



**Answer all the questions**

**Q1. Choose the correct answer from the following:**

**(80 marks)**

- 1- ..... is the milk sugar.  
(A) Galactose (B) Glucose (C) Fructose (D) Lactose
- 2- Sucrose consists of:  
(A) Glucose + glucose (B) Glucose + fructose (C) Glucose + galactose (D) Glucose + mannose
- 3- The conversion of alanine to glucose is termed:  
(A) Glycolysis (B) Oxidative decarboxylation (C) Specific dynamic action (D) Gluconeogenesis
- 4- Conversion of glucose to glucose-6-phosphate in the liver is catalyzed by:  
(A) Hexokinase only (B) Glucokinase only (C) Hexokinase and glucokinase  
(D) Glucose-6-phosphate dehydrogenase
- 5- Cephalin consists of:  
(A) Glycerol, fatty acids, phosphoric acid and choline  
(B) Glycerol, fatty acids, phosphoric acid and ethanolamine  
(C) Glycerol, fatty acids, phosphoric acid and inositol  
(D) Glycerol, fatty acids, phosphoric acid and serine
- 6- Triglycerides are transported from liver to extrahepatic tissues by:  
(A) Chylomicrons (B) VLDL (C) HDL (D) LDL
- 7-  $\beta$ -oxidation takes place in:  
(A) Mitochondria (B) cytoplasm (C) Chloroplasts (D) nucleus
- 8- In mammals, the major fat in adipose tissues is:  
(A) Phospholipid (B) Cholesterol (C) Sphingolipids (D) Triacylglycerol
- 9- Gout is a metabolic disorder of catabolism of:  
(A) Pyrimidine (B) Purine (C) Alanine (D) Phenylalanine
- 10- Cyclic AMP can be formed from:  
(A) AMP (B) ADP (C) ATP (D) GTP
- 11- The sugar moiety present in RNA is:  
(A) Ribulose (B) Arabinose (C) Ribose (D) Deoxyribose
- 12- Phosphorylation of adenosine to AMP is catalyzed by:  
(A) Adenosine kinase (B) Deoxycytidine kinase (C) Adenylosuccinase  
(D) Adenylosuccinate synthetase
- 13- Insulin secreted from.....cells of Langerhans of pancreas.  
(A) Beta (B) Alpha (C) Gamma (D) Delta
- 14- All the followings are the intracellular second messenger for hormone action, except:  
(A) c-AMP (B) c-GMP (C) Phosphatidylinositol (D) NADPH
- 15- Hormone that plays a central role in metabolic processes is:  
(A)  $T_3$  (B) Insulin (C) Glucagon (D) FSH
- 16- Respiratory chain is occur in:  
(A) Mitochondria (B) Cytoplasm (C) Nucleus (D) Endoplasmic reticulum



- 17- In oxidative phosphorylation, the oxidation of one molecule of NADH produce:  
(A) 2ATP molecules (B) 3ATP molecules (C) 4ATP molecules (D) 1ATP
- 18- Acetyl CoA is not used for the synthesis of:  
(A) Fatty acid (B) Cholesterol (C) Pyruvic acid (D) Citric acid
- 19- The enzyme that synthesizes ATP in oxidative phosphorylation is:  
(A) Hexokinase (B) NADH dehydrogenase (C) Cytochrome oxidase (D)  $F_0F_1$ ATPase
- 20 - The digestive enzymes belongs to:  
(A)Hydrolases (B)Transferases (C)Ligases (D)Isomerases
- 21- Which of the following non-proteins can act as an enzyme?  
(A)RNA (B)DNA (C)Phospholipid (D)Nucleoside
- 22- Enzymes may be used as the following, except:  
(A) Therapeutic agents (B) Nutrients (C) Diagnostic agents (D) Laboratory reagents
- 23- Isoenzymes can be characterized as:  
(A) Non - protein part of enzyme  
(B)Enzymes with same quaternary structure  
(C) Similar enzymes that catalyse different reactions  
(D) Multiple forms of given enzyme that catalyse same type of reactions
- 24 - Antihemorrhagic vitamin is:  
(A)Vitamin A (B)Vitamin E (C)Vitamin K (D)Vitamin D
- 25 - Which of the following is both a vitamin and a hormone?  
(A)Ascorbic acid (B)Calciferol (C)Thiamine (D)Folic acid
- 26 - Functionally active form of vitamin D is:  
(A) 1,25-dihydroxy cholecalciferol (B) 24,25 -dihydroxy cholecalciferol  
(C) 1,24 -dihydroxy cholecalciferol (D) 23,24 -dihydroxy cholecalciferol
- 27 - Which of the following is water soluble vitamin?  
(A)Vitamin E (B)Vitamin A (C)Vitamin C (D) Vitamin D
- 28 - All of the following vitamins have antioxidant activity, except:  
(A) $\beta$ -carotene (B)Ascorbic acid (C)Cholecalciferol (D)Vitamin E
- 29 - Pyridoxal phosphate is a coenzyme for the reactions, except:  
(A)Transamination (B)Deamination (C)Oxidation -reduction (D)Methylation
- 30 - Biotin is involved in:  
(A)Oxidation-reduction (B)Carboxylation (C)Dehydration (D)Deamination
- 31 - Plasma albumin performs the following functions except:  
(A)Maintenance of osmotic pressure (B)Transport (C) Solubilisation of glucose  
(D)Buffer
- 32 - The element that prevent the development of dental carries is:  
(A)Fluorine (B) Phosphorus (C) Selenium (D)Calcium
- 33 - Iodine is required for the formation of:  
(A)Vitamin B12 (B)Insulin (C) Thyroxine (D)Calcitonin
- 34 - Transport form of iron is:  
(A)Transferrin (B)Ferritin (C)Hemosiderin (D)Ceruloplasmin
- 35 - Which of the following trace elements has role in electron transport chain?  
(A) Iron (B)Iodine (C)Zinc (D)Fluoride
- 36 -All amino acids found in proteins are optically active, except:  
(A)Serine (B)Glycine (C)Tyrosine (D)Arginine



