

M.B.B.S. 1st PROF. EXAMINATION, JULY- 2012
BIOCHEMISTRY
PAPER – FIRST (SAQ)

[Time allotted: Three hours]

[Max Marks: 50]

Note: Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given

($\frac{1}{2} \times 20 = 10$)

Q. 2. Problem based question:

(2+2+2+2+2 = 10)

A 65 years old man is brought to emergency department with severe pain in chest, difficulty in breathing and sweating. His heart rate increased to 120/min. His family physician made diagnosis of myocardial infarction.

- What are the relevant enzymes to be estimated in the case? ✓
- What is the significance of isoenzyme estimation in this case? ✓
- What other biochemical tests would you like to perform? ✓
- Which enzyme is likely to be elevated first in this patient? ✓
- How can isoenzymes be distinguished from one another? ✓

Q. 3. Structured questions:

(2 x 5 = 10)

- Describe primary, secondary, tertiary and quaternary structure of Proteins. ✓
- Classify enzymes giving suitable examples. Describe isoenzymes of LDH. ✓

Q. 4. Write short notes on:

(3 x 4 = 12)

- Salient features of various transport mechanism. ✓
- Enzyme inhibition. ✓
- Oxidative phosphorylation mentioning inhibitors acting at various steps. ✓

Q. 5. Describe the following in brief :

(4 x 2 = 8)

- Competitive inhibition. ✓
- Non nucleic acid nucleotides. ✓
- Role of G-Protein in action of hormones. ✓
- Amylose and amylopectin ✓

M.B.B.S. 1st PROF. EXAMINATION, JULY- 2012BIOCHEMISTRY
PAPER – FIRST (MCQ)

Time allotted for MCQ – 20 minutes

Set- C

Q. 1. Multiple Choice questions (Encircle the single best response)

(0.5 x 20 =10)

1. Cholesterol combines with fatty acids at:
 - a. C-1
 - b. C-2
 - c. C-3
 - d. C-5
2. Rats fed on fat free diet from birth could be deficient in
 - a. Prostaglandins
 - b. Phospholipids
 - c. Sphingolipids
 - d. Cholesterol
3. Captopril, a competitive inhibitor of ACE (Angiotensin Converting Enzyme) can be used as a therapeutic agent for hypertension. Competitive inhibitors change
 - a. V max of reaction
 - b. Km of the reaction
 - c. Both V max and Km
 - d. Substrate specificity
4. Pyruvate Carboxylase is a type of:
 - a. Oxido-reductase
 - b. Lyase
 - c. Ligase
 - d. Transferase
5. Allosteric regulation of activity is exhibited by all except:
 - a. Phosphofructokinase
 - b. Aspartate Transcarbamoylase
 - c. Glycogen synthase
 - d. Lactate dehydrogenase
6. Which of the following reduces oxygen to water?
 - a. Cytochrome oxidase
 - b. ATP synthase
 - c. Cytochrome reductase
 - d. Glycerol 3 P dehydrogenase
7. Which of the following is natural uncoupler?
 - a. Cortisol
 - b. Thyroxine
 - c. Prolactin
 - d. Biotin
8. An increased Tm for duplex DNA result from a high content of:
 - a. A+G
 - b. C+T
 - c. A+T
 - d. C+G
9. One of the following would be useful as chemotherapeutic agent designed to inhibit synthesis of purine nucleotides:
 - a. Allopurinol
 - b. Sulfanilamide
 - c. Methohexate
 - d. 5-fluorouracil
10. All the following Hormones use C-AMP as II messenger except
 - a. FSH
 - b. Epinephrine
 - c. LH
 - d. Estrogen
11. In diagnosis of pregnancy, which hormone is commonly measured in urine:
 - a. HCG
 - b. FSH
 - c. Progesterone
 - d. LH
12. Which monosaccharide is absorbed from intestine at highest rate?
 - a. Glucose
 - b. Galactose
 - c. Fructose
 - d. Mannose
13. Which of the following compound is an inhibitor of Na dependent glucose transport across the plasma membrane?
 - a. Phlorhizin
 - b. Ouabain
 - c. Sodium Azide
 - d. Dicumarol
14. Glucose is:
 - a. A ketose
 - b. Furanose ring in Solution
 - c. Exists as L-form in humans
 - d. C-4 epimer of galactose
15. Glycosaminoglycans include all except:
 - a. Heparin
 - b. Hyaluronic Acid
 - c. Collagen
 - d. Chondroitin Sulfate
16. Glycosidic Linkage in Lactose is:
 - a. α (1→4)
 - b. β (1→4)
 - c. α (1→6)
 - d. β (1→6)
17. In proteins, α -helix and β -pleats are example of:
 - a. Primary structure
 - b. Secondary structure
 - c. Tertiary structure
 - d. Quarternary structure
18. All the following are metabolic intermediate of amino acid degradation except
 - a. Citrate
 - b. α ketoglutarate
 - c. Fumarate
 - d. Succinyl Co A
19. Amino acids at neutral pH would be predominantly
 - a. Non-polar
 - b. +ve and monovalent
 - c. -ve and monovalent
 - d. Dipolar
20. Linoleic acid has
 - a. 18C; 3 double bonds
 - b. 18C; 2 double bonds
 - c. 16C; 2 double bond
 - d. 20C; 3 double bonds

