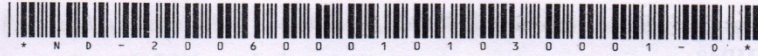


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Date of issue : Centre :

Sup. Sign. : Seat No. :

ND-2006000101030001-O Seat No. _____

First Year M. B. B. S. Examination

December - 2021

Biochemistry : Paper - 1

(New CBME Pattern)

Time : Hours]

[Total Marks : 20

Instruction :

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

Name of the Examination :
First Year M. B. B. S.

Name of the Subject :
Biochemistry : Paper - 1

Section No. (1, 2,.....): Nil

Subject Code No. :
2 0 0 6 0 0 0 1 0 1 0 3 0 0 0 1

Seat No. :

Student's Signature

Section A: MCQ

(20 marks)

Instructions:

1. All questions are compulsory
2. Each MCQ has only one correct answer
3. One mark for correct answer. No negative marking

- 1 Which of the following correctly describes the composition of the CSF
 - a. It has the same osmolarity as blood
 - b. It has the same pH as blood
 - c. It is more alkaline than blood
 - d. It contains higher glucose concentration than blood

ND-2006000101030001-O]

1

[Contd...

- 2 All of the following are functions of kidney, *Except*:
 - a. Detoxification of Alcohol
 - b. Formation of 1, 25 DHCC
 - c. Excretion of hydrogen ions
 - d. Stimulation of Erythropoiesis
- 3 Parathyroid Hormone (PTH) is involved in:
 - a. Activation of Vitamin D
 - b. Increases the intestinal absorption of calcium
 - c. Decreases the intestinal absorption of calcium
 - d. Increases the synthesis of thyroid hormones
- 4 People with diabetes mellitus are prone to develop cataracts because their elevated blood glucose concentration:
 - a. Inhibit gluconeogenesis
 - b. Increase glycosylate hemoglobin
 - c. Increase glycogen synthesis within the lens
 - d. Allow aldose reductase to reduce glucose to sorbitol
- 5 Facilitated diffusion transport molecules:
 - a. Against concentration gradient
 - b. With the concentration gradient
 - c. Always use energy
 - d. Does not require carrier protein
- 6 Lactic acidosis is seen in the following cases, EXCEPT:
 - a. Oxidative phosphorylation disorders (Mitochondrial)
 - b. Defective metabolism of pyruvate
 - c. Excessive ingestion of alcohol
 - d. Deficiency of glucose-6-phosphate dehydrogenase
- 7 In human, vitamin C is not synthesized, because:
 - a. Absence of Xylitol reductase
 - b. Absence of L-gulonolactone oxidase
 - c. Absence of Glucose 6-phosphate dehydrogenase
 - d. Absence of Xylulose dehydrogenase

- 8 Fatty acid synthesis differs from beta oxidation in all, EXCEPT:
- Uses NADPH as reducing power
 - Requires coenzyme A
 - Catalyzed by multienzyme complex
 - Activated by insulin
- 9 The plasma sample of 35 years old man after overnight refrigeration showed a creamy layer on top and opalescence below. The condition which is excluded is:
- Diabetes mellitus
 - Alcoholism
 - Hypothyroidism
 - Familial hypercholesterolemia
- 10 All of the following fatty acid synthesized by humans EXCEPT
- Palmitoleate
 - Oleate
 - Arachidonate
 - Linoleate
- 11 Which of the following is rate limiting enzyme in HMP shunt?
- Transketolase
 - Phosphogluconate dehydrogenase
 - Ribulose 5 phosphate
 - Glucose 6 phosphate dehydrogenase
- 12 Which of the following stops respiratory chain?
- Unavailability of O₂
 - Unavailability of ADP
 - Unavailability of NADH
 - All of the above
- 13 Elevated levels of one of the following lipid parameter is associated with pancreatitis:
- Total cholesterol
 - LDL-cholesterol
 - HDL-cholesterol
 - Triacylglycerol

