RAN-2006000101030002

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Ist MBBS (Biochemistry) Examination November - 2023

Biochemistry : Paper - II

Set - 2

Time: 3 Hours] **[Total Marks: 100**

સૂચના : / Instructions

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **Ist MBBS (Biochemistry)**

Name of the Subject :

☛ **Biochemistry : Paper - II - Set - 2**

Subject Code No.: **2006000101030002**

Seat No.:

Student's Signature

(2) All questions are compulsory.

(3) Each MCQ has only one correct answer.

(4) One mark for correct answer. No negative marking.

Section - A : MCQ **20 Marks**

1. Gout is characterized by increased plasma levels of
   a. Urea b. Uric acid
   c. Creatine d. Creatinine

2. Lesch-Nyhan syndrome, the sex linked recessive disorder is due to the lack of the enzyme :
   a. Hypoxanthine-guanine phosphoribosyl transferase
   b. Xanthine oxidase
   c. Adenine phosphoribosyl transferase
   d. Adenosine deaminase

3. Which of the following vitamins act as a strong reducing agent?
   a. Folic acid b. Tocopherol
   c. Ascorbic acid d. Pantothenic acid

4. The anti-egg white injury factor is:

   a. Avidin b. Choline

   c. Biotin d. Isoniazid

5. Immunoglobulin present in body secretion is:

   a. Ig M b. Ig D

   c. Ig E d. Ig A

6. The number of amino acids in antidiuretic hormone is

   a. 9 b. 18

   c. 27 d. 36

7. A non-functional plasma enzyme is

   a. Psudocholinesterase

   b. Lipoprotein lipase

   c. Proenzyme of blood coagulation

   d. Alanine Transaminase

8. In competitive enzyme inhibition :

   a. The structure of inhibitor generally resembles that of the substrate

   b. Inhibitor decreases apparent Km

   c. Km remains unaffected

   d. Inhibitor decreases Vmax without affecting Km

9. Niacin is synthesized in the body from :

   a. Tryptophan b. Tyrosine

   c. Glutamate d. Aspartate

10. Vitamin K serves as a coenzyme in reaction that result in the modified activity of several enzymes of blood coagulation cascade. Which of the following amino acid modifications requires the activity of vitamin K?

    a. Aspartate to β-carboxyaspartate

    b. Glutamate to y-carboxyglutamate

    c. Lysine to hydroxylysine

    d. Lysine to β-methyl lysine

11. Isoenzymes can be characterized by :

a. Proteolytic enzymes activated by hydrolysis
b. Enzymes with identical primary structure
c. Similar enzymes that catalyse different reaction
d. Chemically, immunologically and electrophoretically different forms of an enzyme

12. Pyrimidine Dimers are seen in :

a. Gout
b. Xeroderma pigmentosa
c. Lesch Nyhan Syndrome
d. Mutation by alkylating agents

13. The most of the ultraviolet absorption of proteins above 240 nm is due to their content of :

a. Tryptophan
b. Aspartate
c. Glutamate
d. Alanine

14. Sakaguchi's reaction is specific for

a. Tyrosine
b. Proline
c. Arginine
d. Cysteine

15. Magenta tongue is found in the deficiency of the vitamin :

a. Riboflavin
b. Thiamine
c. Nicotinic acid
d. Pyridoxine

16. In brain, the major metabolism for removal of ammonia is the formation of

a. Glutamate
b. Aspartate
c. Asparagine
d. Glutamine

17. The sparing action of methionine is :

a. Tyrosine
b. Cystine
c. Arginine
d. Tryptophan

18. Which of the following plasma protein prevents loss of hemoglobin in Urine?

a. Haptoglobin
b. Albumin
c. Transferrin
d. Hemopexin

19. Following are the applications of Polymerase Chain Reaction (PCR), EXCEPT :
    a. Prenatal diagnosis and carrier detection
    b. Splicing of DNA
    c. Forensic analysis of DNA samples
    d. Detection of Viral and bacterial infections

20. The two nitrogens of the pyrimidine ring are contributed by
    a. Ammonia and glycine
    b. Aspartate and carbamoyl phosphate
    c. Glutamine and ammonia
    d. Aspartate and ammonia

Section - B **40 Marks**

Instructions for section B and C :

(1) Use blue/black ball point pen only.
(2) The numbers to the right indicates full marks.
(3) Draw diagrams wherever necessary

Q. 2. Long Answer Questions. (ANY TWO) **(2 x 10 = 20)**

A. Describe the process of replication of DNA in a prokaryotic cell. What are different types of mutations? Write a note on different DNA repair mechanisms. **(5 + 3 + 2)**

B. Describe the Catabolism of heme. Add a note on hyperbilirubinemias. **(5 + 5)**

C. Describe primary and secondary structure of protein with example. Add a note on functions of plasma proteins. **(6 + 4)**

Q. 3. Write Brief Answer / Justifications / Biochemical basis. (ANY TEN) **(10 × 2 = 20).**

a) Adenosine deaminase deficiency cause severe combined immuno-deficiency disorder.

b) Mention 4 biochemical functions of Albumin

c) Vitamin D Acts as a hormone. Justify.

d) Biologically important peptides.

e) Write down two clinical applications of ELISA

f) Blue fluorescent light is used in the treatment of neonatal jaundice.

g) Blood urea levels depletes in liver disease. Justify.

h) Post-transcriptional modifications

i) Telomerase inhibitors can be use in treatment of malignancy,

j) Functions of vitamin C (any four).

k) Zwitter ions have least buffering & amp; solubility capacity.

Section - C **40 Marks**

Q. 4. Short answer questions. (ANY FOUR) **(4 × 5 = 20)**

a) Diagnostic applications of enzymes.

b) Gout.

c) Tumor markers.

d) Vitamin A : Functions and Deficiency disorders.

e) Recombinant DNA technique.

Q. 5. Clinical Cases. (ALL COMPULSORY) **(10 × 2 = 20)**

Case - 1 :

A 55-year-old man attended OPD with complaints of pain in lower limbs, generalized fatigue for last 4 months. He was vegetarian by diet. His laboratory investigations showed low Vitamin B_{12} levels, elevated Homocysteine level and normal folate level. Peripheral smear shows macrocytic anemia. Physician prescribed the vitamin B_{12} injection and symptoms were improved.

1. Enumerate causes of vitamin B_{12} deficiency. What is a daily requirement of vitamin B_{12} for adult?

2. What is folate trap?

3. Why increased homocysteine level leads to cardiovascular problem?

4. Mentioned the Coenzyme form of vitamin B_{12}. Write reactions catalyzed by each of them.

5. Why vitamin B_{12} deficiency leads to macrocytic anemia and neurological symptoms?

Case - 2 :

52 years old patient was admitted to the casualty department of hospital in a serious condition. He had become increasingly depressed after the death of his wife. His daughter found him in an unconscious state when she had come to see him in the morning. One and a half empty bottles of alcohol were found in the room. When the alcohol was examined for its contents, it was found to be containing high amount of methanol. Doctors on duty diagnosed that it was a case of methanol intoxication and decided to start treatment with ethanol.

1. Enumerate various classes of enzymes. Which class of enzymes is required to metabolize alcohols?
2. Why methanol is toxic?
3. Explain ethanol is used in the treatment of methanol poisoning.
4. Enumerate salient differences between competitive and non competitive inhibition.
5. Why in competitive inhibition K_m is increased but V_{max} is not affected?

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