- 37- Golgi apparatus has many functions, such as .....
- (A) Lipids metabolism (B) Protein synthesis (C) Oxidative phosphorylation  
(D) Macromolecules packaging
- 38 – Which of the following is a non-protein amino acid?
- (A)Proline (B)Histidine (C)Ornithine (D)Glycine
- 39-..... are proteins associated with the DNA in the nucleus.
- (A)Histones (B) Chromatids (C) Centromeres (D) Internes
- 40-Which of the following is a correct pathway?
- (A)DNA→Protein→mRNA (B) DNA→mRNA→Protein (C) mRNA→DNA→Protein  
(D) DNA→Protein→mRNA
- 41-How does RNA differ from DNA?
- (A)RNA contains thymine instead of uracil and it is usually single-stranded.  
(B)RNA contains uracil instead of thymine and it is usually double-stranded.  
(C)RNA contains uracil instead of thymine and it is usually single-stranded.  
(D) RNA contains uracil instead of cytosine.
- 42-Where does DNA replication take place?
- (A)Ribosome (B) Cytoplasm (C) Golgi apparatus (D) Nucleus
- 43-The process of synthesizing mRNA from DNA is called.....
- (A) Transcription (B) Replication (C) Translation (D) Reverse transcription
- 44-A triplet of mRNA is called .....
- (A)Amino acid (B) Codon (C) Tripeptide (D) Protein
- 45-The sequence of events for protein synthesis is.....
- (A)Replication then transcription (B)Translation then transcription  
(C)Transcription then translation (D)Replication then translation
- 46-In DNA, which is the correct base pairing?
- (A)A with G (B) G with T (C) A with U (D) A with T
- 47-During transcription, the enzyme that binds to a specific section where an mRNA synthesized is.....
- (A)RNA Polymerase (B) DNA Polymerase (C) Helicase (D) Caspase
- 48-Factors involve termination are called.....
- (A)Elongation factors (B) Release factors (C) Stop factors (D) Initiation factors
- 49-The 80S ribosome consists of ..... subunits.
- (A)30S and 50S (B) 60S and 30S (C) 40S and 60S (D) 20S and 70S
- 50-In messenger RNA, each codon specifies a particular.....
- (A)Nucleotide (B) Enzyme (C) Promoter (D) Amino acid
- 51 – The general mechanism that an enzyme acts is by:
- (A) Reducing the activation energy (B) Increasing activation energy  
(C) Decreasing pH value (D) Increasing the pH value
- 52- The Co-enzyme is:
- (A) Often a metal (B) Always a protein (C) Often a vitamin  
(D) Always an inorganic compound
- 53 – Which of the following is produced by the combination of Apo-enzyme and Co-enzyme?
- (A) Holoenzyme (B) Enzyme substrate complex (C) Enzyme product complex  
(D) Prosthetic group
- 54 – The enzymes.....
- (A) accelerate reactions by lowering activation energy  
(B) are proteins whose three-dimensional form is key to their function



- (C) do not alter the overall change in free energy for a reaction  
(D) accelerate reactions by increasing activation energy

**55 – Enzymes catalyzing rearrangement of atomic grouping without altering molecular weight or number of atoms is:**

- (A) Ligases (B) Isomerases (C) Oxidoreductases (D) Hydrolases

**56 – Proenzyme is a:**

- (A) Modulator (B) Vitamin (C) Enzyme precursor (D) Hormone

**57 – Which one of the following is a cofactor:**

- (A) Inorganic ion (B) Organic molecule (C) Hormones (D) Cortisol

**58 – Which of the following hormones are produced and secreted by the adrenal medulla?**

- (A) Thyroxin and triiodothyronine (B) Adrenalin and noradrenaline  
(C) Insulin and glucagon (D) Aldosterone and cortisol

