

МИНИСТЕРСТВО НАУКИ, ВЫСШЕГО ОБРАЗОВАНИЯ И
ИННОВАЦИЙ КЫРГЫЗСКОЙ РЕСПУБЛИКИ
ОШСКИЙ МЕЖДУНАРОДНЫЙ МЕДИЦИНСКИЙ УНИВЕРСИТЕТ

Кафедра «Естественно-гуманитарных дисциплин»

РАССМОТРЕНО

на заседании кафедры протокол № 2
от «05» 09 2025 года

Зав. кафедрой, [подпись] Р.О.Юсупова

УТВЕРЖДАЮ [подпись]

Председатель УМС ОММУ,
к.б.н., доцент Орунбаева Б.М.
«08» 08 2025 г.

ФОНД ТЕСТОВЫХ ЗАДАНИЙ
для итогового контроля по дисциплине
«Общая и клиническая биохимия»
на 2025-2026 учебный год
Направление: 560001 – Лечебное дело (GM)
курс – I, семестр – I

Наименование дисциплины	Всего	Кредит	Аудиторные занятия (48 ч)		СРС
			Лекции	Практические	
Общая и клиническая биохимия	120	4	24ч	36	60
Количество тестовых вопросов	400				

Составитель: [подпись] Тешебаева У.Т.
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Эксперт-тестолог: [подпись] Алиева Ч.М.

г. Ош – 2025 г.

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ БАНКА ТЕСТОВЫХ ЗАДАНИЙ

кафедры « Естественно-гуманитарная психология »

от « » _____ 20__ г.

на разработанные тестовые задания по дисциплине

« Визуал и кинестическая функции »

наименование дисциплины

Мешенева У.М., Султановичева А.С.

/указать должность, ученую степень, Ф.И.О. автора (авторов)/

Тестовые задания проверены членом экспертной группы тестологов

Алиева У.М.

/указать должность, ученую степень, Ф.И.О./

Направления проведения оценки структуры и содержания тестового задания

№	Направление экспертизы	Оценка экспертов	
		Соответствует <input checked="" type="checkbox"/>	Не соответствует
1.	Соответствие задания программам и стандартам обучения	Соответствует <input checked="" type="checkbox"/>	Не соответствует
2.	Включение в тесты только наиболее важных, базовых знаний	Соответствует <input checked="" type="checkbox"/>	Не соответствует
3.	Ясность смысла тестовой ситуации и представления ТЗ	Ясно <input checked="" type="checkbox"/>	Не ясно
4.	Правильность ответа на вопрос ТЗ	Соответствует <input checked="" type="checkbox"/>	Не соответствует
5.	Значимость содержания тестового задания (0-сомнительный, 1-допустимый, 2-важный, 3-существенный)	<u>3</u> балл(ов)	
6.	Соответствие необходимому числу заданий по каждому разделу дисциплины исходя из его важности и числа часов, отведенных на его изучение в программе.	Соответствует <input checked="" type="checkbox"/>	Не соответствует

Членом экспертной группы выявлены следующие недостатки в тестовом задании 15 тестовых вопросов не соответствует по тематике

Членом экспертной группы внесены следующие исправления (корректировки) в тестовое задание после обсуждения замечаний 15 тестовых вопросов.

На основании представления тестовых заданий автором (авторами) и проведенной проверки сделала следующее заключение:

- 1) Содержание тестовых заданий **соответствует (не соответствует)** содержанию УМКД (нужное подчеркнуть)
- 2) Представленные тестовые задания в следующем объеме 400 вопросов:

соответствуют (не соответствуют) требованиям, предъявляемым к количеству, уровням сложности и формам заданий для составления тестов. (нужное подчеркнуть)

Тестолог: Алиева У.М.

Ознакомлен зав. кафедрой Суринов Р.В.

Алиева У.М.
Суринов Р.В.

**Экзаменационные тестовые вопросы для студентов
2-курса специальности - Лечебное дело (GM)
по клинической биохимия на 2025-2026 уч.год**

Metabolism of lipids

- 1. In fats, the number of OH groups can be expressed as**
 - a) Reichert-Meissil number
 - b) Polenske number
 - c) Iodine number
 - d) Acetyl number

- 2. Rancidity of lipids of lipid-rich foodstuff is because of**
 - a) Reduction of fatty acids
 - b) Hydrogenation of unsaturated fatty acids
 - c) Dehydrogenation of saturated fatty acids
 - d) Oxidation of fatty acids

- 3. The acetyl CoA is produced in the mitochondria and must be transported into cytosol for synthesis of fatty acid. Which of the following is true regarding its transport?**
 - a) Acetyl CoA is diffused from mitochondrial membrane
 - b) acetyl CoA is transported by its specific transporter protein
 - c) acetyl CoA is converted into pyruvate, enters into cytosol and acetyl CoA is regenerated
 - d) acetyl CoA is converted into citrate, enters into cytosol and acetyl CoA is regenerated

- 4. Which is the largest and which is the smallest of the lipoprotein family?**
 - a) VLDL and Lp (a)
 - b) Chylomicrons and HDL
 - c) VLDL and HDL
 - d) VLDL and Lp (a)

- 5. Low-density lipoproteins (LDL) are the principle transport vehicles for _____ in the blood.**
 - a) Glucose
 - b) Triglycerides
 - c) Cholesterol
 - d) amino acids

- 6. What are the most active organs in the animal body that can synthesize triacylglycerol?**
 - a) Liver and intestines
 - b) Kidney and intestines
 - c) Gall bladder and kidneys
 - d) Pancreas and intestines

- 7. What is the precursor for fatty acid synthesis**
 - a) Acetyl CoA
 - b) Propionyl CoA
 - c) Succinyl CoA
 - d) Acetoacetyl CoA

- 8. The conversion of acetyl CoA to malonyl CoA is the rate limiting step in fatty acid synthesis. Which of the following enzyme catalyzes the above mentioned reaction?**
 - a) Acetyl CoA carboxylase
 - b) Acetyl CoA decarboxylase
 - c) Malonyl CoA synthetase
 - d) Malonyl CoA synthase

- 9. Which of the following is the best marker for the diagnosis of Acute pancreatitis?**
 - a) Lactase
 - b) Amylase
 - c) Cholesteryl esterase
 - d) γ -glutamyltrans peptidase

- 10. A gall stone the blocked the upper part of the bile duct would cause an-**
 - a) Incomplete lipid digestion and absorption
 - b) Increased recycled of bile salts
 - c) Increased excretion of bile salts
 - d) decreased excretion of fats in the feces

- 11. Which of the following is monoenoic acid:**
 - a) arachidonic acid
 - b) linoleic acid
 - c) Oleic acid
 - d) linolenic acid

- 12. Hydrogenation of fatty acid is:**
 - a) Hydrolysis by Alkali
 - b) Auto- oxidation of PUFA
 - c) Addition of hydrogen to unsaturated fatty acid
 - d) Addition of hydrogen to saturated fatty acid

13. Autooxidation is seen in-

- a) Cholesterol
- b) Arachidonic acid
- c) Stearic acid
- d) Palmitic acid

14. What will you to stop chyluria in diet?

- a) Small chain FA
- b) Medium chain FA
- c) Long chain FA
- d) Omega-3 unsaturated FA

15. In what compartment does the de novo fatty acid synthesis occur?

- a) Mitochondria
- b) Peroxisome
- c) Endoplasmic reticulum
- c) Cytosol

16. Which of the following events inactivates acetyl CoA carboxylase

- a) ADP-Ribosylation
- b) Glycosylation
- c) Phosphorylation
- d) Farnesylation

17. What is the allosteric regulator of acetyl-CoA carboxylase?

- a) Fatty acid
- b) ATP
- c) Citrate
- d) Acetyl-CoA

18. The acetyl-CoA is produced in the mitochondria and must be transported into cytosol for synthesis of fatty acid. Which of the following is true regarding its transport?

- a) acetyl-CoA is diffused from mitochondrial membrane
- b) acetyl-CoA is transported by its specific transporter protein
- c) Acetyl-CoA is converted into pyruvate, enters into cytosol and acetyl CoA is regenerated
- d) Acetyl-CoA is converted into citrate, enters into cytosol and acetyl-CoA is regenerated

β -oxidation of fatty acids

19. Free fatty acid produced in adipose tissue is transported by-

- a) Globin
- b) Albumin
- c) Ceruloplasmin
- d) None

20. Major metabolism of saturated fatty acids in the mitochondria is called as-

- a) β -oxidation
- b) α -oxidation
- c) ω -oxidation
- d) None of the above

21. Long chain fatty acid is transported into inner mitochondria is called as-

- a) Acyl carrier protein
- b) Acyl carnitine
- c) Simple diffusion
- d) Energy mediated

22. In beta oxidation of fatty acids carnitine is required for-

- a) Conversion of chain fatty acids to long chain fatty acids
- b) Transport of long chain fatty acid to mitochondrial inner layer
- c) Transport of long chain fatty acid to cytoplasm
- d) Conversion of long chain fatty acids to short chain fatty acids

23. ATP yield in stearic acid oxidation-

- a) 146 ATP
- b) 142 ATP
- c) 129 ATP
- d) 139 ATP

24. Oxidation of palmitic acid forms how many ATP molecules-

- a) 94 ATP
- b) 108 ATP
- c) 122 ATP
- d) none

25. In well fed state, the carnitine palmitate acyl transferase on the outer mitochondrial membrane is most potently inhibited by-

- a) Glucose
- b) palmitoyl CoA
- c) Malonyl CoA
- d) Acetyl CoA

26. Omega oxidation of fatty acids occur-

- a) Endoplasmic reticulum
- b) Mitochondria
- c) cytosol
- d) None

27. β -oxidation of very long chain fatty acids occurs-

- a) Endoplasmic reticulum
- b) Peroxisomes
- c) Lysosome
- d) Golgi apparatus

28. In Zellweger syndrome, there is-

- a) Accumulation of long chain fatty acids
- b) Accumulation of short chain fatty acids
- c) Accumulation of verylong chain fatty acids
- d) Accumulation of medium chain fatty acids

29. β -oxidation in peroxisome is differentiated from that occurring in mitochondria by -

- a) Acetyl CoA
- b) H_2O_2 formed
- c) Different enzymes are found in different sites
- d) NADH is required

30. Fatty acid metabolism gives-

- a) acetyl-CoA
- b) Malonyl CoA
- c) Ketone bodies
- d) Cholesterol

31. A patient with high rate of obesity was advised to use carnitine as a food additive in order to enhance “fat burning”. What is the role of carnitine in the process of fat oxidation?