- 14 All the following statements regarding hexokinase and glucokinase are true, EXCEPT
- Hexokinase is Less specific than glucokinase
 - Glucokinase is induced by glucagon
 - Glucokinase is more in the liver
 - They differ in their K_m for the substrate
- 15 Liver can not utilized ketone bodies due to the lack of enzyme
- Thiolase
 - Thiophorase
 - HMG CoA lyase
 - Beta hydroxy butyrate dehydrogenase
- 16 Wilson disease occurs due to defect in which transport protein?
- ATP-7A
 - ATP-7B
 - ABC-A1
 - ABC-C2
- 17 Earliest indicator of iron deficiency anemia is
- S. Ferritin
 - S. TIBC
 - S. Iron
 - S. Transferrin
- 18 Which glucose transporter is under control of insulin?
- | | |
|----------|----------|
| a. GLUT2 | b. GLUT3 |
| c. GLUT4 | d. GLUT5 |
- 19 LDL receptor defect results in the following type of hyperlipidemia
- | | |
|-------------|-------------|
| a. Type I | b. Type IIA |
| c. Type IIB | d. Type IV |
- 20 Cancer cell derive nutrition from:
- | | |
|-------------------|------------------------------|
| a. Glycolysis | b. Oxidative phosphorylation |
| c. Glycogenolysis | d. From a fast food |



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ND-2006000101030001 Seat No. _____

First Year M. B. B. S. Examination

December - 2021

Biochemistry : Paper - I

(New CBME Pattern)

Time : Hours]

[Total Marks : 80

Instruction :

નીચે દર્શાવેલ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી. Fillup strictly the details of signs on your answer book. Name of the Examination : <input type="text" value="First Year M. B. B. S."/> Name of the Subject : <input type="text" value="Biochemistry : Paper - I"/> Subject Code No. : <input type="text" value="2 0 0 6 0 0 0 1 0 1 0 3 0 0 0 1"/> Section No. (1, 2,.....): <input type="text" value="Nil"/>	Seat No. : <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Student's Signature
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Section B:

40 Marks

Instructions for section B & C:

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

2: Long Answer Questions (ANY TWO) (2 x 10 = 20)

- A. Describe the pathway of glycogenolysis along with its regulation.
Add a note on glycogen storage disorders. (6+4=10)
- B. Enumerate ketone bodies. Describe formation and fate of ketone bodies.
Add a note on other fates of acetyl coA (1+6+3=10).
- C. What are blood buffers? Describe in detail role of plasma buffers & renal mechanism in maintenance of acid-base balance. Add a short note on Metabolic Acidosis. (1+3+4+2)

3: Write Brief Answer / Justifications/ Biochemical basis (10 x 2 = 20) (ANY TEN)

- a) Iron is double edged sword, justify.

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1

[Contd...

- b) HDL-Cholesterol has preventive role in atherosclerosis, justify.
- c) Why Fluoride is used as blood preservative for glucose estimation?
- d) Importance of glycemic index.
- e) Muscle glycogen doesn't contribute in maintaining plasma glucose level.
- f) Rancidity of fatty acid increase risk of atherosclerosis.
- g) Diarrhea causes normal anion gap acidosis.
- h) Factors affecting fluidity of cell membrane.
- i) Persons with Sickle cell trait are resistant to Malaria caused by Plasmodium falciparum
- j) Role of carnitine in beta oxidation.
- k) Oral rehydration solution contains glucose and sodium.

Section C:

40 Marks

4: Short answer questions (ANY FOUR) (4 x 5 = 20)

- a) Prostaglandins: synthesis, examples, functions, clinical significance.
- b) Glycosaminoglycans.
- c) Metabolic changes and complications of Diabetes mellitus.
- d) Outline doctor patient communication. Add a short answer on components of communication in medical encounters.
- e) Electron transport chain with its inhibitors.

5: Clinical Cases (ALL COMPULSORY) (2 x 10 = 20)

Case 1:

45 year old female with Body Mass Index (BMI) of 35 kg/m^2 and diagnosis of Diabetes mellitus (DM) for 7 years came to Medicine OPD for increased frequency of micturation, tingling and numbness in bilateral palm and soles, diarrhea and history of not taking any treatment for DM for last 3 months.

Biochemical laboratory test results were as below:

random plasma glucose = 332 mg/dl, Serum Na^+ = 127 mmol/L, K^+ was 2.88 mmol/L. Ketone bodies were found elevated.

- 1) Explain BMI. What is its relation with diabetes mellitus?
- 2) What is difference among random, fasting and post-prandial plasma glucose (give the normal range).

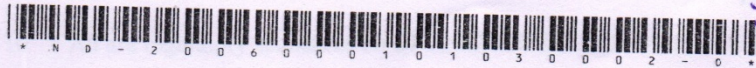
- 3) What is biochemical basis of elevated serum ketone bodies in diabetes mellitus?
- 4) What is biochemical explanation of tingling and numbness in this patient of diabetes mellitus?
- 5) What is glycated hemoglobin? Give the normal range and its clinical significance.