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BIOCHEMISTRY PAPER – FIRST (MCQ)

Time allotted for MCQ – 20 minutes

Set- D

Q. 1. Multiple Choice questions (Encircle the single best response)

(0.5 x 20 =10)

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 - b. C+T
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BIOCHEMISTRY
PAPER SECOND

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Q. 1. Multiple choice questions – separate sheet given

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Q. 2. Problem based question:

(1 x 10=10)

Mother of a three years old child, complaints that his vision is allright in the day light, but it appears to be affected in dim light as he stumbles while playing or moving in poorly lit rooms.

- a. What is the child suffering from and what is the cause?
- b. If the family is too poor to afford medication, what advice would you give them to make up for this deficiency?
- c. What are the other eye symptoms (mention the name only) which can occur due to deficiency of the causative factor of the above disorder?
- d. Name the fat soluble vitamins and name the ring structures present in them.
- e. The fat soluble vitamins are polyisoprenoid substituted compounds. What is an isoprene unit? Write its structure.
- f. What are ACE vitamins? What is their common role?
- g. Enumerate the vitamins of the B-complex group which act as coenzymes in the oxidative decarboxylation of α -keto acids.
- h. Which vitamin resembles a hexose in structure? Deficiency of this vitamin causes which disease?
- i. Name the coenzyme forms of vitamin B₁₂.
- j. Name the three vitamins which are absolutely essential for fatty acid synthesis.

Q. 3. Structured questions:

(2 x 5=10)

- a. What is the central dogma of life? Give a detailed account of the process of transcription. How is this process regulated? Name at least two inhibitors of transcription.
- b. Describe how phenyl alanine is catabolized in the body. Indicate the in born errors which are associated with this pathway.

Q. 4. Write short notes on the following:

(3 x 4=12)

- a. Denovo synthesis of cholesterol and its regulation.
- b. Amphibolic role of the citric acid cycle.
- c. Biochemical functions and deficiency manifestations of iron.