- a) Transport of FFA (free fatty acids) from cytosol to the mitochondria
- b) Transport of FFA from fat to the tissues
- c) FFA activation
- d) It takes part in one reactions of FFA beta-oxidation

Ketone bodies

32. Ketone bodies utilized by conversion of:

- a) Acetoacetate to acetacetyl CoA
- b) Series of changes leads to pyruvate
- c) Alphaketo glutaric acid
- d) Succinyl CoA

33. Insulin inhibits ketogenesis by all except:

- a) Decreased acetyl-CoA
- b) Increased β -oxidation
- c) Decreased lipolysis
- d) Decreased fatty acid

34. In a person fasting overnight with carnitine deficiency, following chemicals increase in quantity in blood:

- a) Glucose
- b) Fatty acids
- c) Amino acids
- d) Ketone bodies

35. A destitute woman is admitted to the hospital with altered sensorium and dehydration; urine analysis shows mild proteinuria and sugar; what other test would be desirable:

- a) Fouchet
- b) Pothera
- c) Hays
- d) Benedicts

36. All the following statements correctly describe ketone bodies, except:

- a) They may result from starvation
- b) They are present at high levels in uncontrolled diabetes
- c) They include—OH β -butyrate and acetone
- d) They are utilized by the liver during long term starvation

37. Which of the following organs do not utilize ketone bodies?

- a) Brain, RBC
- b) RBC, liver
- c) Muscle, heart
- d) Heart, brain

38. The immediate precursor in the formation of acetoacetate from acetyl CoA in the liver is:

- a) Mevalonate
- b) HMG CoA
- c) Acetoacetyl CoA
- d) 3-hydroxy-butyryl CoA

39. In a well fed state, acetyl CoA obtained from diet least used in the synthesis of:

- a) Palmitoyl CoA
- b) Citrate
- c) Acetoacetate
- d) Oxalosuccinate

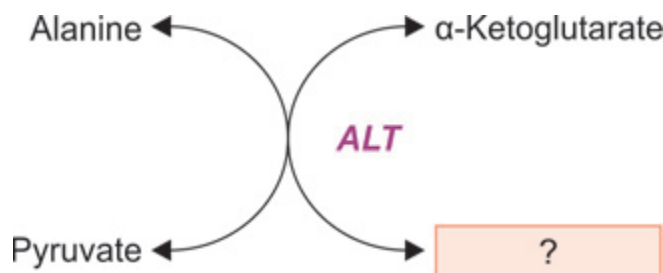
- 40. Common enzyme in cholesterol and Ketone body metabolism:**
- a) HMG CoA reductase
 - b) HMG CoA lyase
 - c) HMG CoA synthase
 - d) Thiolase

Fatty acid synthesis

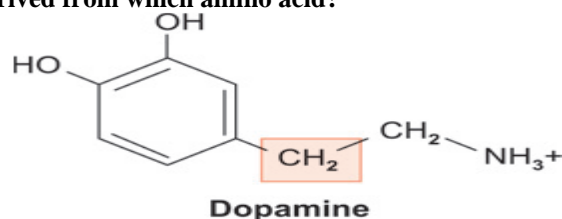
- 41. 1st acetyl group donor in fatty acid synthesis is –**
- a) Malonyl CoA
 - b) Acetyl CoA
 - c) Palmitate
 - d) Citrate
- 42. The end product of cytosol fatty acid synthetase in humans is-**
- a) Oleic acid
 - b) Palmitic acid
 - c) arachidonic acid
 - d) linoleic acid
- 43. Important intermediate product of biosynthesis of fatty acid is-**
- a) Cholesterol
 - b) Acetyl CoA
 - c) Malonyl CoA
 - d) Thioesterases
- 44. The first step in fatty acid synthesis involves-**
- a) Acetyl CoA carboxylase
 - b) Acetyl CoA dehydrogenase
 - c) β -Hydroxy CoA dehydrogenase
 - d) Pyruvate kinase
- 45. Rate limiting step in fatty acid synthesis is-**
- a) Production of acetyl CoA
 - b) Production of malonyl-CoA
 - c) Production of oxaloacetate
 - d) Production of citrate
- 46. Allosteric inhibitor of fatty acid synthetase is-**
- a) Citrate
 - b) ATP
 - c) Long chain acyl CoA
 - d) NAD
- 47. NADPH is required for:**
- a) Gluconeogenesis
 - b) Fatty acids synthesis
 - c) Glycolysis
 - d) Glycogenolysis
- 48.**

GENERAL AMINO ACID METABOLISM

- 1. In the reaction, what is product formed?**



- a) Glutamate
 - b) Glutamine
 - c) Oxaloacetate
 - d) Aspartate
- 2. This compound is derived from which amino acid?**



- a) Tyrosine
- b) Histidine
- c) Tryptophan
- d) Leucine

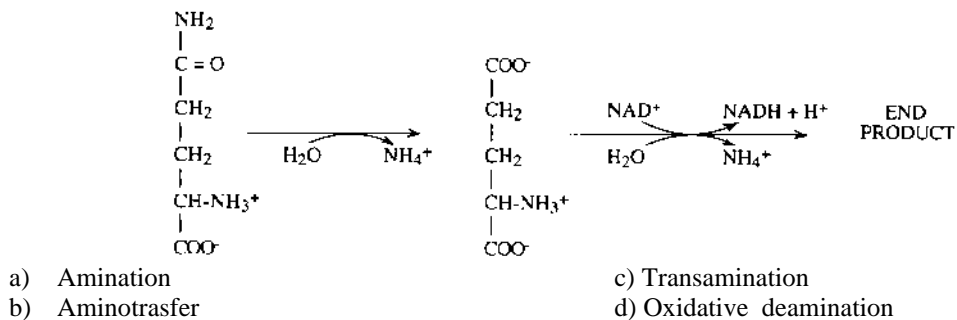
3. The amino acid which serves as a carrier of ammonia from skeletal muscle to liver is:

- a) Alanine
- b) Methionine
- c) Arginine
- d) Glutamine

4. Glutamine in blood acts as:

- a) NH₃ transporter
- b) Toxic element
- c) Stored energy
- d) Abnormal metabolite

5. The second and final enzymatic step in the reaction pathway shown is most correctly described as:



- a) Amination
 - b) Aminotrasfer
 - c) Transamination
 - d) Oxidative deamination
6. In which of the following condition there is increased level of ammonia in blood?
- a) ornithine transcarbamoylase deficiency
 - b) Galactocemia
 - c) Histidinemia
 - d) Phenyl ketonuria
7. Enzyme involved in nonoxidative deamination is:
- a) L-amino acid oxidase
 - b) Glutamate dehydrogenase
 - c) Glutaminase
 - d) Amino acid dehydrases
8. Which of the amino acid produces a vasodilator on decarboxylation?
- a) Glutamin acid
 - b) Histidine
 - c) Ornithine
 - d) Cysteine
9. Accumulation of tryptophan in blood is known as
- a) Pompe's disease
 - b) Wilson's disease
 - c) Wolman's disease
 - d) Hartnup's disease
10. Xanthoproteic test is positive in proteins containing
- a) Sulphur amino acids
 - b) α-Amino acids
 - c) Aromatic amino acids
 - d) Aliphatic amino acids

INDIVIDUAL AMINO ACID METABOLISM

11. The amino acid that can be converted into a vitamin:

- a) Glycine
- b) Tryptophan
- c) Phenylalanine
- d) Lysine

12. Guanidoacetic acid is formed in.....from

- a) Kidney; Arginine + Glycine
- b) Liver; Cysteine + Arginine
- c) Liver; Methionine + Glycine
- d) Muscle; Citrulline + Aspartate

13. Nitric oxide synthesized from?

- a) Arginine
- b) Citrilline
- c) Alanine
- d) Cysteine

- 14. Histidine load test is used for:**
- | | |
|-------------------------|---------------|
| a) Folate Deficiency | c) Histamine |
| b) Histidine Deficiency | d) Serotonine |
- 15. Cysteine is abundantly found in:**
- | | |
|------------------------|-------------|
| a) Keratin | c) Creature |
| b) Chondroitin sulfate | d) Spermine |
- 16. N-acetyl-cysteine replenishes:**
- | | |
|----------------|--------------|
| a) Glutathione | c) Glutamate |
| b) Glycine | d) GABA |
- 17. During the formation of hydroxyl proline and hydroxyl lysine? The essential factors required is are:**
- | | |
|------------------------|---------------------------|
| a) Pyridoxal phosphate | c) Thiamine pyrophosphate |
| b) Ascorbic acid | d) Biotin |
- 18. In the carbon metabolism, Serine loses which carbon atom?**
- | | |
|----------|----------|
| a) Alpha | c) Gamma |
| b) Beta | d) Delta |
- 19. In mammalian tissues serine can be a biosynthetic precursor of**
- | | |
|---------------|------------------|
| a) Methionine | b) Glycine |
| c) Tryptophan | d) Phenylalanine |
- 20. Non essential amino acids**
- Are not components of tissue proteins
 - May be synthesized in the body from essential amino acids
 - Have no role in the metabolism
 - May be synthesized in the body in diseased states
- 21. Which of the following is a tripeptide?**
- | | |
|----------------|-------------|
| a) Anserine | b) Oxytocin |
| c) Glutathione | d) Kallidin |
- 22. An example of metalloprotein is**
- | | |
|------------|------------------|
| a) Casein | b) Ceruloplasmin |
| c) Gelatin | d) Salmine |
- 23. A dietary deficiency of tryptophan and nicotinate leads to**
- | | |
|--------------|------------------|
| a) Beri Beri | b) Xerophthalmia |
| c) Anemia | d) Pellegra |
- 24. Histidine is degraded to α -ketoglutarate and is described as a:**
- | | |
|--------------------------|--------------------------|
| a) Gluco amino acid | c) Ketogenic amino acid |
| b) Glucogenic amino acid | d) Keto-gluco amino acid |
- 25. A person with phenylketonuria cannot convert**
- | | |
|------------------------------|--------------------------------|
| a) Phenylalanine to tyrosine | c) Phenylalanine to isoleucine |
| b) Phenol into ketones | d) Phenylalanine to lysine |
- 26. Oxidative deamination is the conversion of an amino**
- Group from an amino acid to a keto acid
 - Acid to a keto acid plus ammonia
 - Acid to a carboxylic acid plus ammonia
 - Group from an amino acid to a carboxylic acid
- 27. An example of a transamination process is**
- Glutamate = hexanoic acid + NH_3
 - Aspartate + hexanoic acid = glutamate + oxaloacetate
 - Aspartate + α ketoglutarate = glutamate + oxaloacetate
 - Glutamate = α -ketoglutarate + NH_3

28. Transamination is the process where

- a) Carboxyl group is transferred from amino acid
- b) α -amino group is removed from the amino acid
- c) Polymerisation of amino acid takes place
- d) Glutamate = α -ketoglutarate + NH_3

29. Tyrosine is degraded to acetoacetyl CoA and fumarate and is described as a

- a) Glucogenic amino acid
- b) Ketogenic and glucogenic amino acid
- c) Ketogenic amino acid
- d) Keto-gluco amino acid

30. An example of the oxidative deamination is

- a) Glutamate = hexanoic acid + NH_3
- b) Aspartate + α -ketoglutarate = Glutamate + Oxaloacetate
- c) Glutamate = α -ketoglutarate + NH_3
- d) Aspartate + Hexanoic acid = Glutamate + Oxaloacetate

31. A ketogenic amino acid is one which degrades to

- a) Keto-sugars
- b) Either acetyl CoA or acetoacetyl CoA
- c) Pyruvate or citric acid cycle intermediates
- d) Multiple intermediates including pyruvate or citric acid cycle intermediates and acetyl CoA or acetoacetyl CoA

32. A person suffering from phenylketonuria on consumption food containing high phenylalanine may lead to the accumulation of

- a) Phenylalanine
- b) Tyrosine
- c) Phenylpyruvate
- d) Isoleucine

33. The nitrogen atoms of urea produced in the urea cycle are derived from

- a) Nitrate
- b) Nitrite
- c) Ammonia and aspartic acid
- d) Ammonia

34. Which of the following amino acids is a precursor to cysteine?

- a) Threonine
- b) Phenylalanine
- c) Methionine
- d) Lysine

35. Coenzyme for transamination is:

- a) Thiamine pyrophosphate
- b) FAD
- c) Pyridoxal phosphate
- d) Cyanocobalamin

36. If the amino group and a carboxylic group of the amino acid are attached to same carbon atom, the amino acid is called as

- a) Alpha
- b) Beta
- c) Gamma
- d) Epsilon

37. Histidine is degraded to α -ketoglutarate and is described as a

- a) gluco amino acid
- b) ketogenic amino acid
- c) glucogenic amino acids
- d) keto-gluco amino acid

38. Which one of the following statements concerning a one-week-old male infant with undetected classic phenylketonuria is correct?

- a) Tyrosine is a non-essential amino acid for the infant
- b) High levels of phenylpyruvate appear in the urine
- c) A diet devoid of phenylalanine should be initiated immediately
- d) Therapy must begin within the first year of life

39. The phenylalanine metabolism is blocked in the metabolic disease phenylketonuria.

Which of the following product is formed during the normal metabolism of phenylalanine by phenylalanine hydroxylase?

