

**King Saud University  
Faculty of Pharmacy  
Pharmacology Dept.**

***Biochemistry Exam.***

***285 PHL***

**16/6/2007**

**Time allowed: 2 hours.**

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**INSTRUCTIONS**

- 1] All questions are to be attempted.**
- 2] Check that the examination booklet consists of (8) pages, one of which is an answer sheet**
- 3] The answers should be written in the answer sheet in page 1.**

**GOOD LUCK**

<b>Question No</b>	<b>Answer</b>	<b>Question No</b>	<b>Answer</b>
1	C	21	C
2	B	22	C
3	C	23	D
4	C	24	E
5	C	25	B
6	A	26	C
7	D	27	B
8	D	28	C
9	B	29	D
10	E	30	D
11	C	31	A
12	B	32	A
13	D	33	E
14	D	34	E
15	C	35	B
16	C	36	A
17	D	37	C
18	E	38	B
19	D	39	C
20	D	40	E

**Choose the best answer (ONE answer) and record your answers in the answer sheet for question 1 in page 1: (40 marks)**

**1- The following are characters of allosteric enzymes EXCEPT:**

- a) They are oligomeric proteins.
- b) They catalyze irreversible reactions.
- c) They obey Micheals-Menten kinetics.
- d) Their substrates may serve as homotropic effectors.
- e) The allosteric and catalytic sites are separated.

**2- The presence of noncompetitive inhibitor leads to:**

- a) Both an increase in the  $V_{max}$  and  $K_m$ .
- b) A decrease in the observed  $V_{max}$ .
- c) A decrease in both  $V_{max}$  and  $K_m$ .
- d) An increase in  $K_m$  without affecting  $V_{max}$ .
- e) Non of the above.

**3- When a substrate is oxidized via FAD-linked dehydro genase, the number of ATP moles formed per oxygen is:**

- a) 1
- b) 2
- c) 3
- d) 4.
- e) 5

**4- The oxidation of 1 mol of glucose by anaerobic glycolysis yields a net of:**

- a) 2mol of lactate and 2mole of ATP.
- b) 2 mol of lactate, 2 mol of NADH, and 2 mol of ATP.
- c) 2 mol of lactate, 2 mol of  $NAD^+$ , and 6 mol of ATP.
- d) 2 mol of pyruvate and 2 mol of ATP.
- e) 2 mol of pyruvate, 2 mol of NADH, and 2 mol of ATP.

**5- Breakdown of glucose to pyruvate or lactate is known as:**

- a) Glycogenolysis
- b) Lipolysis.
- c) Glycolysis
- d) HMP-shunt.
- e) TCA cycle.

**6- In glycolytic pathway, which of the following are irreversible enzymes?**

- a) Hexokinase, phosphofructokinase, pyruvate kinase.
- b) Glucokinase, aldolase, and phosphofructokinase.
- c) Hexokinase, aldolase, and pyruvate kinase.
- d) Hexokinase, glyceraldehyde 3-phosphate dehydrogenase, and enolase.
- e) Phosphofructokinase, enolase, and pyruvate kinase.

**7- Pyruvate generated by glycolysis, under aerobic conditions, must enter the mitochondria to be oxidized**

- a) to generate malate in the malic enzyme reaction.
- b) because the mitochondria are impermeable to lactate.
- c) so that the cytosol remains electrically neutral.
- d) because pyruvate dehydrogenase is a mitochondrial enzyme.
- e) by exchange with malate.

**8- Conversion of glucose-6-phosphate to fructose 1,6-bisphosphate requires**

- a) phosphohexose isomerase and aldolase.
- b) phosphoglucomutase and phosphorylase.
- c) phosphoglucomutase and aldolase.
- d) phosphohexose isomerase and phosphofructokinase.

**9- Which of the following reactions of citric acid cycle listed below uses GDP as coenzyme?**

- a) Isocitrate dehydrogenase.
- b) Succinate thiokinase.
- c) Succinate dehydrogenase.
- d) Citrate synthetase.
- e) Malate dehydrogenase.