Q. 5. Describe the following in brief :

(4 x 2=8)

- a. Galactosemia
- b. Metabolism of propionyl CoA
- c. Transmethylation reactions (list 4 examples)
- d. Kidney function test (list at least 4 tests)

M.B.B.S. 1st PROF. EXAMINATION, JULY - 2012

BIOCHEMISTRY

PAPER SECOND (MCQ)

Q. 1. Multiple choice questions

Set- A

(.5 x 20 =10)

1. McArdles disease is caused due to the deficiency of which one of the following:
 - a. Branching enzyme
 - b. Debranching enzyme
 - c. Glycogen synthase
 - d. Glycogen phosphorylase
2. Fructose 2, 6 biphosphate is an activator for which one of the following enzymes in the liver?
 - a. Hexokinase
 - b. Phosphofructokinase
 - c. Fructose 1, 6- biphosphatase
 - d. Glucose 6- phosphatase
3. Which one of the following coenzymes is NOT required by the pyruvate dehydrogenase complex?
 - a. NAD⁺
 - b. FAD
 - c. Lipoic acid
 - d. Biotin
4. Aspirin will inhibit which one of the following pathways?
 - a. Arachidonic acid to thromboxanes
 - b. Arachidonic acid to Leukotrienes
 - c. Arachidonic acid to Phospholipids
 - d. Phospholipids to Arachidonic acid
5. Which one of the following is a cofactor for the endothelial enzyme lipoprotein lipase?
 - a. Apo B-48
 - b. Apo B-100
 - c. Apo C-II
 - d. Apo A-I
6. Which one of the following does NOT inhibit acetyl CoA carboxylase?
 - a. Allosteric modification by palmitoyl CoA
 - b. Allosteric modification by citrate
 - c. Consumption of high - fat diet
 - d. Covalent phosphorylation of the enzyme
7. Acute intermittent porphyria is accompanied by an increased urinary level of:
 - a. Biliverdin
 - b. Direct bilirubin
 - c. Heme
 - d. Porphobilinogen
8. In sickle cell hemoglobin, the position 6 glutamyl residue of the β - chain of normal adult haemoglobin is replaced by:
 - a. Lysine
 - b. Valine
 - c. Tyrosine
 - d. Leucine
9. The catabolite excreted in phenylketonuria is:
 - a. Glutamic acid
 - b. Lactic acid
 - c. Phenyl pyruvic acid
 - d. Acetic acid
10. Argentaffinomas are tumor cells in the argentaffin tissue of the abdominal cavity. They overproduce:
 - a. 5'- hydroxyl tryptamine
 - b. Dopamine
 - c. Polyamine
 - d. Histamine
11. Homocystinuria is an inherited disorder caused by deficiency of:
 - a. Cystathioninase
 - b. Cysteine reductase
 - c. Cystathionine synthase
 - d. Cysteine dioxygenase
12. The end product of uracil catabolism is:
 - a. Uric acid
 - b. β - alanine
 - c. β -amino isobutyric acid
 - d. β - urido isobutyric acid
13. Deficiency of vitamin B₁₂ results in all of the following EXCEPT:
 - a. Hemolytic anemia
 - b. Megaloblastic anemia
 - c. Homocystinuria
 - d. Methyl malonicaciduria
14. Prolonged use of the drug isoniazid can induce the deficiency of:
 - a. Thiamine
 - b. Folic acid
 - c. Biotin
 - d. Pyridoxine
15. The antioxidant action of vitamin E is due to:
 - a. Methyl group at position 8
 - b. Hydroxyl group at position 6
 - c. The chromane ring as a whole
 - d. The isoprenoid side chain
16. Which one of the following levels of serum K⁺ is considered to be a medical emergency?
 - a. 3.5 mmol/L
 - b. 4.5 mmol/L
 - c. 5.5 mmol/L
 - d. 6.5 mmol/L
17. The enzyme responsible for unwinding of the DNA ahead of the replication fork is:
 - a. Helicase
 - b. Primase
 - c. Topoisomerase
 - d. Polymerase
18. In eukaryotes, mitochondrial DNA replication is carried out by DNA polymerase:
 - a. α
 - b. β
 - c. γ
 - d. δ
19. The gastric analysis of a patient shows total absence of free Hcl and pepsin. The probable condition is:
 - a. Achlorhydria
 - b. Achylia gastrica
 - c. Hypochlorhydria
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20. Inulin is used diagnostically to assess the function of the:
 - a. Kidneys
 - b. Liver
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 - d. Pancreas