- a) Tyrosine
- b) Phenylacetate
- c) Phenylpyruvate
- d) Phenyl lactate

- 40. The conversion of serine to glycine is catalyzed by an enzyme serine hydroxymethyltransferase. The co-substrate required for this reaction is:**
- a) Biotin
 - b) Tetrahydrobiopterin
 - c) Pyridoxal Phosphate
 - d) Tetrahydrofolate
- 41. Ammonia is trapped in brain by:**
- a) Glutamine synthetase reaction
 - b) urea synthesis cycle
 - c) Glutaminase reaction
 - d) Glutamate dehydrogenase reaction
- 42. Pyridoxal phosphate is the coenzymes of which reactions?**
- a) Transamination reactions
 - b) L-amino acid oxidase
 - c) Glutamate dehydrogenase
 - d) Formimino glutamic acid to glutamate
- 43. Creatine is synthesized from the following amino acids, except:**
- a) Arginine
 - b) Aspartic acid
 - c) Glycine
 - d) Methionine
- 44. The sources of oxalic acid in urine are:**
- a) Ornithine and Citrulline
 - b) Oxalosuccinate and formic acid
 - c) Oxaloacetate and aspartic acid
 - d) Ascorbic acid and glycine
- 45. Urine of a 12 years old boy gave a positive cyanide nitroprusside test. He had renal stones. He is likely to have:**
- a) Homocystinuria
 - b) Hartnup disease
 - c) Cystinosis
 - d) Renal glycosuria
- 46. Ammonia is very toxic substance, especially for nervous system. What substance takes the most active part in ammonia detoxication in brain tissues?**
- a) Glutamic acid
 - b) Lysine
 - c) proline
 - d) Histidine
- 47. A patient has pellagra. Interrogation that he had lived mostly on maize for a long time and eaten little meat. This disease had been caused by the deficit of the following substance in the maize:**
- a) Tryptophan
 - b) Tyrosine
 - c) Proline
 - d) Alanine
- 48. Albinos can't stand sun impact – they don't acquire sun tan but get sunburns. Disturbed metabolism of what amino acid underlies this phenomenon?**
- a) Phenylalanine
 - b) Methionine
 - c) Tryptophan
 - d) Glutamic acid
- 49. Glycine is used for synthesis of all the following compounds, except:**
- A) Serine
 - B) Cytosine
 - C) Pyrimidine ring
 - D) Heme
- 50. In the body, glycine is used for synthesis of all the following substances, except:**
- A) Guanine
 - B) Glutamine
 - C) Glutathione
 - D) Creatinine
- 51. Normal serum creatinine level is:**
- A) 0.2-0.4mg/dL
 - B) 0.3-0.6mg/dL
 - C) 0.7-1.4mg/dL
 - D) 1.4-2.8mg/dL
- 52. Serine is a precursor of all the following, except:**
- A) Methionine
 - B) Glycine
 - C) Choline
 - D) Cysteine
- 53. The methyl donor in methyl transfer reaction is:**
- A) Methyl cobalamin
 - B) Methylmalonyl-CoA
 - C) S-adenosyl methionine
 - D) S-adenosyl homocysteine
- 54. Name the defective enzyme in cystathionuria:**
- A) Cystathionase
 - B) Phenylalanine hydroxylase
 - C) Homogentisic oxidase
 - D) Para-hydroxyphenylpyruvate oxidase
- 55. The urine of a patient with homocystinuria will be positive for:**
- A) Benedict's test
 - B) Ferric chloride test
 - C) Rothera's test
 - D) Cyanide- nitroprusside test

56. Alanine on transamination gives rise to:

- A) Pyruvic acid
B) Para-hydroxyphenylpyruvate
C) Phenylpyruvate
D) Hydroxypyruvate

57. Transamination of glutamic acid leads to:

- A) Glutamine
B) Alpha-ketoglutaric acid
C) Beta-hydroxy-beta-methylglutaric acid
D) Gamma-aminobutyric acid

58. Lysine is:

- A) Deficient in cereals (rice, wheat)
B) Deficient in pulses (dal, bengal gram)
C) Mainly glucogenic
D) A nonessential amino acid

59. Alpha amino group of aspartic acid is incorporated into all the following compounds, except:

- A) Adenine
B) Cytosine
C) Urea
D) Creatine

60. Branched chain keto acids are excreted in urine in large quantities in:

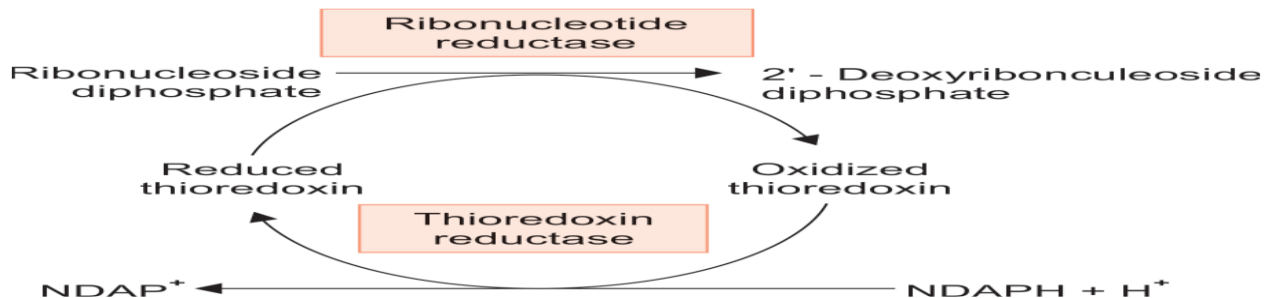
- A) Phenylketonuria
B) Maple syrup urine diseases
C) Tyrosinosis
D) Hartnup's disease

Metabolism of Purines and Pyrimidines

1. End product of purine metabolism in non-primate mammals is:

- a). Uric acid
b). Ammonia
c). Urea
d). Allantoin

2. Deoxyribonucleic acid is formed from:



- a). Ribonuclease
b). Ribonucleotide monophosphate
c). Ribonucleotide diphosphate
d). Ribonucleotide triphosphate

3. What is involved in formation of d-TMP from d-UMP?

- a). N⁵, N¹⁰-methylene tetrahydrofolate
b). From iminofolate
c). N⁵ formylfolate
d). Dihydrofolate

4. Inosinic acid is biological precursor:

- a). Uracil and thymine
b). Purines and thymine
c). Adenylic acid and guanylic acid
d). Orotic acid and uridylic acid

5. False regarding gout is:

- a). Due to increased metabolism of pyrimidines
b). Due to increased metabolism of purines
c). Uric acid levels may not be elevated
d). Has a predilection for the great toe

6. The enzyme deficient in Lesch-Nyhan syndrome is:

- a). GTRT
b). Glutaminase
c). Transcarboxylase
d). HGPRTase

7. A 10-year-old child presents with history of rashes self mutilation family history positive which of the following investigations do you think may be suggestive of valuable for diagnosis:

- a). Lead
b). Alkaline phosphatase

c). L D H

d). Uric acid

8. A ten-year-old child with aggressive behavior and poor concentration is brought with presenting complaints of joint pain and reduced urinary output. Mother gives history of self-mutilate his finger. Which of the following enzymes is likely to be deficient in this child:

a). HGPRTase

b). Adenosine deaminase

c). APRTase

d). Acid maltase

9. A patient with increased Hypoxanthine and Xanthine in blood with hypouricemia which enzyme is deficient?

a). HGPRTase

b). Xanthine oxidase

c). Adenosine deaminase

d). APRTase

10. Choose the incorrect statement. Lesch-Nyhan Syndrome:

a). Affects young boys

b). Presents with gouty arthritis

c). The enzyme defect enhances the reutilization of purine bases

d). Bizarre behavior of self-mutilation

11. Hyperuricemia is not found in:

a). Cancer

b). Psoriasis

c). Von Gierke's disease

d). Xanthinuria

Metabolism of Purines and Pyrimidines

12. End product of purine metabolism in non-primate mammals is:

a). Uric acid

b). Ammonia

c). Urea

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a). Due to increased metabolism of pyrimidines

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14. Hyperuricemia is not found in:

a). Cancer

b). Psoriasis

c). Von Gierke's disease

d). Xanthinuria

15. Pyrimidine biosynthesis begins with the formation from glutamine, ATP and CO₂, of

a) Carbamoyl aspartate

b) Orotate

c) Carbamoyl phosphate

d) Dihydroorotate

16. The two nitrogen of the pyrimidine ring are contributed by

a) Ammonia and glycine

b) Aspartate and carbamoyl phosphate

c) Glutamine and ammonia

d) Aspartate and ammonia

17. A substrate for enzymes of pyrimidine nucleotide biosynthesis is

a) Allopurinol

b) Tetracylin

c) Chloramphenicol

d) Puromycin

18. Conversion of inosine monophosphate to xanthine monophosphate is catalysed by

a) IMP dehydrogenase

b) Formyl transferase

c) Xanthine-guanine phosphoribosyl transferase

d) Adenine phosphoribosyl transferase

19. Blood of a 12-year-old boy presents low concentration of uric acid and accumulation of xanthine and hypoxanthine. This child has genetic defect of the following enzyme:

a) Xanthine oxidase

b) Arginase

c) Urease

d) Ornithine carbamoyl transferase

20. An experiment proved that UV-radiated cells of patients with xeroderma pigmentosum restore the native DNA structure slower than cells of healthy individuals as a result of reparation enzyme defection. What enzyme helps this process?

- a) Endonuclease
- b) RNA ligase
- c) Primase
- d) DNA polymerase III

21. A 48-year-old patient complained about intense pain, slight swelling and reddening of skin over the joints, temperature rise up to 38°C. Blood analysis revealed high concentration of urates. This condition might be caused by disturbed metabolism of:

- a) Purines
- b) Collagen
- c) Pyrimidines
- d) Carbohydrates

22. Cyanide is a poison that causes instant death of the organism. What enzymes found in mitochondria are affected by cyanide?

- a) Cytochrome oxidase (aa3)
- b) Flavin enzymes
- c) Cytochrome B5
- d) NAD⁺- dependent dehydrogenase

Plasma proteins

1. Researchers isolated 5 isoenzymes forms of lactate dehydrogenase from the human blood serum and studied their properties. What property indicates that the isoenzymatic forms were isolated from the same enzyme?

- a) Catalyzation of same reaction
- b) the same molecular weight
- c) the same physicochemical properties
- d) tissue localization

2. Plasma albumin performs the following functions:

- a) Osmotic;
- b) Transport;
- c) Nutritive;
- d) All of them;

3. The immunoglobulin present in most abundant quantity;

- a) IgG;
- b) IgA;
- c) IgM;
- d) IgE;

4. The following anticoagulant binds with Ca²⁺ and prevents blood clotting:

- a) Heparin;
- b) Oxalate;
- c) protein;
- d) all of them.

