



BIOLOGY

BOOKS - CENGAGE BIOLOGY

FOOD AND ITS COMPONENTS

Mandatory Exercise Exercise Set I

1. Give two examples : Monosaccharide

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2. Give two examples : Disaccharide

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3. Give two examples : Polysaccharide



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4. Give two examples : Conjugated protein



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5. Give two examples : Simple lipid



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6. Name the fat-soluble vitamins in our body.



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7. Give reasons : Deficiency of iodine causes goitre.



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8. Give reasons : Diet rich in saturated fatty acids leads to heart problems.



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9. Which vitamin is called sunshine vitamin? Why?



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10. Why is it not advisable to consume food consisting of only one type of nutrient?



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Mandatory Exercise Exercise Set li

1. Astronauts are provided with special high-energy food. Why is this necessary?

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2. A child shows symptoms of swollen abdomen, discolouration of skin and hair, and retarded growth. The child has _____ deficiency. The condition is called _____

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3. Monosaccharide + monosaccharide = _____

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4. Dipeptide + aminoacid = _____

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5. Cellulose serves as roughage. It cannot be digested in our body, but some animals such as cattle can digest. How is this possible?



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6. Classify the organisms given below as carnivore, parasite, herbivore, or autotroph.

Elephant _____



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7. Classify the organisms given below as carnivore, parasite, herbivore, or autotroph.

Tiger _____



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8. Classify the organisms given below as carnivore, parasite, herbivore, or autotroph.

Goat _____



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9. Classify the organisms given below as carnivore, parasite, herbivore, or autotroph.

Liver fluke _____



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10. Classify the organisms given below as carnivore, parasite, herbivore, or autotroph.

Algae _____



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11. Proteins are classified based on their structure as _____ and _____



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12. Simple proteins and conjugated proteins are classified based on _____



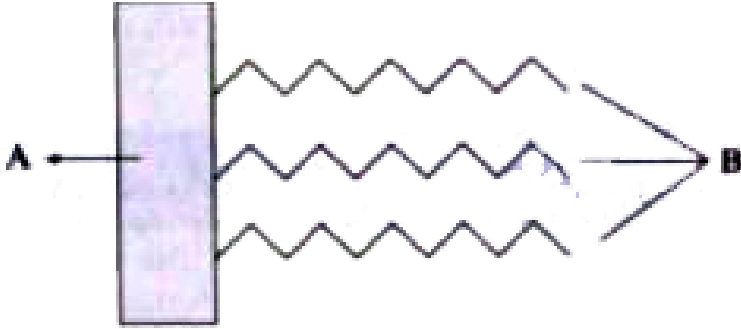
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13. Some proteins provide all essential amino acids, whereas some proteins provide some of the essential amino acids only. These are called _____ proteins and _____ proteins, respectively.



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14. Label the following components in a molecule of triglyceride:



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15. Indicate whether the following disorders are caused due to excess intake or insufficient intake?

Disorders	Excess intake/insufficient intake
Marasmus	
Obesity	
Anaemia	

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1. The storage form of glucose in animals is _____



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2. These organic substances are required in very small quantities for proper functioning of our body. They are _____



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3. There is a food sample in the cup. You rubbed a small amount of this sample on a piece of white paper. After the paper dried, you hold it in front of the light. You see a translucent spot through which light passes? This simple test gives you a clue on the type of component in food. Which is this component?



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4. Mark the following statements as True or False: Sugar present in milk is lactose.



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5. Mark the following statements as True or False: Haemoglobin is a conjugated protein.



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6. Mark the following statements as True or False: Bees wax contains cholesterol.



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7. Mark the following statements as True or False: The bilayer of plasma membrane is made up of protein.





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Consolidated Exercise Mcqs

1. Protein is a

- A. Macromolecule
- B. Steroid
- C. Food
- D. Micromolecule

Answer: A



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2. A protein molecule is formed of

- A. Chain of amino acids

- B. Chain of fatty acids
- C. Chain of monosaccharides
- D. Chain of disaccharides

Answer: A

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3. Hemoglobin is a

- A. Monomeric protein
- B. Oligomeric protein
- C. Chromoprotein
- D. Both B and C

Answer: D

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4. Energy currency of cell is

- A. ATP
- B. ADP
- C. NAD
- D. GDP

Answer: A



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5. Proteins can be denatured by

- A. CO_2
- B. CO
- C. Heat
- D. O_2

Answer: C



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6. Quaternary structure is present in

A. Hemoglobin

B. Insulin

C. Globulin

D. Elastin

Answer: A



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7. The protein present in milk is

A. Caesin

B. Glutein

C. Myosin

D. Gobulin

Answer: A



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8. Nitrogen is a component of

A. Protein

B. Carbohydrate

C. Lipids

D. Polyphosphate

Answer: A



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9. Most abundant protein in the human body is

- A. Haemoglobin
- B. Keratin
- C. Collagen
- D. Immunoglobulin

Answer: C



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10. Which is a type of secondary protein structure?