M.B.B.S. 1st PROF. EXAMINATION, JULY - 2012**BIOCHEMISTRY
PAPER SECOND (MCQ)****Q. 1. Multiple choice questions****Set- D****(.5 x 20 =10)**

1. Deficiency of vitamin B₁₂ results in all of the following EXCEPT:
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 - a. Glutamic acid
 - b. Lactic acid
 - c. Phenyl pyruvic acid
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18. Argentaffinomas are tumor cells in the argentaffin tissue of the abdominal cavity. They overproduce:
 - a. 5'- hydroxyl tryptamine
 - b. Dopamine
 - c. Polyamine
 - d. Histamine
19. Homocystinuria is an inherited disorder caused by deficiency of :
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 - b. β - alanine
 - c. β -amino isobutyric acid
 - d. β - urido isobutyric acid

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PAPER SECOND (MCQ)****Q. 1. Multiple choice questions****Set- C****(.5 x 20 =10)**

1. Acute intermittent porphyria is accompanied by an increased urinary level of :
 - a. Biliverdin
 - b. Direct bilirubin
 - c. Heme
 - d. Porphobilinogen
2. In sickle cell hemoglobin, the position 6 glutamyl residue of the β - chain of normal adult haemoglobin is replaced by:
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 - c. Tyrosine
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12. In eukaryotes, mitochondrial DNA replication is carried out by DNA polymerase:
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13. The gastric analysis of a patient shows total absence of free Hcl and pepsin. The probable condition is:
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PAPER SECOND (MCQ)

Q. 1. Multiple choice questions**Set- B****(.5 x 20 =10)**

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 - d. Glucose 6- phosphatase
20. Which one of the following coenzymes is NOT required by the pyruvate dehydrogenase complex?
 - a. NAD⁺
 - b. FAD
 - c. Lipoic acid
 - d. Biotin

M.B.B.S. FIRST PROF. EXAMINATION, SEPTEMBER - 2012**BIOCHEMISTRY****PAPER – FIRST****[Time allotted: Three hours]****[Max Marks: 50]**

Note: Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given

(0.5 x 20 = 10)

Q. 2. Problem based question:

(5 x 2 = 10)

Lipids being insoluble in water can not be transported as such. Therefore they are transported in plasma, by combining with protein.

- What are lipoproteins? List the various types.
- What is the common term for β - lipoprotein and why is it so named?
- Name the lipoprotein seen in the post – absorptive state which causes the serum to appear milky.
- Which lipoprotein when elevated, is known to be a risk factor for atherosclerosis, and why?
- Name the specific apoproteins which play major structural and functional roles in (a) HDL and in (b) LDL

Q. 3. Structured questions:

(2 x 5 = 10)

- What are uncouplers? How do they act? Give two examples of natural uncouplers of oxidative phosphorylation. What is the effect of uncoupling?
- Name 5 steroid hormones. What is the importance of Cholesterol in steroidogenesis? Describe the mode of action of steroid hormones.

Q. 4. Write short notes on:

(3 x 4 = 12)

- Structure and functions of Mitochondria.
- Mutarotation
- Essential Amino acids.

Q. 5. Describe the following in brief :

(4 x 2 = 8)

- Draw a labeled diagram of purine ring.
- Oxidoreductases.
- Oxidation of monosaccharides.
- Fibrous and globular proteins.