**10- Oxaloacetate is produced from the following molecules by one reaction EXCEPT:**

- a) Citrate
- b) Pyruvate
- c) Aspartate
- d) Malate
- e) Glutamate

**11- The conversion of pyruvate to acetyl CoA and CO<sub>2</sub>**

- a) depends on the coenzyme biotin.
- b) is reversible.
- c) involves the participation of lipoic acid.
- d) is activated by excess acetyl-CoA and NADH.
- e) occurs in the cytosol

**12- Which of the following reactions of citric acid cycle listed below results in substrate level phosphorylation ?**

- a) Isocitrate dehydrogenase.
- b) Succinate thiokinase.
- c) Succinate dehydrogenase.
- d) Citrate synthetase.
- e) Malate dehydrogenase.

**13- Which of the following enzymatic activities would you expect to be decreased in thiamine deficiency?**

- a) Pyruvate carboxylase.
- b) Isocitrate dehydrogenase.
- c) Fumarase.
- d) a-ketoglutarate dehydrogenase.
- e) Lactate dehydrogenase.

**14- Which of the following metabolite is not directly produced in HMP pathway?**

- a) Fructose 6-phosphate.
- b) Erythrose 4- phosphate.
- c) CO<sub>2</sub>
- d) Dihydroxyacetone phosphate,
- e) 6-phosphogluconolactone.

**15- Liver, but not muscle, glycogen can be used as a direct source for blood glucose because**

- a) Muscle lacks aldolase.
- b) Muscle uses all of its glucose 6-phosphate for glycolysis.
- c) Liver cells only contains glucose 6-phosphatase.
- d) Liver cell membranes transport glucose direct into the blood.
- e) Muscle lacks phosphoglucomutase.

**16- Muscle glycogenolysis is stimulated by:**

- a) Glucagon
- b) Insulin
- c) Epinephrine
- d) High carbohydrate diet.
- e) Decreased intracellular cAMP.

**17- Muscle glycogenesis from glucose requires which of the following enzymes?**

- a) Hexokinase, glycogen phosphorylase and branching enzyme.
- b) Glucokinase, phosphofructokinase and glycogen synthetase.
- c) Glucokinase, glycogen synthase and branching enzyme.
- d) Hexokinase, glycogen synthase and branching enzyme.
- e) Hexokinase, glycogen synthase and debranching enzyme.

**18- Key enzymes that regulate gluconeogenesis are:**

- a) Pyruvate carboxylase, pyruvate kinase and fructose 1,6-bisphosphatase.
- b) Pyruvate carboxylase and PEP carboxykinase only.
- c) Pyruvate carboxylase and fructose 1,6-bisphosphatase only.
- d) PEP carboxykinase and fructose 1,6-bisphosphatase only.
- e) Pyruvate carboxylase, PEP carboxykinase and fructose 1,6-bisphosphatase.

**19- The followine are gluconeogenic substances EXCEPT:**

- a) Pyruvate.
- b) Lactate.
- c) Glycerol.
- d) Acetyl CoA.
- e) Valine.

**20- Normal renal threshold capacity for glucose is:**

- a) 80-120 mg/dl.
- b) 60-90 mg/dl
- c) 120-140 mg/dl
- d) 170-180 mg/dl
- e) 200-220 mg/dl

**21- Renal glycosuria is due to:**

- a) Release of epinephrine.
- b) Diabetes mellitus.
- c) Diabetes innocence.
- d) Damage of the islet cell of the pancreas,
- e) Diabetes insipidus.

**22- The following metabolic changes are observed in diabetes mellitus EXCEPT:**

- a) Increased lipolysis
- b) Increased ketogenesis
- c) Increased protein synthesis
- d) Increased amino acids catabolism
- e) Increased mobilization of fatty acids.

**23- Which one of the following compounds is an intermediate in the biosynthesis of cholesterol?**

- a) Oxysterol.
- b) Progesterone,
- c) Cholic acid.
- d) Mevalonate.
- e) Pregnanelone.

