

QUESTION ONE:

(4x1.5= 6 marks, 20 min)

A- Complete the following table with the biochemical/physiological function for each of the following:

Compound	Biochemical function
1- Apoproteins	
2- Prostaglandins	
3- Glutathione	
4- PLA2	

B- Write the detailed equations with chemical structures for each of the following: (4×1.5=6 Marks, 25 min)

1- Biosynthesis of Serotonin

2- Biosynthesis of norepinephrine from tyrosine

3- Biosynthesis of δ -amino levulinic acid

4- Biosynthesis of phosphoribosyl pyrophosphate

QUESTION TWO: (10x1=10 marks, 15 min)

Mention the scientific term expressing each of the following:

No.	Definition	Scientific term
1	It is a way for a cell to change its surface features quickly and is involved in cell- cell recognition and adhesion	
2	Coenzymes that are tightly bound by covalent or non-covalent forces and are not dissociated from the enzyme	
3	It is an enzyme in sperm that hydrolyzes the outer glycosaminoglycan coat around an ovum	
4	The enzyme inhibitor that can bind only to ES complex	
5	It is benzoquinone linked to 10 isoprene units in cell membrane and can shuttle electrons in ETC	
6	It is a part of complex V in ETC , it projects into the matrix and contains the phosphorylation mechanism	
7	It is a disease resulting from a genetic inability to add the GlcNAc-GlcA disaccharide to the growing heparin sulfate chain leads to bone abnormality	
8	It is the primer molecule for glycogen synthesis	

9	Certain proteins such as proteases are synthesized and secreted as inactive precursor proteins	
10	Enzymes catalyze formation of bonds between carbon and O, S, N coupled to hydrolysis of ATP	

QUESTION THREE: (10X1=10 marks, 20 min)

Write T for true or F for false for each of the following statements and correct the false ones regarding the underlined words:

1. Homotropic effectors function as a positive or negative effector on an allosteric enzyme ()
.....
2. Hydroxyproline facilitates the formation of the helical conformation of each α -chain of collagen ()
.....
3. Methotrexate is a non- competitive inhibitor of folate reductase enzyme, therefore it is used as an anticancer drug ()
.....
4. Regarding oxidative phosphorylation, the higher the PMF the higher the rate of electron transport ()
.....
5. Amylase, lipase and alkaline phosphatase are examples of plasma functional enzymes ()
.....
6. Aspartate – malate shuttle is the dominant pathway for aerobic oxidation of cytosolic NADH in heart and muscle ()
.....
7. Template hypothesis of enzyme substrate interaction is more flexible than induced fit model ()
.....

8. Chondroitin sulfate contributes to the elasticity of skin and it is also present in blood vessels and heart valves ()
.....
9. Proteoglycans are plasma membrane components and play a role in signal transduction in cells ()
.....
10. The enzyme specificity is determined by turnover number ()
.....
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QUESTION FOUR:

(36×0.5=18 marks, 40 min)

Choose one correct answer and shade in the answer sheet:

1- An aromatic amino acid is:

- a) Lysine
- b) Tyrosine
- c) Taurine
- d) Arginine

2- Which among the following is a nutritionally essential amino acid for man?

- a) Alanine
- b) Proline
- c) Glycine
- d) Valine

3- Which of the following is a pentapeptide?

- a) Anserine
- b) Oxytocin
- c) Glutathione
- d) Enkephalin

4- All the following are sulfur containing amino acids found in proteins EXCEPT:

- a) Cysteine
- b) Methionine
- c) Cystine
- d) Threonine

5- Alpha helix conformation of proteins is referred to:

- a) Primary structure
- b) Secondary structure
- c) Tertiary structure
- d) Quaternary structure

6- Which of the following are examples of fibrous proteins?

- a. Insulin and hemoglobin
- b. Collagen and hemoglobin
- c. Hemoglobin and keratin
- d. Collagen and elastin

7- The modified amino acid γ -carboxyglutamate is found in:

- a) Phospholipids
- b) Clotting factors
- c) Heparin
- d) Hyaluronic acid

8- The major hemoglobin in adults is named:

- a) Hb-A₂
- b) Hb-S
- c) Hb-A₁
- d) Hb-A1c

9- Phenylalanine is the precursor of:

- a) Serotonin
- b) Tyrosine
- c) Histamine
- d) Thyroxine

10- The first step in pyrimidine biosynthesis is catalyzed by:

- a) HGPRTase
- b) DHF-reductase
- c) Glutamine phosphoribosyl amidotransferase
- d) Carbamoyl phosphate synthetase II