M.B.B.S. FIRST PROF. EXAMINATION, SEPTEMBER - 2012

BIOCHEMISTRY
PAPER-FIRST (MCQ)**Time allotted for MCQ – 20 minutes****Set- C**

Q. 1. Multiple Choice questions (Encircle the single best response)

(0.5 x 20 =10)

1. Which of the following is a non-protein amino acid?
 - a. α - Alanine
 - b. β - Alanine
 - c. α - Histidine
 - d. α - Arginine
2. If a sample of DNA is found to have the base composition of adenine, 40; Thymine, 22; guanine 19; cytosine 19; what conclusion can be drawn?
 - a. The DNA is a circular duplex
 - b. The DNA is a linear duplex
 - c. The DNA is single stranded
 - d. The DNA has a high melting point
3. The international unit (iii) of enzyme activity measurement is defined as:
 - a. The amount of enzyme that catalyzes the transformation of one micro mol of substrate per minute under optimal conditions
 - b. The amount of enzyme that catalyzes the transformation of one micromole of substrate per second under optimal conditions
 - c. The amount of enzyme that catalyzes the transformation of one mol of substrate per hour (hour)
 - d. None of the above
4. The substrate analog produces inhibition of which type?
 - a. Non competitive
 - b. Competitive
 - c. Irreversible
 - d. Uncompetitive
5. The glycolytic pathway is regulated mainly by which enzyme?
 - a. Hexokinase
 - b. Phosphofructokinase
 - c. Pyruvate kinase
 - d. Phosphoglyceratekinase
6. Which type of RNA molecules can work as ribozymes?
 - a. tRNAs
 - b. mRNAs
 - c. rRNAs
 - d. SnRNAs
7. Natural antioxidants are:
 - a. Superoxide dismutase
 - b. Urates
 - c. Bilirubin
 - d. All of the above
8. Complex IV of respiratory chain is inhibited by:
 - a. H₂S
 - b. CO
 - c. CN⁻
 - d. All of the above
9. Receptors of glucocorticoid hormone are present in
 - a. Cytoplasm
 - b. Nucleus
 - c. Cell membrane
 - d. Both cell membrane & cytoplasm
10. Glucosazone is similar in structure to:
 - a. Fructosazone
 - b. Galactosazone
 - c. Maltosazone
 - d. Lactosazone
11. In the small intestine trypsinogen is activated to trypsin by
 - a. Enteropeptidase
 - b. Chymotrypsin
 - c. Enterokinase
 - d. Pancreozymin
12. Transport of macromolecules across the cell membrane occurs by:
 - a. Active transport
 - b. Facilitated diffusion
 - c. Passive diffusion
 - d. Endocytosis/Exocytosis
13. Neuraminic Acid contains..... carbon atoms
 - a. 6
 - b. 7
 - c. 8
 - d. 9
14. Carbohydrates are defined as:
 - a. Hydrated compound of carbon
 - b. Aldehydic derivatives of monohydroxy alcohols
 - c. Aldehydic or ketonic derivatives of monohydroxy alcohols
 - d. Aldehydic or ketonic derivatives of polyhydroxy alcohols
15. Isomaltose have the linkage:
 - a. α -1,4
 - b. β -1,4
 - c. α -1,6
 - d. β -1,6
16. Alcohol present in sphingomyelin is:
 - a. Glycerol
 - b. Sphingol
 - c. Cetyl alcohol
 - d. Ethanol
17. Leukotrienes are formed from:
 - a. Oleic acid
 - b. Linoleic acid
 - c. Linolenic acid
 - d. Arachidonic acid
18. Lecithin contains:
 - a. Choline
 - b. Ethanolamine
 - c. Inositol
 - d. Serine
19. Which of the following is involved in the formation of hydroxyproline in collagen synthesis?
 - a. Vit B6
 - b. Vit B1
 - c. Vit C
 - d. Vit B12
20. The antibody class which can pass through placenta to protect the fetus is?
 - a. IgA
 - b. IgG
 - c. IgM
 - d. Ig E

M.B.B.S. FIRST PROF. EXAMINATION, SEPTEMBER - 2012

BIOCHEMISTRY

PAPER SECOND

[Time allotted: Three hours]

[Max Marks: 50]

Note: Attempt all questions

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions – separate sheet given

(0.5 x 20 = 10)

Q. 2. Problem based question:

(1+1+2+2+1+1+2 = 10)

A 2 year old child reports to OPD with swollen knee. The mother said he has been having bleeding gums. The child is a poor eater and he does not take any fresh fruits.