**24-  $\alpha$ -Glycerophosphate for lipogenesis in adipose tissue is provided by:**

- a) Glycerol transported from liver.
- b) Glycerol released from LDL.
- c) Dietary glycerol.
- d) Glycerol from VLDL.
- e) Glycerol produced from glycolysis.

**25- The number of ATP molecules that are formed from the complete oxidation of a fatty acid contains 14 carbons to CO<sub>2</sub> and water is:**

- a) 108
- b) 112
- c) 114
- d) 129
- e) 131.

**26- The release of Arachidonic acid by phospholipase A<sub>2</sub> from membrane phospholipids is inhibited by:**

- a) Prostaglandins.
- b) Linoleic acid.
- c) Cortisol.
- d) Aspirin,
- e) Indomethacin.

**27- Ketone bodies are NOT utilized in:**

- a) Kidney
- b) Liver
- c) Brain
- d) Skeletal muscle
- e) Heart muscle

**28- Increased formation of ketone bodies during starvation is due to:**

- a) decreased levels of circulating glucagon.
- b) decreased formation of acetyl CoA.
- c) increased levels of free fatty acids in plasma.
- d) inhibition of  $\beta$ -oxidation of fatty acids in the liver.
- e) a decreased activity of hormone sensitive-lipase in adipose tissue.

**29- The following statements about the regulation of cholesterol biosynthesis are false EXCEPT:**

- a) Endogenous cholesterol biosynthesis is stimulated by diet rich in cholesterol.
- b) HMG-CoA synthase is the key enzyme.
- c) The key regulatory enzyme is activated by phosphorylation.
- d) Cholesterol biosynthesis is stimulated during high carbohydrate diet.
- e) Glucagon stimulates cholesterol biosynthesis.

**30- Triacylglycerols present in plasma lipoproteins can be hydrolyzed by**

- a) pancreatic lipase.
- b) hormone-sensitive lipase.
- c) heparin.
- d) lipoprotein lipase.
- e) LCAT.

**31- Tyrosine is a precursor of all the following EXCEPT:**

- a) Phenylalanine.
- b) DOPA.
- c) Dopamine.
- d) Epinephrine.
- e) Thyroxin

**32- Transamination requires which of the following coenzyme:**

- a) Pyridoxal phosphate
- b) Lipoic acid
- c) TPP
- d) NAD
- e) CoASH

**33- The nitrogens of urea synthesized in liver are derived from:**

- a) Ammonia and arginine.
- b) Ammonia and fumarate.
- c) Ammonia and glutamine.
- d) Glutamate and arginine.
- e) Ammonia and aspartate.

**34- Amino acids involved in creatinine formation are:**

- a) Glycine, methionine and glutamine.
- b) Glycine, arginine and cysteine.
- c) Glycine, cysteine and methionine.
- d) Glycine, arginine and glutamine.
- e) Glycine, arginine and methionine.

**35- Glutamic and aspartic acids are:**

- a) Neutral amino acids.
- b) Monoamino, dicarboxylic amino acids.
- c) Diamino, monocarboxylic amino acids.
- d) Monoamino, monocarboxylic amino acids.
- e) Aromatic amino acids.

**36- Brain detoxifies ammonia by:**

- a) Glutamine formation
- b) Urea formation
- c) Asparagine formation
- d) Creatinine formation
- e) Glutathione formation.

**37- The toxicity of ammonia to CNS is thought to be due to:**

- a) Depletion of cellular glucose.
- b) Depletion of NADP<sup>+</sup> coenzyme.
- c) Depletion of cellular  $\alpha$ -ketoglutarate
- d) Conversion of ammonia to urea.
- e) Shift in the ratio of glutamate to glutamine.

**38- The source of C4, C5 and N7 of purine base is**

- a) Glutamine
- b) Glycine
- c) Aspartate
- d) Serine
- e) Leucine

**39-The end product of purine base catabolism is**

- a) Xanthine
- b) Hypoxanthine
- c) Uric acid
- d) Uracil
- e)Thymine

**40-Peptide-chain elongation in proteins synthesis involves all of the followings**

**Except**

- a) Peptidy transferase
- b) Elongation factor
- c) mRNA
- d) GTP
- e) ATP