

001/23

The West Bengal University of Health Sciences
MBBS 1st Professional Examination (New Regulation), Nov - Dec 2023

Subject: Biochemistry

Full Marks : 100

Paper : I

Time : 3 hours

Attempt all questions. The figures in the margin indicate full marks.

1. a) A 23-year-old male was brought to the emergency in semiconscious state. His mother gave history of diagnosis of malaria confirmed by identification of parasites in blood smear and subsequent treatment with Primaquine by his family physician. He was also passing dark coloured urine. On examination, he had fever, extreme pallor, severe jaundice, tachycardia and low BP. His sclera was yellow and his spleen was enlarged.

- What is your provisional diagnosis and why?
- Explain the biochemical basis of the findings in this patient.
- Outline the metabolic pathway that is defective in this case.
- Mention two important functions of this pathway.
- Add a note on glutathione and its role in the body.

2+4+4+2+3

- b) A 8 year old boy has serum LDL 230mg/dl, HDL 35 mg/dl, VLDL 25 mg/dl, Triglycerides 126 mg/dl. His brother and father had isolated increased LDL cholesterol.

- What is your provisional diagnosis?
- Discuss the Fredrickson classification of hyperlipoproteinemia. *→ 2005 update*
- Mention in a flow diagram, the cholesterol synthesis up to mevalonate.
- Name a lipid lowering agent with its mechanism of action.

2+5+5+3

2. a) Describe the mitochondrial electron transport chain with diagram. Name the inhibitors of different complex of electron transport chain. 6+4

- b) Write down the chemical name of carnitine. Describe the role of carnitine in Beta oxidation of fatty acids. How is it regulated? What are the symptoms of carnitine deficiency? 1+3+3+3

- c) A 50 year old man was admitted to hospital with complaint of persistent vomiting. On examination, he was found dehydrated and the respiration was shallow. He gave past H/O dyspepsia. The result of the laboratory investigations are as follows:

Parameter	Obtained Value
Blood pH	7.72
Plasma HCO ₃	45mmol/L
pCO ₂	60mmHg
Na ⁺	140 mEq/L
K ⁺	2.5 mEq/L
Urine	Acidic

*metabolic
AI ketosis with
partial respiratory
compensation*

- Interpret the report and give a probable diagnosis based on acid base disorder.
- Explain the compensatory phenomenon going on in this state.
- Explain briefly the cause of hypokalemia with excretion of acidic urine in this patient.

5+2+3

2x5

3. Write short notes on the following:

- Doctor as lifelong learner.
- Write down the significance of glycosaminoglycans in health.

P.T.O

*Phase 11
Revision
Red*

oligom...

4. Explain the following statements:

- Physical techniques are used to isolate subcellular organelles.
- The chemiosmotic theory explains the mechanism of oxidative phosphorylation.
- The oxygen dissociation curve for myoglobin and haemoglobin suit their respective physiologic roles.
- Aspartate transcarbamoylase is an allosteric enzyme.
- Homocysteine is related to atherosclerotic vascular disease and thrombosis.

Folate trap

10x1

5. Choose the correct option for each of the following:

i) When blood glucagon rises, which of the following hepatic enzyme activities fall:

- Protein kinase
- Glycogen synthase
- Glycogen phosphorylase
- Adenylyl cyclase

ii) An important Zn containing enzyme is:

- Carbonic anhydrase
- Isocitrate dehydrogenase
- Choline esterase
- Lipoprotein lipase

iii) Allosteric activator of CPS I is:

- Fructose -2, 6 biphosphate
- Citrate
- N- acetyl glutamate
- Malonyl CoA

iv) In hospital, used cotton should be discarded in:

- Yellow bag
- Red bag
- White container
- Blue container

v) Acute intermittent porphyria occurs due to deficiency of:

- Uroporphyrinogen I synthase
- Uroporphyrinogen III synthase
- Uroporphyrinogen decarboxylase
- Protoporphyrinogen oxidase

vi) The enzyme commonly used in the estimation of plasma glucose level from a blood sample is:

- Glucose oxidase
- Glucose-6-phosphatase
- Glucose-6-phosphate dehydrogenase
- Glucokinase

vii) All are true about thermogenin except:

- It is a type of adipose tissue.
- It produces heat.
- It is rich in mitochondria.
- It stops electron flow in ETC.

viii) Which phenomenon is not related to functional properties of hemoglobin?

- Bohr effect
- Haldane effect
- Pasteur effect
- Donnan effect

ix) Marker enzyme for peroxisome is:

- Glucokinase
- ATP Synthase
- 5 nucleotidase
- Uric acid oxidase

x) Which statement is false?

- CKD may cause decreased calcium absorption from intestine.
- CKD may cause anemia.
- CKD may be present in patients with normal GFR.
- Renal replacement therapy may be necessary in advanced CKD.