- What is your probable diagnosis?
- Deficiency of which vitamin causes this disease?
- Name three rich sources of this vitamin.
- What is biochemical role of this vitamin?
- Give an example of post translational changes in a protein?
- Which protein is important for wound healing?
- What is infantile scurvy?

Q. 3. a. What is Replication? Describe in short the process in prokaryotes?

5

b. Enumerate liver function tests and describe in detail any two of them with clinical significance.

5

Q. 4. Write short notes on:

(4 x 3 = 12)

- Specialized products of Tyrosine.
- Glycolysis
- Ketosis

Q. 5. Describe in brief:

(2 x 4 = 8)

- Gout
- Von Gierke's disease
- Role of Parathormone in calcium metabolism.
- Iron absorption

X

M.B.B.S. FIRST PROF. EXAMINATION, SEPTEMBER - 2012**BIOCHEMISTRY****PAPER-SECOND (MCQ)****Time allotted for MCQ – 20 minutes****Set- A****Q. 1. Multiple Choice questions (Encircle the single best response)****(0.5 x 20 =10)**

1. Uric acid stones are formed, if urine is:
 - a. Alkaline
 - b. Acidic
 - c. Neutral
 - d. None of the above
2. The rate limiting step in pyrimidine synthesis is formation of:
 - a. Carbamoyl phosphate
 - b. Carbamoyl aspartate
 - c. Dihydro-orotic acid
 - d. Orotic acid
3. In heme catabolism, the first bile pigment formed is:
 - a. Cholic acid
 - b. Deoxycholic acid
 - c. Bilirubin
 - d. Biliverdin
4. Creatinine clearance is an indicator of:
 - a. Serum creatinine
 - b. Glomerular filtration
 - c. Tubular reabsorption
 - d. Renal threshold
5. In obstructive jaundice, Van der Bergh's test is:
 - a. Direct positive
 - b. Indirect positive
 - c. Biphasic
 - d. None of the above
6. Neural tube defects are associated with deficiency of:
 - a. Pyridoxine
 - b. Thiamine
 - c. Folate
 - d. Cobalamine
7. Anti oxidant vitamin is:
 - a. Vitamin D
 - b. Vitamin K
 - c. Vitamin E
 - d. Vitamin B
8. The functionally active form of D_3 is:
 - a. Calcitriol
 - b. Calcidiol
 - c. Ergocalciferol
 - d. Cholecalciferol
9. Wilson's disease is related to:
 - a. Iron metabolism
 - b. Copper metabolism
 - c. Zinc metabolism
 - d. Magnesium metabolism
10. Termination codons are:
 - a. UAG, UGA, UAA
 - b. UCA, UAC, UCU
 - c. CCA, UAA, UGA
 - d. UCA, UCU, UAA
11. Development of recombinant DNA technology is based on discovery of:
 - a. Polymerase chain reaction(PCR)
 - b. Plasmids
 - c. Restriction endonucleases
 - d. Complementary DNA (cDNA)
12. In brain tissue, the major mechanism for detoxification of ammonia is:
 - a. Urea formation
 - b. Glutamate formation
 - c. Glutamine formation
 - d. α -KG formation
13. Which of the following reactions do not require vitamin B6 as a coenzyme:
 - a. Cystathionine synthase reaction
 - b. Non-oxidative decarboxylation
 - c. Oxidative decarboxylation
 - d. Transamination
14. "Ornithine Cycle" is the other name for:
 - a. Urea cycle
 - b. Malate cycle
 - c. Tricarboxylic acid cycle
 - d. Alanine-Pyruvate cycle
15. Propionyl CoA, one of the end products of β -oxidation of fatty acids containing odd number of carbon atoms, is linked to TCA cycle through:
 - a. α -Ketoglutarate
 - b. Oxaloacetate
 - c. Succinyl CoA
 - d. Fumarate
16. Which of the following acts as Co-enzyme for transketolases?
 - a. TPP
 - b. Lipoic acid
 - c. Folic acid
 - d. Vit B₆
17. Fasting glucose level is:
 - a. below 100 mg/dl
 - b. below 140 mg/dl
 - c. below 180 mg/dl
 - d. below 240 mg/dl
18. Rate limiting enzyme for denovo synthesis of fatty acid is:
 - a. HMG CoA synthase
 - b. HMG CoA reductase
 - c. Acetyl CoA carboxylase
 - d. Propionyl CoA carboxylase
19. Which of the following is used for reverse cholesterol transport:
 - a. HDL
 - b. LDL
 - c. VLDL
 - d. Chylomicrons
20. Substrate level phosphorylation in TCA cycle occurs during conversion of:
 - a. Citrate to isocitrate
 - b. α -Ketoglutarate to succinyl CoA
 - c. Succinyl CoA to succinate
 - d. Succinate to Fumarate