- A. α -helix
- B. β -sheet
- C. Collagen
- D. All of the above

Answer: D



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11. A globular protein is

- A. Elastin
- B. Keratin
- C. Albumin
- D. Collagen

Answer: C



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12. Calcium is required for

- A. Muscle contraction

- B. Blood clotting
- C. Bone formation
- D. All of the above

Answer: C



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13. DNA is a polymer of

- A. Proteins
- B. Carbohydrates
- C. RNA
- D. Nucleotides

Answer: D



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14. DNA is directly involved in the synthesis except that of

- A. DNA
- B. Protein
- C. tRNA
- D. mRNA

Answer: B



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15. DNA can be

- A. A-DNA
- B. B-DNA
- C. Z-DNA
- D. All of the above

Answer: D



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16. Blood clotting is helped by

A. Na^+

B. K^+

C. Ca^{2+}

D. Mg^{2+}

Answer: B



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17. Number of base pairs in each turn of Z-DNA helix is

A. 10

B. 11

C. 12

D. 15

Answer: C



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18. Difference between RNA and DNA is that of

A. Sugar and base

B. Sugar and phosphate

C. Phosphate and base

D. All of the above

Answer: A



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19. Nitrogen bases of RNA are

A. AGUC

B. AUTC

C. ATUG

D. ATCG

Answer: A



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20. Clover leaf structure is found in

A. DNA

B. rRNA

C. tRNA

D. mRNA

Answer: C



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21. Phosphorus is a constituent of

- A. Carbohydrate
- B. Protein
- C. Fat
- D. Nucleotide

Answer: D



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22. Which one is a polysaccharide?

- A. Starch

B. Cellulose

C. Glycogen

D. All of the above

Answer: D



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23. Glycogen is stored inside cells of

A. Kidney and liver

B. Liver and muscles

C. Spleen and liver

D. Pancreas

Answer: B



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24. Where are starch grains located?

- A. Lysosome
- B. Mitochondria
- C. Amyloplast
- D. Proplastid

Answer: C



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25. Steroid is

- A. Cholesterol
- B. Thyroxin
- C. Vitamin A
- D. Fatty acid ester

Answer: A



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26. Number of essential fatty acid is

A. 6

B. 4

C. 3

D. 2

Answer: C



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27. Essential fatty acids are

A. Saturated

B. Unsaturated

C. Both A and B

D. Cyclic

Answer: B

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28. Essential fatty acids occur in

A. Animal fat

B. Plant oils

C. Fish and fowl

D. Both B and C

Answer: D

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29. Number of amino acids is

- A. 20
- B. 120
- C. 200
- D. 500

Answer: A



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30. Essential amino acids were discovered by

- A. Evans and Burr
- B. Hopkins
- C. Beevers
- D. Sutherland

Answer: B



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31. Number of essential amino acids for human requirement is

A. 4

B. 6

C. 7

D. 9

Answer: D



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32. Number of semi-indispensable amino acids is

A. 4

B. 3

C. 2

D. 1

Answer: C



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33. An aromatic amino acid is

A. Tryptophan

B. Tyrosine

C. Phenylalanine

D. All of the above

Answer: D



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34. Rubber is

A. Monoterpene

B. Diterpene

C. Polyterpene

D. Tetraterpane

Answer: D



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35. Maltose is

A. composed of glucose units

B. composed of galactose units

C. a polysaccharide

D. a disaccharide

Answer: A::D



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36. Proteins function as

- A. structural elements
- B. biocatalysts
- C. main energy source
- D. genetic material

Answer: A::B::D



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37. Linoleic acid is

- A. unsaturated fatty acid

B. saturated fatty acid

C. non-essential fatty acid

D. essential fatty acid

Answer: A::D



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38. A person suffering from marasmus is deficient in

A. proteins only

B. proteins

C. carbohydrates only

D. carbohydrates and fats

Answer: A::B::D



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39. The main dietary source of vitamin C is

- A. lemon
- B. potato
- C. orange
- D. milk

Answer: A::C::D



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Olympiad And Ntse Level Exercises

1. An average small hamburger has 280 cal. This hamburger has 10 g of fat, 25 g of carbohydrates and 18 g of proteins and other micronutrients. Calculate the percentage of calories from fat, carbohydrate and protein.

