Daily protein need based on the Ideal Body weight	IBW (kgs) * 0.8	56.0
10	Daily water need (ml)		
	Based on the Ideal Body weight	IBW (kgs) * 35	2450.0
	Based on daily total energy expenditure	TEE * 1	1995.8

6.	**calculate the followings for a healthy extra active (1.9) male; height (cm)=**	**156**	
1	Ideal body weight=	(height in cm -100) – {(height in cm) -150)/4}	54.5
2	Basal Metabolic rate (BMR) =	1 kcal x BW (kg) x 24 hrs	1308.0
3	BMR and energy expended in physical activity (PA)= BMR X	1.9	2485.2
4	Thermic effect of food (TEF) =	10% of BMR+ energy expended in Physical activity	248.5
5	Total Energy Expenditure (TEE)=	BMR+ energy in PA+ TEF	2733.7
6	The total energy requirement to keep the body weight ideal=		2733.7
7	Distribute total energy requirements among the following nutrients;		
	Protein 15%=	410.1	
	Carbohydrates (60%)=	1640.2	
	Fat (25%)=	683.4	
8	Based on the above amount of calories assigned for each nutrients, Calculate the corresponding amount of nutrients in grams:		
	Protein =	102.5	

	Carbohydrates=	410.1	
	Fat =	75.9	
9	Daily protein need based on the Ideal Body weight	IBW (kgs) * 0.8	43.6
10	Daily water need (ml)		
	Based on the Ideal Body weight	IBW (kgs) * 35	1907.5
	Based on daily total energy expenditure	TEE * 1	2733.7

7. Vitamins are classified into either
   1) **Water soluble**
   2) **Fat soluble**
8. Iron in foods presents as either:
   1) **heme iron** in animal products
   2) **Nonheme iron** mainly in plant products
9. Iron-containing compounds in the body are grouped into two categories:-
   1) **functional iron:** chiefly in hemoglobin
   2) **storage or nonessential iron:** chiefly in the liver, spleen, and bone marrow.