BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Sc.(FND)-Hons-2022
Course Name – Nutrients Metabolism
Course Code - BFNC301
(Semester III)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Which vitamin acts as a coenzyme for the enzyme HMG-CoA reductase, playing a regulatory role in cholesterol synthesis?
a) Vitamin A b) Vitamin C
c) Vitamin D d) Vitamin B5 (pantothenic acid)

(ii) Which of the following is a common symptom of a gout attack?
a) High fever b) Muscle weakness
c) Severe joint pain and swelling d) Shortness of breath

(iii) Where does glycogenesis primarily occur in the body?
a) Liver b) Kidneys
c) Heart d) Lungs

(iv) Vitamin A plays a crucial role in which physiological process related to vision?
a) Maintenance of the cornea b) Retinal synthesis
c) Formation of optic nerve d) Eye muscle function

(v) Which enzyme is responsible for the formation of glycogen by catalyzing the addition of glucose molecules to the growing glycogen chain?
a) Glucagon b) Glycogen phosphorylase
c) Glycogen synthase d) Glucose-6-phosphatase

(vi) In GSD-II (Pompe Disease), which enzyme deficiency leads to glycogen accumulation?
a) Glycogen debranching enzyme b) Acid alpha-glucosidase (GAA)
c) Glycogen synthase d) Phosphorylase kinase

(vii) Under anaerobic conditions, what happens to pyruvate generated in glycolysis?
a) It is converted to acetyl-CoA. b) It is converted to lactic acid.
c) It enters the citric acid cycle. d) It is stored as glycogen.

(viii) Which molecule inhibits the enzyme glucose-6-phosphate dehydrogenase, thereby regulating the rate of the pentose phosphate pathway?
a) NADPH b) Ribose-5-phosphate

c) Glucose-6-phosphate
d) Fructose-6-phosphate

(ix) In addition to its role in energy metabolism, vitamin B1 also supports the proper functioning of which vital organ?

a) Kidneys
b) Liver
c) Brain and nervous system
d) Heart

(x) Pyridoxal phosphate (PLP) is the active form of vitamin B6 and serves as a cofactor for many enzymes. One such enzyme involved in amino acid metabolism is:

a) Pyruvate dehydrogenase
b) Phenylalanine hydroxylase
c) Glutamate decarboxylase
d) Tyrosine kinase

(xi) During chain elongation, what molecule is used to extend the fatty acid chain?

a) Acetyl-CoA
b) Malonyl-CoA
c) Citrate
d) Glycerol

(xii) What is a neural tube defect?

a) A type of heart condition
b) A birth defect affecting the brain and spinal cord
c) A genetic disorder
d) A type of skin condition

(xiii) What is the role of sodium-potassium pumps in maintaining cellular function.?

a) They regulate blood pressure.
b) They control muscle contraction.
c) They maintain the resting membrane potential of cells.
d) They produce insulin.

(xiv) What is the name of the protein that stores iron in the body?

a) Hemoglobin
b) Myoglobin
c) Ferritin
d) Collagen

(xv) Which enzyme catalyzes the conversion of orotate to uridine monophosphate (UMP) in the pyrimidine biosynthesis pathway?

a) Uridylate kinase
b) Orotate phosphoribosyltransferase
c) Cytidine deaminase
d) Adenylate kinase

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define oxidative phosphorylation. (3)

3. Express iron deficiency. (3)

4. Express the biosynthesis of TPP. (3)

5. Elaborate the first step of urea cycle. (3)

6. Illustrate the structure of Uracil. (3)

OR

Illustrate the structure of Thymine. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain the role of thiolase enzyme in oxidation of fatty acids. (5)

8. Explain the importance of transamination. (5)

9. Explain the regulatory enzymes of TCA cycle with the influencing factors. (5)

10. Express the role of vitamin C in synthesis of carnitine. (5)

11. Calculate the net energy production in Krebs cycle. (5)

12. Express the diagram of ATP synthase. (5)

OR

Express the function of calcium in muscle contraction. (5)

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