11- Lesch-Nyhan Syndrome is due to deficiency of:

- a) Xanthine oxidase
- b) Hypoxanthine-guanine phosphoribosyl-transferase
- c) DHFR
- d) Thymidylate synthase

12- Triglycerides are:

- a) Heavier than water
- b) Major constituents of membranes
- c) Non-polar
- d) Hydrophilic

13- The essential fatty acid involved in eicosanoids biosynthesis is:

- a) Linolenic acid
- b) Oleic acid
- c. Linoleic acid
- d. Palmitic acid

14- RDS of a premature infant is due to deficiency of:

- a) Chylomicrons
- b) Dipalmitoyl-lecithin
- c) HDL-C
- d) Adenine nucleotides

15- Which of the following is omega-3 polyunsaturated fatty acid?

- a) Linoleic acid
- b) Oleic acid
- c) Linolenic acid
- d) Arachidonic acid

- 16- The highest cholesterol ester content is found in:**
a) Chylomicrons b) VLDL c) LDL d) HDL
- 17- The major sterol in human tissues is:**
a) LDL c) Cholesterol
b) HDL d) Vitamin D
- 18- The precursor for the synthesis of prostacyclins & thromboxane is:**
a) PGH₂ c. Vitamin D
b) PAF d. Diacylglycerol
- 19- Cholecystokinin stimulates the release of:**
a) Insulin b) Bicarbonate b) Bile acids b) HCl
- 20- Methemoglobin can be reduced to hemoglobin by:**
a) Removal of hydrogen c) Vitamin C
b) Glutathione d) Creatinine
- 21- The porphyrin present in hemoglobin is:**
a) Uroporphyrin c) Protoporphyrin- I
b) Protoporphyrin-IX d) Protoporphyrin- II
- 22- In Hemoglobin C disease, glutamate is substituted in β -chain by:**
a) Lysine c) Glutamine
b) Valine d) Alanine
- 23- O₂-Hb dissociation curve is shifted to left when:**
a) Affinity of Hb for O₂ decreased
b) Affinity of Hb for O₂ increased
c) Hb binds irreversibly to O₂
d) Affinity of Hb for CO increased
- 24- Nascent chylomicron receives apolipoproteins C II and E from:**
a) VLDL remnant b) VLDL c) LDL d) HDL
- 25- Alanine can be synthesized from:**
a) Glutamate and α -ketoglutarate
b) Pyruvate and glutamate
c) Pyruvate and α -ketoglutarate
d) Aspartate and α -ketoglutarate
- 26- The protein present in hair is:**
a) Keratin b) Elastin c) Myosin d) Tropocollagen

27- A sigmoidal plot of a substrate concentration versus reaction velocity may indicate:

- a) Michaelis – Menten kinetics
- b) Co-operative binding
- c) Competitive inhibition
- d) Non- competitive inhibition

28- The sugar absorbed by facilitated diffusion and requiring Na independent transporter is:

- a) Glucose
- b) Fructose
- c) Galactose
- d) Ribose

29- Combination of apoenzyme and coenzyme produces:

- a) Prosthetic group
- b) Holoenzyme
- c) Enzyme substrate complex
- d) Enzyme product complex

30- An uncoupler of oxidative phosphorylation such as dinitrophenol:

- a) Inhibits electron transport and ATP synthesis
- b) Inhibits electron transport without impairment of ATP synthesis
- c) Allow electron transport to proceed without ATP synthesis
- d) Specially inhibits cytochrome b

31- Synovial fluids contain:

- a) Heparin
- b) Chondroitin sulphate
- c) Keratin sulphate
- d) Hyaluronic acid

32- The concentration of the following enzymes depend upon the presence of inducer except:

- a) Allosteric enzyme
- b) Constitutive enzyme
- c) Co-operative enzyme
- d) Isoenzyme

33- is the C4 The epimer of glucose:

- a) Galactose
- b) Fructose
- c) Arabinose
- d) Xylose

34- In competitive enzyme activity inhibition:

- a) Apparent Km is decreased
- b) Vmax is increased
- c) Vmax is decreased
- d) Apparent Km is increased

35- A carbohydrate, known commonly as invert sugar is:

- a) Fructose
- b) Sucrose
- c) Glucose
- d) Lactose

36- The glycosaminoglycan which does not contain uronic acid is:

- a) Dermatan sulphate
 - b) Chondroitin sulphate
 - c) Keratan sulphate
 - d) Heparan sulphate
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Good Luck