M.B.B.S. FIRST PROF. EXAMINATION, SEPTEMBER - 2013**BIOCHEMISTRY****PAPER FIRST****[Time allotted: Three hours]****[Max Marks: 50]****Note:** Attempt all questions

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions – separate sheet given**(.5 x 20=10)****Q. 2.** Problem based question:**(5 x 2 =10)**

An elderly man, suffering from long standing hypertension and diabetes mellitus was admitted to the emergency department with complaint of severe chest pain, breathlessness and excessive sweating. The clinician decided to test for plasma levels of certain enzymes to locate the damaged tissue and to confirm the electro cardiogram findings.

- Name any two enzymes which could help in the diagnosis of the above case.
- What are isoenzymes? Name a technique which can be used to distinguish between isoenzymes.
- How many isoenzymes does LDH have? Which one is specific for the heart and which one for the liver. How are they different?
- Name the isoenzyme of Creatine kinase.
- Which coenzyme is required by LDH for its action? Write the complete reaction catalysed by LDH.

Q. 3. Structured questions:**(2 x 5=10)**

- With the help of a diagram describe the various components of the electron transport chain and explain its function. List the various inhibitors of this chain indicating their sites of action.
- What are immunoglobulins? List the different types indicating the basis of differentiation into these classes. Draw a well labeled diagram of a typical immunoglobulin molecule.

Q. 4. Write short notes on the following:**(3 x 4=12)**

- Buffers
- Different types of isomerism of glucose
- Classification and functions of different phospholipids

Q. 5. Describe the following in brief :**(4 x 2=8)**

- Non-protein aminoacids
- Essential fatty acids
- Thyroid hormones
- Glycosaminoglycans

M.B.B.S. FIRST PROF. EXAMINATION, SEPTEMBER - 2013

BIOCHEMISTRY
PAPER-FIRST (MCQ)

Time allotted for MCQ – 20 minutes

Set- A

Q. 1. Multiple Choice questions (Encircle the single best response)

(0.5 x 20 = 10)