- A. 32% of calories from fat, 35.8% of calories from carbohydrate and 25.8% of calories from protein
- B. 35.8% of calories from fat, 32% of calories from carbohydrate and 25.8% of calories from protein
- C. 90 calories from fat, 100 calories from carbohydrate and 72 calories from protein
- D. 100 calories from fat, 72 calories from carbohydrate and 72 calories from protein

Answer: A



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2. The body mass index (BMI), or Quetlet index, is a heuristic proxy for human body fat based on an individual's weight and height. BMI does not actually measure the percentage of body fat. Body mass index is defined as the individual's body weight divided by the square of his or her height.

The formula universally used in medicine produce a unit of measure of kg/m^2 . Archana, who is 32 years old, consumes 1900 calories per day and does no exercise. She weighs 150 pounds and she is 5.3 feet tall. Choose the correct answer regarding her BMI.

- A. Archana's BMI is 40.4 and she is over-weighted.
- B. Archana's BMI is 26.01 and she is over-weighted.
- C. Archana's BMI is 40.4 and she is obese.
- D. Archana's BMI is 28.86 and she is obese.

Answer: B



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3. In the absence of ultraviolet rays reaching the earth, humans would suffer from the deficiency of

- A. fatty acids
- B. essential amino acids

C. vitamin D

D. vitamin E

Answer: C



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4. The two forms of vitamin B2 which are the co-enzymes required for carbohydrate, fats and protein metabolism are

A. NAD^+ and $NADP^+$

B. FAD and $NADP^+$

C. FMN and FAD

D. FMN and NAD

Answer: C



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5. Assertion (A): Scurvy is caused by deficiency of a vitamin.

Reason (R): Deficiency of ascorbic acid causes scurvy.

A. If both Assertion and Reason are true: Reason is the correct explanation of Assertion.

B. If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: B



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6. When breast-feeding is replaced by less nutritive food low in proteins and calories, the infants below the age of one year are likely to suffer from

- A. rickets
- B. kwashiorkor
- C. pellagra
- D. marasmus

Answer: D

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7. Which one of the following is a fat-soluble vitamin and its related deficiency disease?

- A. Calciferol-pellagra
- B. Ascorbic acid-scurvy
- C. Retinol-xerophthalmia
- D. Cobalamine-beri beri

Answer: C



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8. Which of the following concerning the major dietary constituents is true?

- A. The body cannot store glucose.
- B. All essential amino acids are found in meat.
- C. Plant oils mainly consist of saturated fats.
- D. Ketones are likely to be present in the urine of an individual eating a predominantly carbohydrate diet

Answer: C



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9. Casein is a protein present in milk. Which group of protein is associated with casein?

- A. nucleoprotein
- B. chromoprotein
- C. phosphoprotein
- D. glycoprotein

Answer: C

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10. A person will suffer from beri beri, rickets and scurvy, if his food does not contain adequate amounts of

- A. vitamin B_6 , A and C
- B. vitamin B_1 , D and C
- C. vitamin A, B_1 and E
- D. vitamin B_6 , A and K

Answer: B

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Challenging Exercise

1. The Harris-Benedict equation is a calorie formula to determine BMR. It takes into account the height, weight, age, and sex of the individual.

$$\text{BMR}_{\text{Men}} = 66 + \left(13.7 \times \text{weight}_{\text{in kg}}\right) + \left(5 \times \text{height}_{\text{in cm}}\right) - \left(6.8 \times \text{age}_{\text{in years}}\right)$$

$$\text{BMR}_{\text{Women}} = 655 + \left(9.6 \times \text{weight}_{\text{in kg}}\right) + \left(1.8 \times \text{height}_{\text{in cm}}\right) - \left(4.7 \times \text{age}_{\text{in years}}\right)$$

Calculate BMR for a woman of 30 years, with height and weight as 5 feet 7 inches and 55 kg, respectively.

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2. A patient intakes oral antibiotics as a treatment for a disease. Soon, it is found that this patient shows symptoms such as bleeding and susceptibility to fractures which are associated with vitamin K deficiency.

What is the reason for this?

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