

Date: 28-5-2018

Time allowed: Two hours

Total assessment marks: 75 marks



Faculty of Medicine
Kafr El-Sheikh University
Department of Medical Biochemistry

Final Biochemistry exam for 1st Medical year (2017-2018)

*All Questions are to be answered

1. Choose the correct answer within the ANSWER SHEET: (Total :20 marks)
1. Carboxylation of acetyl-CoA to malonyl- CoA takes place in presence of
a. FAD+ b. NAD+ c. Biotin d. NADP+
2. Hot concentrated nitric acid oxidizes glucose to form:
a. Gluconic acid b. Glucaric acid c. Glucuronic acid d. Galactonic acid
3. Which of the following statements about ATP synthase is INCORRECT?
a. It is located in the inner mitochondrial membrane.
b. It requires a proton motive force to form ATP in the presence of ADP and Pi.
c. F₀ subunit protrudes to the matrix.
d. It is a phosphorylating enzyme complex
4. All of the following are tissue markers EXCEPT:
a. S-100
b. Estrogen/progesterone receptors.
c. HER2/neu
d. PSA
5. All of the following are heme containing compounds EXCEPT:
a. Hemoglobin b. Transferrin c. Myoglobin d. Cytochromes
6. An individual with insulin resistance and normal β - cell function:
a. usually shows elevated fasting glucose levels.
b. will eventually become diabetic
c. usually shows elevated fasting insulin levels.
d. is rarely obese.
7. Renal failure causes:
a. Hypokalemia and hypocalcemia
b. Hypokalemia and hypercalcemia
c. Hyperkalemia and hypocalcemia
d. Hyperkalemia and hypercalcemia
8. The number of amino acids in growth hormone is:
a. 91 b. 181 c. 191 d. 189
9. A fatty acid with an odd number of carbons will enter the citric acid cycle as acetyl-CoA and:
a. α -ketoglutarate b. Malate c. Succinyl-CoA d. Butyrate
10. Two important byproducts of HMP shunt are
a. NADH and pentose sugars b. NADPH and pentose sugars
c. Pentose sugars and 4 membered sugars d. Pentose sugars and sedoheptulose

11. Glycogen is converted to glucose-1-phosphate by
 a. UDPG transferase b. Branching enzyme c. Phosphorylase d. Phosphatase
12. Which of the following statements apply to the β -oxidation of fatty acids?
 a. The process takes place in the cytosol of mammalian cells.
 b. Carbon atoms are removed from the acyl chain one at a time.
 c. Before oxidation, fatty acids must be converted to their CoA derivatives.
 d. NADP⁺ is the electron acceptor.
13. Protein kinase C is activated by:
 a. Cyclic AMP triphosphate b. Cyclic GMP c. Diacylglycerol d. Inositol
14. Which of the following statements is NOT true of glycolysis?
 a. Glucose is transformed into pyruvate.
 b. It can take place by anaerobic metabolism.
 c. It requires O₂ and the final product is CO₂.
 d. It takes place mainly in cytoplasm
15. If a cell has high levels of ATP, which of the following enzymes will be negatively affected?
 a. Hexokinase
 b. Phosphofructokinase
 c. Glycogen phosphorylase
 d. Fructose 1, 6-bisphosphatase
16. All of the following statements are true about sodium EXCEPT:
 a. It is responsible for maintenance of osmotic pressure of extracellular fluid
 b. It is affected by renin angiotensin system
 c. Aldosterone increases sodium excretion.
 d. It is involved in transmission of nerve impulses & contraction of muscles
17. Parathormone:
 a. Decreases calcium reabsorption.
 b. Increases calcium excretion.
 c. Increases calcium reabsorption.
 d. Decreases bone resorption.
18. Lovastatin is a
 a. Competitive inhibitor of acetyl CoA carboxylase
 b. Competitive inhibitor of HMG CoA synthetase
 c. Competitive inhibitor of HMG CoA reductase
 d. Non-competitive inhibitor of HMG CoA reductase
19. Insulin is a dimer. The numbers of amino acids in the A and B chain respectively are:
 a. 19 and 30 b. 21 and 30 c. 30 and 21 d. 29 and 38
20. Concerning group I hormones, all of the following are true except:
 a. Their receptors are located intracellular either in the cytoplasm or in the nucleus.
 b. They are hydrophilic in nature and can traverse the cytoplasmic membrane.
 c. They don't need a second messenger to mediate their action.
 d. Thyroid hormones belong to this group