5. Normal level of albumin in blood is:

- a) 1.5 – 2.5 mg/dL
- b) 2.5 – 3.5 mg/dL
- c) 2.5 – 3.5 mg/dL
- d) 3.5 – 5.0 mg/dL

6. Hypoalbuminemia is seen in all the following conditions, except:

- a. Cirrhosis of liver
- b. Nephrotic syndrome
- c) Malnutrition
- d) acute infections

7. Hemopexin carries:

- a. Free hemoglobin
- b. Free bilirubin
- c) free heme
- d) free iron

8. All the following are acute phase reactant proteins, except:

- a) C-reactive protein (CRP)
- b) HDL
- c) ceruloplasmin
- d) Haptoglobin

9. Polymorphism is exhibited by all the following proteins, except:

- a) Haptoglobin
- b) Transferrin
- c) albumin
- d) ceruloplasmin

10. Wilson's hepatolenticular degeneration is characterized by:

- a. ceruloplasmin level in blood is increased
- b) copper accumulated in liver to produce cirrhosis
- c) copper is deposited in skin to produce bronze color

d) autosomal dominant inheritance

11. All are true with regard to alpha-1 antitrypsin (AAT), expert:

- a. it is a protease inhibitor
- b. in shows polymorphism
- c) deficiency leads to emphysema in lungs
- d) deficiency is associated with Edema

12. Albumin level in blood is estimated by:

- a. Jaffe's picric acid reaction
- b) Bromo cresol green reaction
- c) diacetyl monoxine method
- d) Chromatography

13. Which reaction takes place exclusively in liver:

- a. Cluconeogenesis
- b. Glycolysis
- c) Glycogen synthesis
- d) Albimun synthesis

14. In blood, allarebound with albumin, expert:

- a. Non-esterified fatty acids
- b. Bilirubin
- c) Iron
- d) salicylate

15. Electrophoretic separation of proteins is of diagnostic value in all conditions, expert:

- a. Hephrotic syndrome
- b. Multiple myeloma
- c) alpha-1 antitrypsin deficiency
- d) acquired immunodeficiency syndrome

16. Edema due to hypoproteinemia may be seen in all the following clinical conditions, expert:

- a) Rheumatoid arthritis
- b) Cirrhosis liver
- c) Malnutrition
- d) Nephrotic syndrome

17. Heme biosynthesis do not occur in:

- a) Osteocyte
- b) Liver
- c) RBC
- d) Erythroid cells of bone marrow

18. In lead poisoning which of the following is seen in urine:

- a) delta ALA
- b) uroporphyrin
- c) coproporphyrin
- d) protoporphyrin

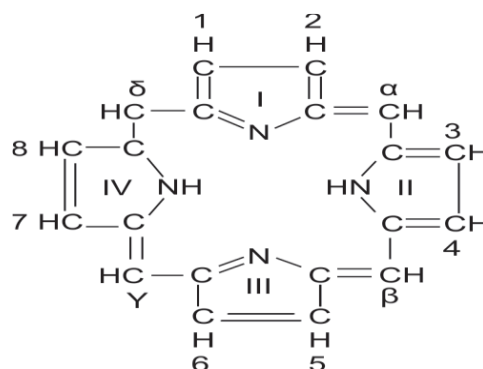
19. In HbS, Clutamic acid replaced by valine. What will be its electrophoretic mobility?

- a) Incresed
- b) Decreased
- c) No change
- d) Depends on level of concentration of HbS

20. Which of the following porpyrias does not present with photosensitryvity:

- a) urophophyrin decarboxylase
- b) HMG synthase
- c) protophophrinogen oxidase
- d) Coproprophyrinogen oxidase

21. Identy the structure given below?



- a) Porphyrin
- b) Heme
- c) Chlorophyll
- d) Pyrrole

22. A 10-year-old boy present with increased serum bilirubin, increased bilirubin in urine and no urobilinogen. Diagnosis is:

- a) Gilbert Syndrome
- b) Hemolytic jaundice
- c) Viral hepatitis
- d) Obstructive jaundice

23. Which Vitamin is required for carboxylation of clotting factors?

- a) Vitamin A
- b) Vitamin D
- c) Vitamin E
- d) Vitamin K

24. Electrophoretic separation of proteins is of diagnostic value in all conditions, except:

- a) Nephrotic syndrome
- b) Multiple myeloma
- c) Alpha-1 antitrypsin deficiency
- d) Acquired immunodeficiency syndrome

25. Normal level of albumin in blood is:

- a) 1,5-2,5 md/dl
- b) 2,5-3,5 md/dl
- c) 2,5-3,5 g/dl
- d) 3,5-5 g/dl

26. Wilson's hepatolenticular degeneration is characterized by:

- a) Ceruloplasmin level in blood is increased
- b) Copper is accumulated in liver to produce cirrhosis
- c) Copper is deposited in skin to produce bronze color
- d) Autosomal dominant interitance

27. One of the plasma proteins listed below is not a transport protein (carrier protein):

- a) Transferrin
- b) Haptoglobin
- c) Albumin
- d) alpha-1-antitrypsin

28. The protein present in highest concentration in plasma is:

- a) Fibrinogen
- b) Albumin
- c) Gamma globulins
- d) Alpha globulins

29. Which of the following is not transported by albumin?

- a) Calcium
- b) Sodium
- c) Copper
- d) Aspirin

30. A patient has an increased pyruvate concentration in blood. A large amount of it is excreted with the urine. Which vitamin is lacking in this patient?

- a) B1
- b) E
- c) B3
- d) B6

31. a 62-year-old female patient has developed a cataract (lenticular opacity) secondary to the diabetes mellitus? What type of protein modification is observed in case of diabetic cataract?

- a) Glycosylation
- b) Phosphorylation
- c) ADP-ribosylation
- d) Methylation

32. Untrained people often have muscle pain after sprints as a result of lactate accumulation. This might be caused by intensification of the following biochemical process:

- a) Glycolysis
- b) Gluconeogenesis
- c) pentose phosphate pathway
- d) Lipogenesis

MCQ: Hemoglobin

1. When oxygen binds to a heme-containing protein, the two open coordination bonds of Fe²⁺ are occupied by:

- a) One O atom and one amino acid atom
- b) One O₂ molecule and one heme atom
- c) One O₂ molecule and one amino acid atom
- d) Two O atoms

2. In Hemoglobin, the transition from T state to R state (low to high affinity) is triggered by:

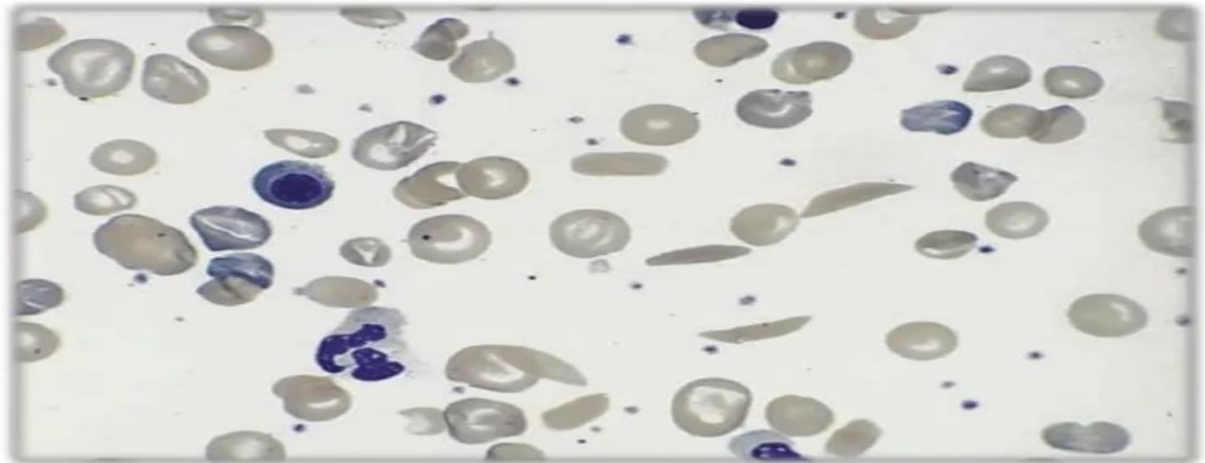
- a) Fe binding
- b) Oxyden binding
- c) Heme binding
- d) Subunt dissociation

3. Myoglobin and the subunits of hemoglobin have

- a) No obvious structural relationship
- b) Very different primary and tertiary structures

17. Which one of the following statements concerning the hemoglobin is correct?
- HbA is the most abundant hemoglobin in normal adults
 - Fetal blood has a lower affinity for oxygen than does adult blood because HbF has an increased affinity for 2,3-biphosphoglycerate
 - The globin chain composition of HbF is $\alpha_2\delta_2$
 - HbA1c differs from HbA by a single, genetically determined amino acid substitution.
18. Which one the following statements concerning ability of acidosis to precipitate a crisis in sickle cell anemia is correct?
- Acidosis decreases the solubility of HbS
 - Acidosis increases the oxygen affinity of hemoglobin
 - Acidosis favors the conversion of hemoglobin from the taut to the relaxed conformation
 - Acidosis shifts the oxygen-dissociation curve to the left
19. β -Lysine 82 in HbA is important for the binding of 2,3-biphosphoglycerate. In Hb Helsinki, this amino acid has been replaced by methionine. Which of the following should be true concerning Hb Helsinki?
- It should be stabilized in the taut, rather than the relaxed, form
 - It should have increased oxygen affinity and consequently, decreased oxygen delivery to tissues
 - Its oxygen-dissociation curve should be shifted to the right relative to HbA
 - It results in anemia
20. A 67-year-old man presented to the emergency department with a 1-week history of angina and shortness of breath. He complained that his face and extremities had taken on a blue color. His medical history included chronic stable angina treated with isosorbide dinitrate and nitroglycerin. Blood obtained for analysis was brown. Which one of the following is the most likely diagnosis?
- Carboxyhemoglobinemia
 - Hemoglobin SC disease
 - Methemoglobinemia
 - Sickle cell anemia
21. A 27-year-old firefighter is brought to the emergency room after being exposed to smoke during a training exercise. He is clutching his head and exhibits an altered mental status. On examination, you note that he appears red, and his pulse oximetry reads 100%. You suspect carbon monoxide toxicity. What is true of the oxygen saturation curve during carbon monoxide toxicity?
- The oxygen saturation curve is shifted to the left
 - The oxygen saturation curve is shifted to the right
 - The effect of carbon monoxide on hemoglobin is similar to that of a low pH state
 - The effect of carbon monoxide on hemoglobin is similar to that of an increased temperature state
22. In deoxyhemoglobin (Hb), the Fe (II) is 5-coordinated to:
- Four nitrogen of heme and to the proximal His. Of Hb
 - Four nitrogen of heme and to a water molecule
 - Four nitrogen of heme and to an O₂ molecule
 - Two nitrogen of heme and to three water molecules
23. In sickle cell anemia, the basis of the malfunction of the hemoglobin molecule
- Incorrect secondary structure
 - Substitution of a single amino acid
 - Faulty binding of the heme groups
 - Reduced affinity for oxygen
24. Hemoglobin has a high content of this amino acid
- Proline
 - Leucine
 - Arginine
 - Histidine

25. A 7-year-old African American male is admitted to the hospital with severe abdominal pain. A blood workup indicated anemia, and an abnormal blood smear (see below). The molecular event triggering this disease is which of the following?