CASE-2:

A 3 year old female child was reported to pediatric OPD with complaints of growth retardation, loss of appetite, discoloration of skin & hair. Child also had frequent respiratory infections & diarrhea. Child was exclusively on breast feed up to 2 years of age and was now receiving diluted buffalo milk and rice. On examination child was edematous with hepatomegaly & distended abdomen, skin was rough and hairs was flaky. Biochemical investigations are as follows:

Investigations	Results	Reference Range
Hemoglobin	9.5 gm/dl	13 to 15 gm/dl
S. Total Protein	5.7 gm/dl	6.4 to 8.2 gm/dl
S. Albumin	2.0 gm/dl	3.4 to 5.0 gm/dl
S. Cortisol	0.4 µg/dl	0.5 to 1.5 µg/dl

- 1) Differentiate Kwashiorkor with Marasmus.
- 2) Give the reference range of total proteins, albumin and AG ratio in serum.
- 3) What is the biochemical basis for edema & hepatomegaly in this case?
- 4) Write the causes & treatment for such case.
- 5) Functions of albumin (any four)?



Date of issue : Centre :
Sup. Sign. : Seat No. :

ND-2006000101030002-O Seat No. _____

First Year M. B. B. S. Examination

December - 2021

Biochemistry : Paper - II

(New CBME Pattern)

Time : Hours]

[Total Marks : 80

Instruction :

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

Name of the Examination :
First Year M. B. B. S.

Name of the Subject :
Biochemistry : Paper - II

Subject Code No. : 2 0 0 6 0 0 0 1 0 1 0 3 0 0 0 2

Section No. (1, 2,.....): Nil

Seat No. :

Student's Signature

Section A: MCQ

(20 marks)

Instructions:

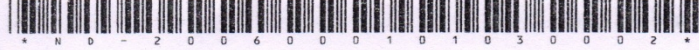
- All questions are compulsory
 - Each MCQ has only one correct answer
 - One mark for correct answer. No negative marking
- 1 Michaelis constant (K_m) of an enzyme is
- Dependent upon the enzyme concentration
 - Numerically equal to $\frac{1}{2} V_{max}$
 - Independent of pH
 - Numerically equal to substrate concentration at $\frac{1}{2} V_{max}$

- 2 Creatine kinase level in serum is increased in:
- Myocardial infarction
 - Infective hepatitis
 - Prostate cancer
 - Intravascular hemolysis
- 3 Which enzyme is used for preparing recombinant DNA molecules?
- Restriction endonuclease
 - DNA Polymerase
 - RNA Polymerase
 - Topoisomerase
- 4 Southern blotting analysis is used for all, except:
- Detecting the presence of a mutant gene
 - Studying a microarray
 - Visualizing DNA profile
 - Detecting Restriction fragment length polymorphism
- 5 Deficiency of thyroxine results in:
- | | |
|-------------------|-----------------------|
| a. Graves disease | b. Cushing's syndrome |
| c. Myxedema | d. Thyrotoxicosis |
- 6 Heme biosynthesis does not occur in
- | | |
|---------------|------------------------------|
| a. Osteocytes | b. Liver |
| c. RBC | d. Erythroid cells of marrow |
- 7 Which vitamin is required for carboxylation of clotting factors
- | | |
|--------------|--------------|
| a. Vitamin A | b. Vitamin D |
| c. Vitamin E | d. Vitamin K |
- 8 Mitochondrial DNA is
- | | |
|--------------------|--------------------|
| a. Closed circular | b. Nicked circular |
| c. Linear | d. Open circular |
- 9 Northern blot is for
- | | |
|------------|----------------------------|
| a. DNA | b. RNA |
| c. Protein | d. DNA protein interaction |

- 10 All are regulatory sequences on DNA, EXCEPT:
- a. Attenuator sequences
 - b. Enhancer sequences
 - c. Consensus sequences
 - d. Promoter sequences
- 11 Tumor suppressor genes are sometimes called:
- a. Antioncogenes
 - b. Proto Oncogenes
 - c. Oncogenes
 - d. Proximate Carcinogens
- 12 Conversion of allopurinol to alloxanthine is an example of:
- a. Competitive inhibition
 - b. Uncompetitive inhibition
 - c. Non-competitive inhibition
 - d. Suicide Inhibition
- 13 Radioisotopes used for treatment of thyroid cancer is
- a. I^{131}
 - b. Au^{198}
 - c. Cs^{139}
 - d. Ta^{182}
- 14 Chaperon proteins play a role in
- a. Protein folding
 - b. Protein misfolding
 - c. Denaturation
 - d. All the above
- 15 During denaturation, all the levels of a protein structure are disrupted, Except:
- a. Primary Structure
 - b. Secondary Structure
 - c. Tertiary Structure
 - d. Quaternary Structure
- 16 Catabolite gene activator protein along with cyclic AMP (CAP - cAMP) is associated with the function of
- a. Lac operon
 - b. Tryptophan operon
 - c. Both of the above
 - d. None of the above
- 17 Corona virus is positive stranded RNA virus having lipid bilayer with M spike protein in it. Which of the following nitrogen base is absent in genome of this virus?
- a. Guanine
 - b. Cytosine
 - c. Thymine
 - d. Adenine