21. All of the following increase calcium absorption EXCEPT:

- a. Excess fat in diet
- b. Excess protein in diet
- c. Citrate
- d. Vitamin D

22. Resting muscles mainly depend on which of the following for energy:

- a. Fatty acid oxidation
- b. Glycogenolysis
- c. Phosphocreatine
- d. All of the above

23. All of the following is true about android obesity EXCEPT:

- a. It is characterized by high fat turnover.
- b. Abdominal cells are hormonally very responsive
- c. Patients are more liable to be diabetic.
- d. Waist/hip ratio is less than 0.8 for women

24. All of the following tumor markers are associated with breast cancer EXCEPT:

- a. Estrogen/progesterone receptors.
- b. HER2/neu
- c. CA 125
- d. CA 15-3

25. Lactose contains:

- a. α -D galactose (1-4) α -D glucose linkage
- b. α -D galactose (1-1) α -D glucose linkage
- c. β -D galactose (1-4) α -D glucose linkage
- d. β -D galactose (1-6) β -D glucose linkage

26. The number of ATP molecules produced for each molecule of FADH₂ oxidized via the respiratory chain is:

- a. 1
- b. 2
- c. 3
- d. 2.5

27. Carnitine is:

- a. One of the amino acids commonly found in protein.
- b. Essential for intracellular transport of fatty acids.
- c. An essential cofactor for the citric acid cycle.
- d. A 15-carbon fatty acid.

28. All the following statements about ketone bodies are true except

- a. Their synthesis increases in diabetes mellitus
- b. They are synthesized in mitochondria
- c. They can deplete the alkali reserve
- d. They can be oxidized in the liver

29. Thyroid hormones are synthesized by the iodination of the amino acid:

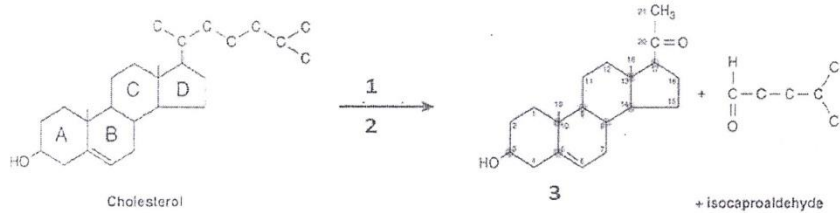
- a. Glycine
- b. Phenylalanine
- c. Tryptophan
- d. Tyrosine

30. Adenylate cyclase is activated by:

- a. GDP-bearing α -Subunit of G-protein
- b. GTP-bearing γ -Subunit of G-protein
- c. GDP-bearing γ -Subunit of G-protein
- d. GTP-bearing α -Subunit of G-protein

16. The main extracellular cation is, the main intracellular cation is and the main extracellular anion is

17. Knowing that this reaction is the first step in steroid hormones biosynthesis, fill in the following spaces:



- a. The required enzyme.....
- b. The required coenzyme.....
- c. Cholesterol is converted into
- d. This step occurs in (organelle)

18. Characters of ideal tumor marker:

- a.
- b.
- c.
- d.

19. PDH enzyme complex is located in, containssubunits and it *needs**coenzymes* that all are derivatives of

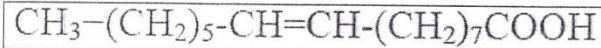
20. Glucokinase is present only in.....and it has km for glucose andaffinity and its function.....

انتهت الامتلاء

GOOD LUCK

IV. Complete the following sentences: (25 marks)

1. Von Gierke's Disease is due to deficiency of enzyme, and the patient suffering from
2. HDL is synthesized in the&
3. What is the name of this molecule and classify it according to the nutritional value:



-
4. Hormones secreted by adipose tissue and
 5. Oral glucose tolerance test is indicated for and blood samples are collected every
 6. In android obesity, fat is mainly stored in while in gynoid obesity, fat is mainly stored in
 7. ΔG is defined as and it carries charge in endergonic reactions.
 8. Glycogen is a polymer of linked by
 9. 7-dehydrocholesterol is the direct precursor of by U.V. rays, in which the ring B is opened and the methyl group is converted to
 10. Insulin is broken down by 2 enzymes..... and
 11. Hormones using cAMP as a second messenger are and
 12. The glycerol released during TAG degradation cannot be metabolized by because
 13. In post absorptive state, dietary fat is carried to the blood stream in the form of while endogenous fat from liver is carried in the form of
 14. Number of acetyl coA produced on complete oxidation of stearic acid is and net ATP generation is
 15. Hormonal factors affecting blood calcium level are
 - a.
 - b.
 - c.