- a) A loss of quaternary structure of the hemoglobin molecule
b) An increase in oxygen binding to hemoglobin
c) A gain of ionic interactions, stabilizing the "T" form of hemoglobin
d) An increase in hydrophobic interactions between deoxyhemoglobin molecules
26. The pigment in red blood cells that carries oxygen is:
a) Erythropoietin
b) Hemoglobin
c) Melatonin
d) Urobilinogen
27. Each heme unit is derived from:
a) 4 molecules of glycine + 4 molecules of succinyl CoA
b) 8 molecules of glycine + 8 molecules of succinyl CoA
c) 4 molecules of glycine + 8 molecules of succinyl CoA
d) 8 molecules of glycine + 4 molecules of succinyl CoA
28. δ -aminolevulinic acid (ALA) synthase is located in:
a) Mitochondria
b) Nucleus
c) Cytosol
d) Lysosomes
29. Vitamin K is required for activation of the following except:
a) Prothrombin
b) Factor IX
c) Factor VI
d) Product of growth arrest specific gene Gas6
30. Diagnosis of Wilson's disease include the following except:
a) Kayser-Fleischer ring present
b) Serum Ceruloplasmin increased
c) 24-hour Urinary Copper >100 pg/24 h
d) 3 methyl histidine excretion is reduced in urine
31. In case of atrophic gastritis, a combination of intrinsic factor and vit B12 is used for treatment of:
a) Iron deficiency anemia
b) Hemolytic anemia
c) Pernicious anemia
d) Aplastic anemia
32. Hb electrophoresis is the slandered test for diagnosis of
a) Iron deficiency anemia
b) Thalassemia
c) Anemia of chronic disease
d) A Transferrinemia
33. Causes of iron deficiency anemia include:
a) Acute blood loss
b) Chronic blood loss
c) Acute hemolysis
d) All of the above
34. The antibody that is fist formed after infection is:
a) IgG
b) IgM
c) IgA
d) IgE

35. Hepatitis has led to the development of hepatic failure. Mechanism of Edema formation is activated by the impairment of the following liver function:

- a) Protein-synthetic
- b) Barrier
- c) Chologenic
- d) Antitoxic

36. Hemoglobin catabolism results in release of iron which is transported to the bone marrow by a certain transfer protein and used again for the synthesis of hemoglobin. Specify this transfer protein:

- a) Transferrin (siderophilin)
- b) Transcobalamin
- c) Haptoglobin
- d) Ceruloplasmin

37. An infectious disease unit admitted a patient with signs of jaundice caused by hepatitis virus. Select an indicator that is specific only for parenchymatous jaundice:

- a) Increase in ALT and AST rate
- b) Hyperbilirubinemia
- c) Bilirubinuria
- d) Cholaemia

38. A 20-year-old patient complains of general weakness, dizziness, quick fatgability. Blood analysis results: Hb-80 g/l. Microscopical e[amination results: erythrocytes are of modified form. This condition might be caused by:

- a) Sickle-cell anemia
- b) Hepatocellular jaundice
- c) acute intermittent porphyria
- d) Addison's disease

Liver and gastric function test

1. All enzymes are elevated in obstructive liver disease, expert:

- a) Gamma-glutamyltransferase (GGT)
- b) 5-nucleotidase (NTP)
- c) Alkaline phosphatase (ALP)
- d) Lactate dehydrogenase (LDH)

2. All are features of obstructive jaundice, expert:

- a) Increased level of conjugated bilirubin in blood
- b) Clay colored stools
- c) Present of bile salts in urine
- d) Increased excretion of urobilinogen in urine

3. A patient with infective hepatitis is likely to have all the following, expert:

- a) Hyperbilirubinemia
- b) Bilirubinemia
- c) Absence of bile salts in urine
- d) Elevated AST

4. An increase in serum unconjugated bilirubin occurs in:

- a) Hemolytic jaundice
- b) Obstructive jaundice
- c) Defect in intestinal absorption
- d) Glomerulonephritis

5. Conjugated hyperbilirubinemia with raised alkaline phosphatase levels are characteristic of:

- a) Hemolytic jaundice
- b) Obstructive jaundice
- c) Viral hepatitis
- d) Physiological jaundice

6. Which of the following is the nonfunctional plasma enzymes increased in alcoholic subjects?

- a) Alkaline phosphatase
- b) Acid Phosphatase
- c) Lactate dehydrogenase
- d) Gamma-glutamyltransferase

7. Hypoacidity is found in all the following conditions, except:

- a) Pernicious anemia
- b) Carcinoma of stomach
- c) Insulinoma
- d) Atrophic gastritis

8. All the following biochemical parameters are indices of liver function, except:

- a) Bilirubin
- b) Cholesterol
- c) Albumin
- d) Creatinine

9. A patient with infective hepatitis is likely to have all the following findings, except:

- a) Hyperbilirubinemia
- b) Bilirubinuria
- c) Absence of bile salts in urine
- d) Elevated AST

10. Which enzyme test is more specific for parenchymal (hepatocellular) liver disease?

- a) Acid phosphatase
c) Lactate dehydrogenase (LDH)
- b) Alanine aminotransferase (ALT)
d) Amylase

11. Which hormone has no effect on gastric acid secretion?

- a) Cholecystokinin
c) Gastrin
- b) Secretin
d) Somatomedin

12. Which of the following tests is not indicated in a patient with generalized edema?

- a) Liver function test
c) Thyroid function test
- b) Renal function test
d) Pancreatic function test

13. Which of the following biochemical findings does not agree with acute hepatic failure?

- a) Respiratory alkalosis
c) Lactic acidosis
- b) Hyperammonemia
d) Uremia

14. The laboratory data that is against a diagnosis of obstructive jaundice is:

- a) High alkaline phosphatase level
c) Elevated serum cholesterol level
- b) Increased excretion of urobilinogen in urine
d) Direct positive van den Bergh reaction

15. Disease of the _____ is a common cause of obstructive jaundice.

- a) Pancreas
c) Heart
- b) Gallbladder
d) Liver

16. _____ is responsible for the yellow coloring in jaundice.

- a) Urobilinogen
c) Bilirubin
- b) Carotene
d) AST

17. _____ is a group of enzymes found mainly in bone, liver, intestines, and placenta.

- a) AST
c) SGPT
- b) ALT
d) ALP

18. _____ transports unconjugated bilirubin to the liver.

- a) Globulin
c) AST
- b) Albumin
d) ALP

19. Jaundice caused by an obstructive pathology of the biliary tree, is known as _____.

- a) Prehepatic
c) Hepatic
- b) Post hepatic
d) Splenohepatic

20. Highest elevations with AST is seen in viral _____.

- a) Hepatitis
c) Influenza
- b) Meningitis
d) Pneumonia

21. A patient present with jaundice, abdominal pain, and nausea. Clinical laboratory results show in serum conjugated bilirubin, presence of urinary bilirubin but absence of urine urobilinogen. What is the most likely cause of the jaundice?

- a) Decreased hepatic conjugation
b) Decreased secretion of bile into the intestine
c) Decreased hepatic uptake
d) Increased hemolysis

22. _____ is responsible for the yellow coloring in jaundice.

- a) Bilirubin
b) Urobilinogen
- c) urobilin
d) stercobilin

23. Which of the following is produced in the bones?

- a) GGT
b) ALT
- c) Protrombin
d) AST

24. An important function the liver carries out in the human body is detoxification. Which of the following best describes what happens in detoxification?

- a) Ammonia is converted into urine and excreted
b) Harmful or toxic substances in the body broken down or neutralized

- c) Bile is produced to detoxify excess stomach acid
- d) Excess carbon dioxide is broken down into its components: carbon and oxygen

25. Which of the following is an example of a toxic substance that is broken down by the cells in the cells in the liver?

- a) Bile
- b) Erythrocytes
- c) pepsin
- d) Ethanol

26. An important function the liver has in the human body is to carry out the deamination of amino acids. What happens to an amino acid undergoing deamination?

- a) It has an amino acid group added
- b) It has an amino acid group removed
- c) It is converted into ammonia
- d) It reacts with ammonia to form carbon dioxide

27. The liver is vital for excretion in humans. Which of the following best explains excretion?

- a) Excretion is the removal of excess water and food from the body
- b) Excretion is the removal of excess water and food from the body
- c) Excretion is the production of sweat from the sweat glands in the skin
- d) Excretion is the process by which waste products are converted into useful compounds for the body

28. A 37 year old patient suffering from obliterating vascular endarteritis of lower limbs takes daily 60 microgram/kilogram of phenylin. Because of presentations of convulsive disorder (craniocerebral trauma in anamnesis) he was prescribed phenobarbital. Withholding this drug caused nasal hemorrhage. What is this complication connected with?

- a) Induction of enzymes of microsomal oxidation in liver caused by phenobarbital;
- b) Aliphatic hydroxylation of phenobarbital;
- c) Conjugation of phenylin with glucuronic acid;
- d) Oxidative deamination of phenylin. Inhibition of microsomal oxidation in liver caused by phenobarbital;

29. During starvation muscle proteins break up into free amino acids. These compounds will be the most probably involved into the following process:

- a) gluconeogenesis in liver
- b) synthesis of higher fatty acids
- c) gluconeogenesis in muscles
- d) glycogenolysis

30. A 3 year old child with fever was given aspirin. It resulted in intensified erythrocyte haemolysis. Hemolytic anemia might have been caused by congenital insufficiency of the following enzyme:

- a) Glucose-6-phosphate dehydrogenase
- b) Glycogen phosphorylase
- c) glucose-6-phosphatase
- d) Glycerol phosphate dehydrogenase

31. The normal concentration of the serum bilirubin is

- a) 0,2-1 mg/dl
- b) 1-2 mg/dl
- c) 0,2-0,4 mg/dl
- d) 2-3 mg/dl

32. The condition in which the colour of the sclera of the eye and skin become yellow is termed as:

- a) Jaundice
- b) Plague
- c) yellow fever
- d) Congo fever

33. High level of the bilirubin is observed in

- a) Gallstone
- b) Plague
- c) Chronic hepatitis
- d) Both A and B

34. The excretory functions of the liver include

- a) bile pigment secretion
- b) excretion of the cholesterol
- c) bile salt secretion
- d) all of above

35. the major site for the detoxification of the xenobiotic is

- a) kidney
- b) stomach
- c) intestine
- d) liver

36. The increased activity of the alkaline phosphatase, alanine transaminase and aspartate transaminase may result in

- a) Haemolytic jaundice
- b) hepatic jaundice
- c) none of above
- d) obstructive jaundice

37. The process of the phagocytosis to eliminate foreign compounds is done by

- a) Kupffer cells of liver
- b) Epithelial cells
- c) oxyntic cells
- d) Metabolic cells

38. Best explained pathogenesis of fatty liver in alcoholic liver disease

- a) Increased hydrolysis of fat from adipocytes
- b) Decreased synthesis of fatty acids
- c) Decreased [NADH]/[NAD⁺] ratio
- d) Impaired beta oxidation of fatty acids

39. After consumption of rich food, a patient has nausea and heartburn, steatorrhea. This condition might be caused by:

- a) bile acid deficiency
- b) increased lipase secretion
- c) amylase deficiency
- d) disturbed phospholipase synthesis

40. Characteristic sign of glycogenesis is muscle pain during physical work. Blood examination reveals usually hypoglycemia. This pathology is caused by congenital deficiency of the following enzyme:

- a) Glycogen phosphorylase
- b) Glucose 6-phosphate dehydrogenase
- c) Alpha amylase
- d) Gamma amylase

41. A 46-year-old woman suffering from cholelithiasis developed jaundice. Her urine became dark-yellow and feces became colourless. Blood serum will have the highest concentration of the following substance:

- a) Conjugated bilirubin
- b) unconjugated bilirubin
- c) Biliverdin
- d) Mesobilirubin

Biochemistry of kidney

1. The amino acid producing ammonia in kidney is

- a) Glutamine
- b) Alanine
- c) Methionine
- d) Glycine

2. Kidney is an excretory organ. It also performs another function of releasing the hormones. What are these hormones?

- a) Renin
- b) Erythropoietin
- c) calcitriol
- d) all of these

3. Which of the following components of blood does not enter the nephron?

- a) Ions
- b) Plasma proteins
- c) glucose
- d) urea

4. The process that pushes out water and dissolved materials from in the glomerulus is

- a) Dialysis
- b) Secretion
- c) ultrafiltration
- d) not dialysis

5. Which of the following parts of nephron is least permeable to water?

- a) Proximal tubule
- b) Ascending limbs of loop of Henle
- c) collecting duct
- d) descending limbs of loop of Henle

6. Chronic kidney disease increase the risk of

- a) Heart attacks and strokes
- b) skin troubles
- c) Malaria
- d) diabetes and eye problems

7. Diuresis is the condition which

- a) the excretory volumes of urine increases
- b) the kidney fails to excrete urine
- c) the water balance of the body is disturbed
- d) the excretory volumes of urine decreases

8. In the presence of vasopressin, the greatest fraction of filtered water is absorbed in

- a) Loop of Henle
- b) collecting tubule
- c) proximal convoluted tubule
- d) distal convoluted tubule

9. Podocytes are the cells present in

- a) cortex of nephron
- b) inner wall of Bowman's capsule
- c) outer wall of Bowman's capsule
- d) wall of glomerular capillaries