**59 – Microminerals or trace elements are present in the body in very small amount, such as:**

- (A) Micrograms to milligrams (B) Milligrams to grams (C) More than 5 gram  
(D) More than 10 gram

**60- Hormones could be measured in body fluids by various approaches such as:**

- (A)MRI (B)CT Scan (C) X-ray (D)Immunoassay

**61- Which is not transport protein?**

- (A)Transferrin (B)Collagen (C)Ceruloplasmin (D)Hemoglobin

**62- All of the methods below can determine protein structure, except:**

- (A)HPLC (B)Mass spectrometry (C)X-ray crystallography (D)NMR spectrometry

**63- All the following are sulfur containing amino acids found in proteins except:**

- (A) Cysteine (B) Cystine (C) Methionine (D) Threonine

**64- Which of the following is a dipeptide?**

- (A) Anserine (B) Glutathione (C) Glucagon (D) Lipoprotein

**65- In proteins the alpha-helix and beta-pleated sheet are examples of:**

- (A) Primary structure (B) Secondary structure (C) Tertiary structure (D) Quaternary structure

**66- The end product of protein digestion in GIT is:**

- (A) Dipeptide (B) Tripeptide (C) Polypeptide (D) Amino acid

**67- The chief protein of cow's milk is:**

- (A) Albumin (B) Vitellin (C) Livetin (D) Casein

**68- A water soluble vitamin deficient in egg is:**

- (A) Thiamin (B) Ribofalvin (C) Ascrobic acid (D) Cobalamin

**69- In mammals, the major fat in adipose tissues is:**

- (A) Phospholipid (B) Cholesterol (C) Sphingolipids (D) Triacylglycerol

**70- Dietary fats after absorption appear in the circulation as:**

- (A) HDL (B) VLDL (C) LDL (D) Chylomicron

**71- The enzymes of  $\beta$ -oxidation are found in:**

- (A) Mitochondria (B) Cytosol (C) Golgi apparatus (D) Nucleus

**72- Ketone bodies are synthesized in:**

- (A) Adipose tissue (B) Liver (C) Muscles (D) Brain

**73- Lipoprotiens may be identified more accurately by means of:**

- (A) Electrophoresis (B) Ultra centrifugation (C) Centrifugation (D) Immuno electrophoresis

**74- The cellular organelles called "suicide bags" are:**

- (A) Lysosomes (B) Ribosomes (C) Nucleolus (D) Golgi's bodies



75- The Golgi complex.....

- (A) Synthesizes proteins (B) Produces ATP (C) Forms glycoproteins  
(D) Provides a pathway for transporting chemicals

76- Synovial fluid contains:

- (A) Heparin (B) Hyaluronic acid (C) Chondroitin sulphate (D) Keratin sulphate

77- P53 gene is:

- (A) A proto-oncogene (B) An oncogene (C) A tumor suppressor gene (D) A tumor inducer gene

78- Calcium absorption is increased by:

- (A) Vitamin D (B) Vitamin C (C) Vitamin K (D) Vitamin E

79-  $\text{Na}^+/\text{K}^+$  ATPase along with ATP requires:

- (A) Ca (B) Mn (C) Mg (D) Cl

80- Oncotic pressure of plasma is due to:

- (A) Proteins (B) Chloride (C) Sodium (D) Potassium

Q2. Answer the following by marking T (True) or F (False): (20 Marks)

1. Some nucleic acids act as enzymes and coenzymes. For example, RNA acts as catalyst (ribozyme).
2. UTP is require for protein biosynthesis.
3. The pyrimidine bases present in nucleotides are adenine, uracil and thymine.
4. UGA, UAG, and UAA consider termination codons.
5. Translation occurs in cytosol on ribosomes and is guided by mRNA.
6. During transcription, the DNA primer, which contains about 10 nucleotides, is formed by primase.
7. Certain cells like RBCs, WBCs, and brain tissue lack enzymes of *de novo* pathways and hence they entirely depend on salvage pathways for nucleotide biosynthesis.
8. Histones are used for packing of RNA.
9. The nitrogenous base present in the RNA molecule is thymine.
10. The sugar molecule present in DNA is ribose.
11. Iron (Fe) potentiates the action of insulin.
12. There is no digestion of protein in mouth, it starts in stomach.
13. The absorption of most amino acids involves an active transport mechanism, requiring ATP and specific transport proteins in the intestinal mucosal cells.
14. The number of double bonds is three in arachidonic acid.
15. Cholesterol molecule has 27 carbon atoms.
16. Esterification of cholesterol occurs mainly in liver and muscles.
17. Bile salts, made in the liver and stored in the gallbladder.
18. The major storage form of lipids is sphingolipids.
19. The precursor of ketone bodies synthesis is Acetyl CoA.
20. Sodium is the principal cation in intracellular fluid.

Good Luck



Handwritten signature and text in Arabic, including the name 'الاستاذ الدكتور' and 'يعرب جعفر موسى'.