III. Put (True) or (False) in front of each sentence and correct the wrong ones: (15 marks)

1. Insulin resistance is less common with gynoid obesity ()
.....
2. Vitamin D deficiency causes hypocalcemia ()
.....
3. Gaucher's disease is due to deficiency of the enzyme galactocerebrosidase. ()
.....
4. Saturated fats have many double bonds between their carbons ()
.....
5. Hereditary fructose intolerance is due to deficient activity of aldolase A in liver ()
.....
6. Iron is absorbed by intestinal cells in the form of ferrous ()
.....
7. Brain depends on ketone bodies in early fasting state ()
.....
8. Ideal tumor marker is characterized by long half-life ()
.....
9. Racemase enzyme catalyzes the conversion of D-glyceraldehyde into L-glyceraldehyde and vice versa ()
.....
10. The density of lipoproteins increases as the protein content decreases. ()
.....
11. Glucagon is composed of 26 amino acids arranged in a single polypeptide chain. ()
.....
12. Calcitonin hormone stimulates osteoclast activity in bone. ()
.....
13. The most common and severe form of Galactosemia is due to deficiency of galactose-1-P uridyltransferase ()
.....
14. Reduction on chemical reaction is defined by loss of electrons ()
.....
15. McArdle's disease is due to Liver glycogen phosphorylase deficiency ()
.....

II. Put the suitable scientific term that best fits the following statements: (15 marks)

1. A polypeptide containing seven enzyme activities and acyl carrier protein (ACP) segment.
.....
2. They are synthesized as pre- pro hormones and undergo processing then stored in secretory granules before being released by exocytosis.
3. Neuroendocrine tumor of the medulla of the adrenal glands (mainly in the chromaffin cells), that secretes high amounts of catecholamines.
4. It is a medical condition characterised by decreased response to circulating insulin
.....
5. It is the main storage form of iron
6. The hormone decreases calcium blood level.
7. A polysaccharide that acts as roughages as it helps water retention during the passage of food along the intestine and prevent constipation
8. A compound that irreversibly inhibit enolase enzyme and Thus stop the whole glycolysis
.....
9. It is a mitochondrial pathway in which two-carbon fragments are successively removed, from the carboxyl end of the fatty acyl CoA, producing acetyl CoA
10. They represent group of tumor markers related to presence of cancer tissue
11. The enzyme required for oxidation (I-) to (I+).
12. A compound that acts as a catalyst, which enters into the TCA cycle, causes complete oxidation of acetyl CoA and comes out of it without any change
13. It is a tumor marker used to detect, diagnose and follow up of prostate cancer
14. The conversion of ADP to ATP by the use of high energy phosphate metabolites
.....
15. These are esters of fatty acids with tri-hydroxy alcohols, glycerol

31. The Cori cycle describes the release of lactate from active muscle into the blood stream and its subsequent uptake by the liver. The lactate in the liver is then used for:
- Glycogen synthesis
 - ATP phosphorylation
 - Phosphocreatine synthesis
 - Glucose synthesis
32. In TCA cycle, citrate is converted to.....after losing a molecule of H₂O
- Isocitrate
 - Cis-aconitate
 - Oxaloacetate
 - Glutarate
33. Glucose-6-phosphatase is not present in
- Liver and kidneys
 - Kidneys and muscles
 - Kidneys and adipose tissue
 - Muscles and adipose tissue
34. Carcinoembryonic antigen (CEA) is used to monitor patients with:
- Pancreatic cancer
 - Hepatocellular carcinoma
 - Colorectal cancer
 - Lung cancer
35. Which one of the following is profoundly found in untreated patients with type 1 diabetes?
- Extremely low levels of insulin synthesis and secretion.
 - A relatively obese patient.
 - A simple pattern of genetic inheritance.
 - Ketoacidosis.
36. Which one of the following would be expected in pyruvate kinase deficiency?
- Increased levels of lactate
 - Hemolytic anemia
 - Decreased ratio of ADP to ATP
 - Increased phosphorylation of Glucose to Glucose-6-phosphate
37. Galactose is phosphorylated by galactokinase to form
- Galactose-6-phosphate
 - Galactose-1, 6 diphosphate
 - Galactose-1-phosphate
 - All of these
38. Lysolecithin is produced by:
- removal of the saturated fatty acid.
 - removal of the unsaturated fatty acid.
 - removal of choline.
 - removal of phosphocholine.
39. Sphingosine is synthesized from
- Palmitoyl CoA and Choline
 - Palmitoyl CoA and ethanolamine
 - Palmitoyl CoA and serine
 - Acetyl CoA and choline
40. Increased body fat mass is accompanied with:
- Low levels of adiponectin
 - Low levels of resistin
 - Low levels of leptin
 - Non of the above