10. Fluid within the loop of Henle is most concentrated in

- a) ascending limb
- b) descending limb
- c) Hairpin bend
- d) Bend between the ascending limb and the distal tubule

11. Surgical removal of both the kidneys would result in death because

- a) water will accumulate in blood
- b) immune response will be suppressed
- c) glucose will be lost from the body
- d) urea will not be excreted

12. All the following statements are true of the H^+ secreted into the lumen of the distal nephron except:

- a) can combine with NH_4^+
- b) can combine with HCO_3^-
- c) can combine with HPO_4^{2-}
- d) can remain as free H^+

13. Amino acids are almost completely reabsorbed from the glomerular filtrate via active transport in the:

- a) Proximal tubule
- b) loop of Henle
- c) Distal tubule
- d) collecting duct

14. Ammonia is an important urinary buffer for which of the following reasons:

- a) its production in the kidney decreases during chronic acidosis
- b) the walls of the renal tubules are impermeable to NH_3
- c) the walls of the renal tubules are impermeable to NH_4^+
- d) its acid base reaction has a low pK_a

15. An increase in the concentration of plasma potassium causes increase in

- a) release of renin
- b) secretion of aldosterone
- c) secretion of ADH
- d) release of natriuretic hormone

16. Which indicates an abnormal renal function?

- a) blood urea 30 mg/dl
- b) GFR = 125 ml/min
- c) Serum creatinine 8 mg/dl
- d) Urine pH = 6.8

17. Normal specific gravity of urine is:

- A) 1.003-1.010
- B) 1.010-1.015
- C) 1.015-1.025
- D) 1.025-1.035

18. Specific gravity of urine increases in:

- A) Chronic glomerulonephritis
- B) Diabetes mellitus
- C) Liver diseases
- D) Intake of vegetables

19. Renal plasma flow is measured by:

- A) Creatinine clearance
- B) Inulin clearance
- C) Para-aminohippurate clearance
- D) Urine output

20. Urea clearance is lowered in:

- A) Acute nephritis
- B) Chronic liver failure
- C) Benign hypertension
- D) Congestive cardiac failure

21. Failure of concentrating capacity of urine is assessed by:

- A) Urea clearance
- B) Water deprivation test
- C) Specific gravity of urine after giving water
- D) Creatinine level in urine

22. Urine will have abnormal color in all the following conditions, except:

- A) Melanuria
- B) Porphyruria
- C) Creatinuria
- D) Alkapturia

23. All of the following statements regarding glomerular filtration is correct, except:

- A) GFR is approximately equal to endogenous creatinine clearance
- B) Measurement of GFR is a test of renal tubular function

- C) Glomerular filtrate has a specific gravity of 1010
- D) Glomerular filtrate is formed by ultrafiltration of plasma

24. All are functions of the kidney, except:

- A) Excretion of hydrogen ions
- B) Detoxification of alcohol
- C) Stimulation of erythropoiesis
- D) Formation of 1,25 DHCC

25. To calculate the creatinine clearance, all the following data are required, except:

- A) Plasma creatinine level
- B) Patient's height and weight
- C) Daily urine output
- D) Specific gravity of urine

26. All the following laboratory data are suggestive of acute renal failure, except:

- A) Plasma sodium-150mmol/L
- B) Plasma potassium-5.6mmol/L
- C) Urea-220mg/dL
- D) Creatinine-3.2 mg/dL

27. Which ion is decreased in renal failure?

- A) Phosphate
- B) Potassium
- C) Bicarbonate
- D) Hydrogen ions

28. Plasma urea is increased but creatinine is normal in all the following, except:

- A) High protein intake
- B) Gastrointestinal bleeding
- C) Starvation
- D) Muscle wasting

29. Which substance is not normally present in urine?

- A) Creatinine
- B) Glucose
- C) Uric acid
- D) Urobilinogen

30. The level of creatinine in urine is influenced by:

- A) Protein content of diet
- B) Rate of cellular turn over
- C) Muscle mass
- D) Patency of urinary tract

Glomerular Function of Kidney

17. The following are the endocrine function of the kidney, except:

- a) Erythropoietin secretion
- b) Synthesis of Prostaglandins
- c) Synthesis of Vit D3
- d) Synthesis of Angiotensin

18. Normally, proteins with a molecular weight higher than 65kda are retained in the plasma, Some small size protein is filtered through the kidney by which of the following mechanism:

- a) Protein channels
- b) Cotransport with Na⁺
- c) Endocytosis
- d) None of the above

19. The rate of filtration in the kidney depends on

- a) Glomerular Permeability
- b) Oncotic pressure
- c) Capillary hydrostatic pressure
- d) All of the above

20. Which of the following factor increases the glomerular filtration rate (GFR)?

- a) Antidiuretic hormone
- b) Nitric oxide
- c) Arterial Natriuretic peptide
- d) Dopamine

21. Under the normal condition, the glomerular filtrate in the Bowmans capsule of nephron consists of the following EXCEPT:

- a) Major electrolytes such as sodium, chloride, potassium, bicarbonate
- b) Metabolic waste products such as urea, creatinine
- c) Amino Acids, Glucose, Organic Acids
- d) Proteins such as albumin and globulin

22. The glomerular filtration rate is the rate at which fluid is filtered into Bowman's capsule and it is expressed in ml/min or liter/day. The GFR for healthy adults is 180 L/day which is equivalent to approximately

- a) 90 ml/min
- b) 120 ml/min
- c) 150 ml/min
- d) 180 ml/min

23. The glomerular filtration rate is determined by the balance of hydrostatic and colloidal osmotic pressure. Which of the following promote the glomerular filtration?

- a) hydrostatic pressure of glomerular capillary
- b) oncotic pressure of the glomerular capillary
- c) hydrostatic pressure of Bowman's capsule
- d) Oncotic pressure of Bowman's capsule

- a) Maple syrup urine disease and metabolic acidosis
- b) Conn's syndrome and metabolic alkalosis
- c) SIADH and hypertonic expansion
- d) Waldenström's macroglobulinemia and hyperviscosity

6. A patient with diarrhea may have all the following abnormalities, except:

- a) Metabolic acidosis
- b) Isotonic contraction of ECF
- c) Hypertonic contraction of ECF
- d) Urine with a high specific gravity

7. Which of the following has NO effect on ECF volume?

- a) ADH
- b) Aldosterone
- c) Calcitriol
- d) Renin

8. Which of the following causes hypokalemia:

- a) Hemolysis
- b) Polycythemia
- c) Leukemia
- d) Alkalosis

9. Vasopressin (ADH)

- a) Enhance facultative reabsorption of water
- b) Decreases reabsorption of water
- c) Increases excretion of calcium
- d) Decreases excretion of calcium

10. An important cause of water intoxication is

- a) Nephrogenic diabetes insipidus
- b) Renal failure
- c) Gastroenteritis
- d) Fanconi syndrome

11. Urine examination in secondary dehydration shows

- a) Ketonuria
- b) Low specific gravity
- c) High specific gravity
- d) Albuminuria

12. The element needed in quantities greater than 100 mg for human beings is

- a) Calcium
- b) Zinc
- c) Selenium
- d) Cobalt

13. The mineral present in the human body in larger amounts than any other cation is

- a) Sodium
- b) Calcium
- c) Potassium
- d) Iron

14. The physiologically active form of calcium is

- a) Protein bound
- b) Ionised
- c) Complexed with citrate
- d) Complexed with carbonate

15. Renal rickets is caused by renal tubular defect (usually inherited) which interferes with reabsorption of

- a) Calcium
- b) Phosphorous
- c) Sodium
- d) Chloride

16. After operative removal of the parathyroid glands resulting into hypoparathyroidism the concentration of the serum calcium may drop below

- a) 11 mg
- b) 10 mg
- c) 9 mg
- d) 7 mg

17. One of the principal cations of soft tissue and body fluids is

- a) Mg
- b) S
- c) Mn
- d) Co

18. Hypernatremia may occur in

- a) Diabetes insipidus
- b) Diuretic medication
- c) Heavy sweating
- d) Kidney disease

19. Intestinal absorption of magnesium is increased in

- a) Calcium deficient diet
- b) High calcium diet
- c) High oxalate diet
- d) High phytate diet

20. Deficiency of magnesium may occur with

- a) Alcoholism
c) Hypothyroidism
- b) Diabetes mellitus
d) Advanced renal failure
- 21. A decrease in serum sodium may occur in**
a) Adrenocortical insufficiency
c) Hyperparathyroidism
- b) Hypoparathyroidism
d) Thyrotoxicosis
- 22. An important cause of secondary dehydration is**
a) Dysphagia
c) Oesophageal varices
- b) Oesophageal varices
d) Gastroenteritis
- 23. The exclusive function of iron in the body is confined to the process of**
a) Muscular contraction
c) Cellular respiration
- b) Nerve excitation
d) Blood coagulation
- 24. Hypokalemia with an accompanying hypochloremic alkalosis may be observed in**
a) Cushing's syndrome
c) Hypothyroidism
- b) Addison's disease
d) Malnutrition
- 25. Important buffer system of extracellular fluid is**
a) Bicarbonate/carbonic acid
c) Plasma proteins
- b) Disodium hydrogen phosphate/sodium dihydrogen phosphate
d) Organic Phosphate
- 26. The pH of body fluids is stabilized by buffer systems. The compound which will be the most effective buffer at physiologic pH is**
a) Na_2HPO_4 pKa = 12.32
c) NH_4OH pKa = 7.24
- b) Na_2HPO_4 pKa = 7.21
d) Citric acid pKa = 3.09
- 27. All the following conditions produce isotonic expansion of extracellular fluid volume, except:**
A) Congestive cardiac failure
C) Hyperaldosteronism
- B) Infusion with normal saline
D) Pulmonary edema
- 28. Isotonic expansion of ECF:**
A) Hematocrit value
C) Specific gravity of urine
- B) Osmolality of urine
D) Urinary pH
- 29. All the following hormones affect fluid and electrolyte balance, except:**
A) Aldosterone
C) Cortisone
- B) Antidiuretic hormone
D) Thyroxine
- 30. The type of fluid electrolyte imbalance seen in a case of diabetic insipidus is:**
A) Isotonic expansion
C) Hypertonic contraction
- B) Hypotonic contraction
D) Hypertonic expansion
- 31. The major difference between intracellular fluid (ICF) and extracellular fluid (ECF) is that:**
A) ECF has a lower protein concentration than ICF
B) Chloride level is higher in ECF
C) Sodium concentration is lower in ECF
D) Phosphates form the major anion of ECF
- 32. Secretion of ADH is stimulated by all, except:**
A) Increased sodium in serum
C) Inability to retain sodium
- B) High osmolality of plasma
D) Contraction of ECF volume
- 33. A patient with diarrhea may have all the following abnormalities, except:**
A) Metabolic acidosis
C) Hypertonic contraction of ECF
- B) Isotonic contraction of ECF
D) Urine with a specific gravity
- 34. The incorrect statement regarding osmolality of ECF is:**
A) Mainly contributed by proteins
C) Dependent on sodium level
- B) Regulated by kidney
D) Sensed by thirst center

35. Hyponatremia is seen in:

- A) Addison's disease
- B) Conn's disease
- C) Diabetes insipidus
- D) Compulsive water drinking

Acid-base balance and pH

1. All are true for renal handling of acids in metabolic acidosis, except:

- a) Hydrogen ion secretion is increased
- b) Bicarbonate reabsorption is decreased
- c) Urinary acidity is increased
- d) Urinary ammonia is increased

2. Ventilation increases and more carbon dioxide is removed from the blood:

- a) pCO₂ will increase
- b) hydrogen ion concentration of the blood will decrease
- c) blood pH will decrease
- d) hydrogen ion concentration of the blood will decrease

3. A person was admitted in a coma. Analysis of the arterial blood gave the following values: PCO₂ 16 mm Hg, HCO₃ - 5 mmol/l and pH 7.1. What is the underlying acid-base disorder?

