Biochemistry INI-25 (May) Reworked

Question: 1

Subject: Biochemistry

Topic: Cellular Respiration

Subtopic: Oxidative Phosphorylation & Inhibitors

Non-clinical question:

Death caused by Carbon monoxide and cyanide is because they affect:

Options:

A) Myoglobin
B) Cytochrome C oxidase
C) NADH Dehydrogenase
D) ATPase

Correct Answer: B) Cytochrome c oxidase

Question: 2

Subject: Biochemistry

Topic: Molecular Diagnostics

Subtopic: Genetic Testing Techniques

Non-clinical question:

A 35year old female with a strong family history of breast and ovarian cancer has come for genetic testing. What is the most appropriate genetic test to identify multiple mutations across different gene sites?

Options:

A) Sanger sequencing
B) Restriction fragment length polymorphism (RFLP)
C) Exome sequencing
D) Fluorescence in situ hybridization (FISH)

Correct Answer: C) Exome sequencing

Question: 3

Subject: Biochemistry
Topic: Lysosomal Storage Diseases
Subtopic: Sphingolipidoses

Clinical question:
A 4-year-old child presents with hepatosplenomegaly, developmental regression, and a cherry-red spot in the macula. Which enzyme deficiency is responsible for this condition?

Options:

A) Sphingomyelinase
B) Hexosaminidase A
C) Glucose 6 phosphate
D) Aryl sulphatase B

Correct Answer: A) Sphingomyelinase

Question 4

Subject: Biochemistry
Topic: Lipid Metabolism
Subtopic: Regulation of Fatty Acid Synthesis

Non-clinical question:
In a 90-kg man, follows a high carbohydrate meal diet plan, which metabolic pathway is predominantly active and contributes to weight gain?

1. Malonyl-CoA
2. Acetyl-CoA carboxylase
3. Mitochondrial carnitine transporter
4. Tricarboxylate transporter (citrate)

Options:

A) 1, 2 and 4
B) 1 and 2
C) 1 and 3
D) 1, 2, 3 and 4

Correct Answer: A) 1, 2 and 4

Question: 5

Subject: Genetics
Topic: Molecular Techniques
Subtopic: Blotting Techniques

Non-clinical question:
Match the following:

1 - Southern blotting	a - Proteins
2 - Northern blotting	b - Enzymes
3 - Western blotting	c - RNA
4 - Eastern blotting	d - DNA

Options:

A) 1-c, 2-d, 3-a, 4-b
B) 1-d, 2-c, 3-a, 4-b
C) 1-a, 2-b, 3-c, 4-d
D) 1-b, 2-c, 3-d, 4-a

Correct Answer: B) 1-d, 2-c, 3-a, 4-b

Question: 6

Subject: Genetics
Topic: Molecular Techniques
Subtopic: Polymerase Chain Reaction (PCR)

Non-clinical question:
If a polymerase chain reaction (PCR) amplification is run for 26 cycles, how many cycles would yield exactly half the number of DNA copies produced at 26 cycles?

Options:

A) 25
B) 12
C) 13
D) 27

Correct Answer: A) 25

Question: 7

Subject: Biochemistry
Topic: Hematology
Subtopic: Hemolytic Anemias

Clinical question:
In a patient with glucose-6-phosphate dehydrogenase (G6PD) deficiency, which pattern of laboratory findings is most likely regarding direct bilirubin, indirect bilirubin, and urobilinogen?

Options:
A) Normal – Increased – Increased
B) Increased – Normal – Absent
C) Normal – Normal – Normal
D) Decreased – Decreased – Increased

Correct Answer: A) Normal – Increased – Increased

Question: 8

Subject: Biochemistry
Topic: Cancer Metabolism
Subtopic: Warburg Effect

Non-clinical question:
Cancer cells are observed to utilize more glucose compared to normal cells. Which underlying mechanism best explains this phenomenon?

Options:
A) Lactic acid is produced despite the presence of oxygen
B) Enhanced conversion of glucose to pyruvate
C) Increased conversion of pyruvate to acetyl-CoA due to high NADH/NAD^+ ratio
D) Absence of oxygen

Correct Answer: A) Lactic acid is produced despite the presence of oxygen

Question 9

Subject: Biochemistry
Topic: Endocrinology
Subtopic: Insulin Action

Non-clinical question:
Which cell has decreased uptake of glucose in insulin resistance?

Options:
A) Kidney
B) Skeletal muscle
C) Brain
D) RBC

Correct Answer: B) Skeletal muscle

Question Number: 10

Subject: Biochemistry
Topic: Glycogen Storage Diseases
Subtopic: Type III GSD

Clinical question:
A patient has hepatosplenomegaly and hypoglycemia. After glucagon administration, blood glucose rises following a meal but does not improve after an overnight fast. Liver biopsy shows abnormally structured glycogen. Which enzyme deficiency is most likely responsible?

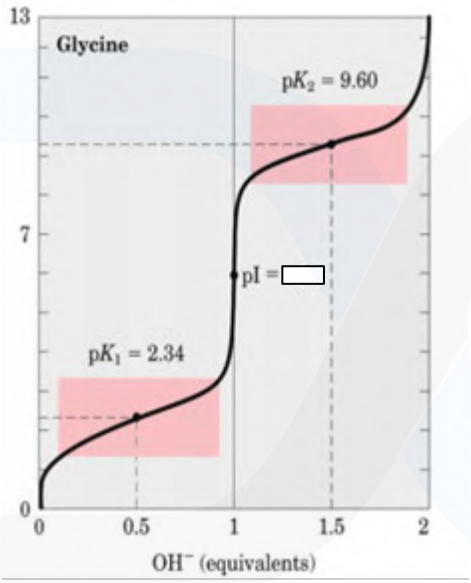
Options:
A) Muscle phosphorylase
B) Glycogen phosphorylase
C) Debranching enzyme
D) Glucose-6-phosphatase

Correct Answer: C) Debranching enzyme

Question 11

Subject: Biochemistry
Topic: Amino Acid Chemistry
Subtopic: Titration & pI

Non-clinical question:
Identify the pH at which molecules exist in a zwitter ion form in the given glycine titration curve.



Options:

A) 4.4
B) 6
C) 9
D) 2.2

Correct Answer: B) 6

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