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- 18 The receptor of the following hormone has intrinsic tyrosine kinase activity
- a. Insulin
 - b. ADH
 - c. Steroids
 - d. Glucagon
- 19 Positive nitrogen balance is seen in
- a. Starvation
 - b. Wasting diseases
 - c. Growing age
 - d. Intestinal malabsorption
- 20 Transmethylation of guanidoacetate gives
- a. Creatine
 - b. Creatinine
 - c. Choline
 - d. n-methyl nicotinamide
-



ND-2006000101030002 Seat No. _____

First Year M. B. B. S. Examination

December - 2021

Biochemistry : Paper - II

(New CBME Pattern)

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Time : Hours] _____

[Total Marks : 80

Instructions : (1)

નીચે દર્શાવેલ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી. Fillup strictly the details of signs on your answer book.	Seat No.:
Name of the Examination :	<input type="text"/>
First Year M. B. B. S.	<input type="text"/>
Name of the Subject :	<input type="text"/>
Biochemistry : Paper - II	<input type="text"/>
Subject Code No. :	Section No. (1, 2,.....): Nil
2 0 0 6 0 0 0 1 0 1 0 3 0 0 0 2	<input type="text"/>
	Student's Signature

- Use blue/black ball point pen only.
- The numbers to the right indicates full marks.
- Draw diagrams wherever necessary

Section B:

(40 Marks)

2: Long Answer Questions (ANY TWO) (2 x 10 = 20)

- Describe mutations. Explain various types of DNA repair processes with suitable diagram (4+6=10).
- How phenylalanine is converted to tyrosine? Describe biologically important substances synthesized from tyrosine. Describe phenylketonuria in detail (2+5+3=10)
- Describe coenzymes and isoenzymes. Write diagnostic and therapeutic applications of enzymes (2+2+4+2=10).

3: Write Brief Answer / Justifications / Biochemical basis (ANY TEN) (10 x 2 = 20).

- Restriction endonuclease.
- Nutritional classification of amino acids.
- Vitamin D is a pro-hormone, explain.
- Telomerase is essential for dividing cells.
- IUB classification of enzymes with one example each.
- Lead poisoning causes anemia.

ND-2006000101030002]

1

[Contd...

- g) Ammonia is toxic to brain.
- h) Phenylalanine has sparing action on tyrosine
- i) Glycine is a neurotransmitter
- j) Inhibitors of protein synthesis and their action.
- k) Brown adipose tissue keeps body warm.

Section C:

(40 Marks)

4: Short answer questions (ANY FOUR)

(4 x 5 = 20)

- a) Describe the polymerase chain reaction with its applications.
- b) Describe salvage pathway of purine nucleotide synthesis with associated disorders.
- c) What is the clinical significance of 2, 3 -BPG? Add a note on effect of 2, 3-BPG on oxygen dissociation curve.
- d) Metabolism and biochemical functions of vitamin D.
- e) Biologically important peptides.

5: Clinical Cases (ALL COMPULSORY)

(2 x 10 = 20)

Case 1:

A newborn baby was brought with yellowish discoloration of skin and conjunctiva 5 days after birth. Serum unconjugated bilirubin was high. Treatment with phototherapy and oral phenobarbitone was started.

- a) What is the diagnosis and cause of the above condition?
- b) What is basis of phototherapy in treatment of this disorder?
- c) What is basis of phenobarbitone in treatment of this disorder?
- d) What are serious consequences, if treatment is delayed in this patient?
- e) Write Normal range of serum total, conjugated and unconjugated bilirubin?

Case 2:

43-year-old male working in a shipping company visited Dental OPD with complain of bleeding gums and hemorrhagic patches on the skin. He was taking frozen food throughout his sailing time. The dentist diagnosed him as a case of scurvy.

- a) Write any four sources of vitamin C.
- b) Name the enzymes requires vitamin C as co-factor.
- c) Vitamin C deficiency may be associated with iron deficiency, explain.
- d) Human cannot synthesis vitamin C, justify.
- e) RDA of vitamin-C.