- a) Metabolic Acidosis
- b) Metabolic Alkalosis
- c) Respiratory Acidosis
- d) Respiratory Alkalosis

4. In a man undergoing surgery, it was necessary to aspirate the contents of the upper gastrointestinal tract. After surgery, the following values were obtained from an arterial blood sample: pH 7.55, PCO₂ 52 mm Hg and HCO₃ - 40 mmol/l. What is the underlying disorder?

- a) Metabolic Acidosis
- b) Metabolic Alkalosis
- c) Respiratory Acidosis
- d) Respiratory Alkalosis

5. A young woman is found comatose, having taken an unknown number of sleeping pills an unknown time before. An arterial blood sample yields the following values: pH - 6.90, HCO₃ - 13 meq/liter, PaCO₂ 68 mmHg. This patient's acid-base status is most accurately described as:

- a) Uncompensated metabolic acidosis
- b) uncompensated respiratory acidosis
- c) simultaneous respiratory and metabolic acidosis
- d) respiratory acidosis with partial renal compensation

6. A student is nervous for a big exam and is breathing rapidly, what do you expect out of the followings:

- a) Metabolic Acidosis
- b) Metabolic Alkalosis
- c) Respiratory Acidosis
- d) Respiratory Alkalosis

7. A 45- year-old female with renal failure, missed her dialysis and was feeling sick, what could be the reason?

- a) Metabolic Acidosis
- b) Metabolic Alkalosis
- c) Respiratory Acidosis
- d) Respiratory Alkalosis

8. An 80-year-old man had a bad cold. After two weeks he said, "It went in to my chest, I am feeling tightness in my chest, I am coughing, suffocated and unable to breathe!" What could be the possible reason?

- a) Metabolic Acidosis
- b) Metabolic Alkalosis
- c) Respiratory Acidosis
- d) Respiratory Alkalosis

9. A post operative surgical patient had a naso gastric tube in for three days. The nurse caring for the patient stated that there was much drainage from the tube that is why she felt so sick. What could be the reason?

- a) Metabolic Acidosis
- b) Metabolic Alkalosis
- c) Respiratory Acidosis
- d) Respiratory Alkalosis

10. The pH of the body fluids is stabilized by buffer systems. Which of the following compounds is the most effective buffer system at physiological pH?

- a) Bicarbonate buffer
- b) Phosphate buffer
- c) Protein buffer
- d) All of the above

11. Which of the following laboratory results below indicates compensated metabolic alkalosis?

- a) Low p CO₂, normal bicarbonate and, high pH
- b) Low p CO₂, low bicarbonate, low pH
- c) High p CO₂, normal bicarbonate and, low p H
- d) High pCO₂, high bicarbonate and High pH

12. The greatest buffering capacity at physiological pH would be provided by a protein rich in which of the following amino acids?

- a) Lysine
- b) Histidine
- c) Aspartic acid
- d) Leucine

13. Which of the following is most appropriate for a female suffering from Insulin dependent diabetes mellitus with a pH of 7.2, HCO₃⁻-17 mmol/L and pCO₂-20 mm HG:

- a) Metabolic Acidosis
- b) Metabolic Alkalosis
- c) Respiratory Acidosis
- d) Respiratory Alkalosis

14. All are true about metabolic alkalosis, except one:

- a) Associated with hyperkalemia
- b) Associated with decreased ionic calcium concentration
- c) Can be caused due to Primary hyperaldosteronism
- d) Can be caused due to Renin secreting tumor

15. What is the normal range of bicarbonate ion (HCO₃⁻) in arterial blood?

- a) 35-45
- b) 22-26
- c) 7.35-7.45
- d) Not listed

16. Hyperventilation (breathing in and out more air than normal) during a panic attack causes an increase in blood _____.

- a) partial pressure of CO₂ and H⁺
- b) pH
- c) H⁺
- d) partial pressure of CO₂

17. Causes of metabolic alkalosis include the following, except:

- A) Prolonged vomiting
- B) Continuous gastric aspiration
- C) Hyperventilation
- D) Ingestion of antacids

18. Biochemical findings in diabetic ketoacidosis include the following, except:

- A) pCO₂ is lowered or normal
- B) Increased anion gap
- C) Lowered bicarbonate level
- D) Elevation of plasma chloride

19. In respiratory acidosis, patient will show which of the following features?

- A) A low pCO₂
- B) Lowered plasma bicarbonate
- C) Reduced rate and depth of respiration
- D) Decreased hydrogen ion concentration in plasma

20. Administration of diuretics cause loss of potassium, which may lead to:

- A. Metabolic acidosis
- B) Respiratory acidosis
- C) Metabolic alkalosis
- D) Respiratory alkalosis

21. Which of the following conditions will produce a high anion gap acidosis?

- A) Diarrhea
- B) Renal tubular acidosis
- C) Renal failure
- D) Ureterosigmoidostomy

22. Metabolic alkalosis is characterized by:

- A) High hydrogen ion concentration in plasma
- B) Increased pCO₂
- C) Elevated chloride level in serum
- D) Low potassium level

23. Respiratory acidosis can result from all the following, except:

- A) Bronchial asthma
- B) Narcotic poisoning
- C) Poliomyelitis
- D) Artificial ventilation

24. Nonrespiratory alkalosis can result from:

- A) Persistent vomiting
- B) Salicylate poisoning
- C) Chronic renal failure
- D) Cyanotic heart disease

25. When pH falls by 1 unit, the hydrogen ion concentration

- A) Decreases 10 times
- B) Increases two fold
- C) Changes by 7 times
- D) Increases 10 times

26. Rapid correction of acidosis in a patient with hypoxia leads to:

- A) Improvement of pO₂
- B) Decreased tissue oxygenation
- C) Decreased affinity of hemoglobin for oxygen
- D) Exaggerated 2,3 BPG effect

Mineral metabolism and abnormalities

1. When ATP forms AMP

- A) Inorganic pyrophosphate is produced
- B) Inorganic phosphorous is produced
- C) Phosphagen is produced
- D) No energy is produced

2. Calcium is excreted by

- A) Kidney
- B) Kidney and intestine
- C) Kidney and liver
- D) Kidney and pancreas

3. Alcohol dehydrogenase from liver contains

- A) Sodium
- B) Copper
- C) Zinc
- D) Magnesium

4. Sodium is involved in the active uptake of

- A) D-Glucose
- B) D-Galactose
- C) L-Amino acids
- D) All of these

5. Magnesium ions are required in the reactions involving

- A) NAD
- B) FAD
- C) ATP
- D) CoA

6. An increase in carbohydrate metabolism is accompanied by temporary decrease in serum:

- A) Calcium
- B) Phosphate
- C) Iron
- D) Sodium

7. The normal serum level of phosphorus in human adult is

- A) 1–2 mg
- B) 2–3 mg
- C) 3–4.5 mg
- D) 5–7 mg

8. An inherited or acquired renal tubular defect in the reabsorption of phosphate (Vit D resistant ricket) is characterized with

- A) Normal serum Phosphate
- B) High serum phosphate
- C) A low blood phosphorous with elevated alkaline Phosphate
- D) A high blood phosphorous with decreased alkaline phosphatase

9. A rise in blood calcium may indicate

- A) Paget's disease
- B) Rickets
- C) Osteomalacia
- D) Hypervitaminosis D

10. In iron deficiency anemia

- A) The plasma bound iron is low
- B) The plasma bound iron is high
- C) Total iron binding capacity is low
- D) Both the plasma bound iron and total iron binding capacity are low

11. In hepatic diseases

- A) Both the bound iron and total iron binding capacity of the plasma may be low
- B) Both the bound iron and total iron binding capacity of the plasma may be high
- C) Only bound iron may be high
- D) Only the total iron binding capacity may be high

12. A hypochromic microcytic anemia with increased iron stores in the bone marrow may be

- A) Iron responsive
- B) Pyridoxine responsive
- C) Vitamin B12 responsive
- D) Folate responsive

13. An increased serum iron and decreased iron binding capacity is found in

- A) Fe deficiency anemia
- B) Sideroblastic anemia
- C) Folate deficiency anemia
- D) Sickle cell anemia

14. The absorption of iron is increased 2–10 times of normal in

- A) Iron deficiency anemia
- B) Pregnancy
- C) Spherocytosis
- D) Sickle cell anemia

15. Wilson's disease is a condition of toxicosis of

- A) Iron
- B) Copper
- C) Chromium
- D) Molybdenum

16. In Wilson's disease

- A) Copper fails to be excreted in the bile
- B) Copper level in plasma is decreased
- C) Ceruloplasmin level is increased
- D) Intestinal absorption of copper is decreased

17. Richest source of chromium is

- A) Brewer's yeast
B) Milk and milk products
C) Yellow vegetables
D) Green vegetables

18. Selenium is a constituent of the enzyme:

- A) Glutathione peroxidase
B) Homogentisate oxidase
C) Tyrosine hydroxylase
D) Phenylalanin hydroxylase

19. Sulphur is made available to the body by the amino acids:

- A) Cystine and methionine
B) Taurine and alanine
C) Proline and hydroxyproline
D) Arginine and lysine

20. Sulphur containing coenzyme is

- A) NAD
B) FAD
C) Pyridoxal phosphate
D) Biotin

21. Which of the following mineral deficiency may result into impaired growth and development, skin lesions and loss of appetite?

- A) Zinc
B) Cobalt
C) Iron
D) Magnesium

22. Which of the following carbohydrate is effective in promoting the calcium absorption?

- A) Lactose
B) Maltose
C) Sucrose
D) Xylose

23. What condition is caused by iodine deficiency during pregnancy and is characterized by stunted growth, deafness, and mental retardation?

- A) Cretinism
B) Keshan disease
C) Multiple sclerosis
D) Crohn's disease

24. Wilson's disease is an example of _____ and Menkes' syndrome is an example of _____ .

- A) Zinc deficiency; zinc toxicity
B) Zinc toxicity; zinc deficiency
C) Copper deficiency; copper toxicity
D) Copper toxicity; copper deficiency

25. Which of the following statement is correct?

- A) Sodium and chloride are the chief extracellular ions of the body
B) Sodium and chloride are primarily involved in maintaining osmotic equilibrium and body fluid volume.
C) Chloride ion is necessary for the production of hydrochloric acid of gastric juice.
D) All of these

26. Respiratory acidosis is caused by

- A) Increase in carbonic acid relative to bicarbonate
B) Decrease in bicarbonate fraction
C) Increase in bicarbonate fraction
D) Decrease in the carbonic acid fraction

27. Metabolic acidosis is caused in

- A) Uncontrolled diabetes with ketosis
B) Pneumonia
C) Intestinal Obstruction
D) Hepatic coma

28. Excretion of conjugated bilirubin from liver cells into biliary canaliculi is defective in

- A) Gilbert's disease
B) Crigler-Najjar syndrome
C) Lucey-Driscoll syndrome
D) Rotor's syndrome

29. The correct statement about serum inorganic phosphorous concentration is

- A) It is higher in men than in women
B) It is higher in women than in men
C) It is higher in adults than in children
D) It is higher in children than in adults

30. A high plasma calcium level decreases intestinal absorption of calcium by

- A) Stimulating the secretion of parathormone
B) Inhibiting the secretion of parathormone
C) Decreasing the synthesis of cholecalciferol
D) Inhibiting the secretion of thyrocalcitonin

31. Haemoglobin contains about

- A) 30% of the total body iron
B) 50% of the total body iron
C) 75% of the total body iron
D) 90% of the total body iron

32. All the following statements about ceruloplasmin are correct except

- A) It is a copper-containing protein
- B) It possesses oxidase activity
- C) It is synthesised in intestinal mucosa
- D) Its plasma level is decreased in Wilson's disease

33. Zinc deficiency occurs commonly in

- A) Acrodermatitis enteropathica
- B) Wilson's disease
- C) Xeroderma pigmentosum
- D) Menke's disease

34. All the following statements regarding calcium are correct except

- A) It diffuses as a divalent cation
- B) It freely diffuses across the endoplasmic reticulum of muscle cells
- C) It can exist in the blood as ionic form and also protein bound
- D) It is found in high concentration in bones

35. Transferrin is a type of

- A) Albumin
- B) α -globulin
- C) β 1 globulin
- D) γ -globulin

36. In case of wilson's disease, the features include all of the following except

- A) Progressive hepatic cirrhosis
- B) Keyser Fleisher ring
- C) Aminoaciduria
- D) Urinary excretion of Cu is decreased

37. The active transport of 'Ca' is regulated by _____ which is synthesized in kidnyes.

- A) Cholecalciferol
- B) Ergosterol
- C) 25-OH cholecalciferol
- D) 1, 25-di OH-Cholecalciferol

38. What is the normal level of K⁺ in the serum ?

- A) 137–148 mEq/L
- B) 120–160 mEq/L
- C) 3.9–5.0 mEq/L
- D) 0.3–0.59 mEq/L

39. The general functions of minerals are

- A) The structural components of body tissues
- B) In the regulation of body fluids
- C) In acid-base balance
- D) All of these

40. Ferritin is

- A) Coenzyme
- B) One of the component of photophosphorylation
- C) It is the stored form of iron
- D) Non-protein moiety

41. What is the primary function of electrolytes in the body?

- A) To synthesize ATP from glucose
- B) To regulate the body's temperature
- C) To carry an electric charge in various processes
- D) To produce hormones in the endocrine system

42. The following are the functions of copper:

- A) Constituent of cytochromes
- B) Catalase
- C) Tyrosinase
- D) All of these

43. The normal serum inorganic phosphorous level is

- A) 1.5–2.5 mg/100 ml
- B) 2.5–4.5 mg/100 ml
- C) 4.5–6.5 mg/100 ml
- D) 0.5–1.5 mg/100 m

44. Which group is most often affected with copper deficiency?

- A) Elderly woman
- B. [Alcoholics](#)
- C. [Active toddlers with limited](#)
- D. [Preterm infants food variety](#)

45. Parathyroid hormone directly causes

- A) Decalcification of bone
- B) Increased intestinal absorption of calcium
- C) Enhanced calcium excretion by kidneys

D) Calcification of bone

46. Normal glucose metabolism requires

A) Chromium B) Manganese C) Magnesium D) Calcium

47. Chronic consumption of excess selenium can lead to

A) Brittle hair and nails B) Muscle weakness
C) TPN D) Diarrhea

48. Which of the following vitamin is essential for the absorption of calcium from the intestinal tract?

A) Vitamin D B) Vitamin E C) Vitamin B₁₂ D) Vitamin B₆

49. Selenium deficiency leads to

A) Liver necrosis B) Diarrhea C) Multiple sclerosis D) Crohn's disease

50. Adding _____ to a breakfast of cereal will help your body absorb iron.

A) Milk B) Orange juice C) Coffee D) Water

51. The predominant extracellular cation is

A) Bicarbonate B) Sodium C) Potassium D) Chloride

52. Extracellular fluid has a

A) Higher protein content than intracellular fluid
B) Higher potassium content than intracellular fluid
C) Higher sodium content than intracellular fluid
D) Higher number of large organic molecules than intracellular fluid

53. Serum electrolyte concentrations are most often expressed as

A) mg% B) mmHg C) mg/dl D) mEq/l

54. Which of the following events occurs last?

A) Release of renin by the kidney B) Release of aldosterone by the adrenal cortex
C) Sodium reabsorption by the kidney tubules D) Angiotensin I → Angiotensin II

55. The primary regulator of plasma sodium concentration is

A) Renin B) Atrial natriuretic hormone
C) Insulin D) Antidiuretic hormone (ADH)

56. Which of the following would be expected to cause hyponatremia?

A) High intake of sodium B) Increased aldosterone production
C) Increased ADH production D) Increased urine output

57. Oversecretion of aldosterone causes

A) Hyperkalemia B) Hypercalcemia
C) Hyponatremia D) Increased urine volume

58. Oversecretion of aldosterone causes

A) Decreased secretion of calcium by the kidney
B) Increased secretion of potassium by the kidney
C) Increased reabsorption of phosphate ions by the kidney
D) Decreased reabsorption of sodium by the kidney

59. Which of the following is correctly matched?

A) Alkalosis- hypokalemia
B) Cell destruction- hypokalemia
C) Increased secretion of aldosterone- hyperkalemia
D) Acidosis- hypokalemia

60. Calcium balance is influenced by

A) ADH and parathyroid hormone levels B) ADH and aldosterone levels
C) Parathyroid hormone and vitamin D levels D) Insulin and glucagon

61. Angiotensin II increases blood volume by stimulating

- A) Thirst
C) Renal excretion of sodium
- B) Water movement into the cells
D) Vasodilatation

62. Which of the following substances releases hydrogen ions into a solution?

- A) Acids
B) Bases
C) Salts
D) Water

63. pH

- A) Increases with acidity
B) Is measured on a scale of 0 to 10
C) Reflects sodium content of body fluids
D) Is a measure of the hydrogen ion concentration

64. If the hydrogen ion concentration in the blood increases, bicarbonate ions act as a buffers by

- A) Removing excess hydrogen ions from the plasma
B) Releasing hydrogen ions into the plasma
C) Combining with chloride ions
D) Combining with hemoglobin

65. Which of the following is not a buffer system of the body?

- A) Bicarbonate buffer system
B) Phosphate buffer system
C) Protein buffer system
D) NaCl buffer system

66. Body fluid pH will rise dramatically when

- A) Sodium is excreted by the kidney
B) Large amounts of bicarbonate are ingested
C) Carbonic acid is formed
D) Carbon dioxide levels increase

67. As a result of hyperventilation

- A) The body pH decreases
B) The partial CO₂ level decreases
C) The kidney will increase the rate of hydrogen ion excretion
D) The plasma PCO₂ level increases

68. An increase in blood CO₂ levels is followed by a (n) ____ in H⁺ ions and a (n) ____ in blood pH.

- A) Decrease, decrease
B) Decrease, increase
C) Increase, Increase
D) Increase, decrease

69. Respiratory alkalosis can occur as a result of

- A) Asphyxia
B) Asthma
C) Hyperventilation
D) Severe emphysema

70. Prolonged vomiting of stomach contents will result in

- A) Metabolic acidosis
B) Metabolic alkalosis
C) Respiratory acidosis
D) Respiratory alkalosis

71. Once alkalosis has occurred, which of the following would you expect to happen?

- A) Increased respiratory rate
B) Retention of hydrogen ions by the kidney
C) A plasma pH less than 7.40
D) Secretion of hydrogen ions by the kidney

72. Which of the following individuals would have the largest percentage as water?

- A) A small 7-year-old female
B) A lean 35-year-old male athlete
C) A chunky 52-year-old male athlete
D) An adult female marathon runner

73. Which of the following people would be most severely affected by prolonged vomiting?

- A) 3-year-old male
B) 15-year-old male
C) 35-year-old female
D) 50-year-old male

74. The predominant intracellular cation is

- A) Potassium
B) Sodium
C) Calcium
D) Magnesium

75. One difference between the plasma and intestinal fluid is that the plasma has significantly more _____ than intestinal fluid.

- A) Protein B) Chloride C) Water volume D) Hydrogen ions

76. Receptors sensitive to changes in the osmolality of extracellular fluid are the.

- A) Baroreceptors B) Chemoreceptors
C) Osmoreceptors D) Proprioceptors

77. Elevated blood pressure under resting conditions results in increased urinary output because

- A) Baroreceptors signal the hypothalamus to increase ADH secretion
B) Elevated blood pressure stimulates renin secretion
C) Baroreceptors signal the hypothalamus to decrease ADH secretion
D) The amount of angiotensin II formed is increased

78. Urinary water loss is increased in

- A) Diabetes mellitus B) Diabetes insipidus
C) Chronic aldosterone secretion D) Unresponsiveness of osmoreceptors

79. The water produced during metabolic reactions in an adult is about

- A) 100 ml/day B) 300 ml/day C) 500 ml/day D) 700 ml/day

80. Anion gap in plasma is because

- A) Of differential distribution of ions across cell membranes
B) Cations outnumber anions in plasma
C) Anions outnumber cations in plasma
D) Of unmeasured anions in plasma

81. All the following features are found in blood chemistry in uncompensated lactic acidosis except

- A) pH is decreased B) Bicarbonate is decreased
C) pCO₂ is normal D) Anion gap is normal

82. All the following statements about renal tubular acidosis are correct except

- A) Renal tubules may be unable to reabsorb bicarbonate
B) Renal tubules may be unable to secrete hydrogen ions
C) Plasma chloride is elevated
D) Anion gap is decreased

83. Which of the following features are present in blood chemistry in uncompensated metabolic alkalosis except?

- (A) Increased pH B) Increased bicarbonate
C) Normal chloride D) Normal pCO₂

84. Respiratory acidosis results from

- A) Retention of carbon dioxide B) Excessive elimination of carbon dioxide
C) Retention of bicarbonate D) Excessive elimination of bicarbonate

85. Respiratory acidosis can occur in all of the following except

- A) Pulmonary oedema B) Hysterical hyperventilation
C) Pneumothorax D) Emphysema

86. Buffering action of haemoglobin is mainly due to its

- A) Glutamine residues B) Arginine residues
C) Histidine residues D) Lysine residues

87. Quantitatively, the most significant buffer system in plasma is

- A) Phosphate buffer system B) Carbonic acid-bicarbonate buffer system
C) Lactic acid-lactate buffer system D) Protein buffer system

88. Obligatory reabsorption of water

- A) Is about 50% of the total tubular reabsorption of water
B) Is increased by antidiuretic hormone
C) Occurs in distal convoluted tubules

D) Is secondary to reabsorption of solutes

89. Colloid osmotic pressure of intracellular fluid is

- A) Equal to that of plasma
B) More than that of plasma
C) More than that of plasma
D) Nearly zero

90. Bohr effect is

- A) Shifting of oxyhemoglobin dissociation curve to the right
B) Shifting of oxyhemoglobin dissociation curve to the left
C) Ability of hemoglobin to combine with O₂
D) Exchange of chloride with carbonate

91. Osmotic pressure of plasma is

- A) 80–100 milliosmole/litre
B) 180–200 milliosmole/litre
C) 280–300 milliosmole/litre
D) 380–400 milliosmole/litre

92. Oncotic pressure of plasma is due to

- A) Proteins
B) Chloride
C) Sodium
D) All of these

93. Hypokalemia with an accompanying hypochloremic alkalosis may be observed in

- A) Cushing's syndrome
B) Addison's disease
C) Hypothyroidism
D) Malnutrition

94. The exclusive function of iron in the body is confined to the process of

- A) Muscular contraction
B) Nerve excitation
C) Cellular respiration
D) Blood coagulation

95. A high serum potassium, accompanied by a high intracellular potassium occurs in

- A) Adrenal insufficiency
B) Any illness
C) Gastrointestinal losses
D) Cushing's syndrome

96. Hypermagnesemia may be observed in

- A) Hyperparathyroidism
B) Diabetes mellitus
C) Kwashiorkor
D) Primary aldosteronism

97. An important cause of water intoxication is

- A) Nephrogenic diabetes insipidus
B) Renal failure
C) Gastroenteritis
D) Fanconi syndrome

98. In primary dehydration

- A) Intracellular fluid volume is reduced
B) Intracellular fluid volume remains normal
C) Extracellular fluid volume is much reduced
D) Extracellular fluid volume is much increased

99. The percentage of water contained in the body of an individual is less because of

- A) High fat content
B) Low fat content
C) High protein content
D) Low protein content

100. Action of kinins is to

- A) Increase salt excretion
B) Decrease salt retention
C) Decrease water retention
D) Increase both salt and water excretion