1. Which of the following describes a universal property of buffers?
 - a. Buffers work best at the pH at which they are completely dissociated
 - b. Buffers work best at the pH at which they are 50% dissociated
 - c. Buffers work best at one pH lower than the pKa
 - d. Buffers work equally well at all concentrations
2. Monosaccharide present in inulin is:
 - a. Galactose
 - b. Fructose
 - c. Mannose
 - d. Glucose
3. Sorbitol is a:
 - a. Reducing sugar
 - b. Sugar ester
 - c. Sugar alcohol
 - d. Glycoside
4. The linkage between the aldehyde group of glucose and its hydroxyl group of the 5th carbon atom is called:
 - a. Hemiacetal linkage
 - b. Hemiketal linkage
 - c. Glycosidic linkage
 - d. Ester linkage
5. All sphingolipids contain:
 - a. N-acetyl neuraminic acid
 - b. Glycerol backbone
 - c. Phosphoryl choline
 - d. Ceramide
6. 18 carbon containing saturated fatty acid is:
 - a. Palmitic acid
 - b. Stearic acid
 - c. Lauric acid
 - d. Myristic acid
7. Prostaglandins are synthesized from:
 - a. Oleic acid
 - b. Linoleic acid
 - c. Linolenic acid
 - d. Arachidonic acid
8. Which of the following is nutritionally non essential?
 - a. Valine
 - b. Leucine
 - c. Tyrosine
 - d. Tryptophan
9. Which of the following amino acids is ketogenic but not glucogenic?
 - a. Tyrosine
 - b. Lysine
 - c. Leucine
 - d. Isoleucine
10. One of the following is NOT a function of plasma albumin:
 - a. Osmoregulation
 - b. Transport of hormone
 - c. Transport of bilirubin
 - d. Solubilization of glucose
11. 4th, 5th carbon & 7th nitrogen atoms of the purine ring are derived from:
 - a. Glycine
 - b. Glutamine
 - c. Carbamoyl phosphate
 - d. Glutamate
12. The backbone of the DNA strand is composed of:
 - a. Nucleotides and sugars
 - b. Bases and phosphates
 - c. Phosphates and sugar
 - d. Sugar and bases
13. If the inhibitor occupies the catalytic site, it is:
 - a. Allosteric inhibition
 - b. Competitive inhibition
 - c. Non competitive inhibition
 - d. Uncompetitive inhibition
14. The enzyme hexokinase belongs to the class of:
 - a. Transferases
 - b. Lyases
 - c. Ligases
 - d. Oxidoreductases
15. The Michaelis constant 'Km' is:
 - a. Equal to Vmax
 - b. Dependant on pH
 - c. Dependant on enzyme concentration
 - d. Substrate concentration at half maximal velocity
16. Inactive zymogens are precursors for all of the following gastrointestinal enzymes EXCEPT:
 - a. Trypsin
 - b. Pepsin
 - c. Steapsin
 - d. Carboxy peptidase
17. Natural uncoupler of oxidative phosphorylation is:
 - a. Thyroxine
 - b. DNPH
 - c. H₂S
 - d. Rotenone
18. Which of the following electron carriers is NOT a component of the mitochondrial electron transport chain?
 - a. NAD⁺
 - b. NADP⁺
 - c. FMN
 - d. FAD
19. Which one of the following has CPP nucleus?
 - a. Glucagon
 - b. Insulin
 - c. Para thyroid hormone
 - d. 1,25-Dihydroxy cholecalciferol
20. Which of the following is a second messenger for hormonal action?
 - a. AMP
 - b. cAMP
 - c. TPP
 - d. CoA

M.B.B.S. 1st PROF. EXAMINATION, SEPTEMBER - 2013**BIOCHEMISTRY
PAPER – SECOND (SAQ)****[Time allotted: Three hours]****[Max Marks: 50]****Note:** Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given

(½ x 20 = 10)

Q. 2. Problem based question:

(2 x 5 = 10)

A child is brought to the Paediatric OPD with complaints of poor vision in dim light. During day time vision is normal.

- Name the condition. Deficiency of which vitamin causes this condition?
- Name the part of retina and the compound present in it which is responsible for vision in dim light.
- Which form of vitamin is present in the above compound? Name the other two forms.
- Enumerate the other eye symptoms that can occur in the deficiency of this vitamin.
- Why deficiency of this vitamin leads to upper respiratory tract infection?

Q. 3. Structured questions:

(2 x 5 = 10)

- What is importance of HMP shunt pathway? Enumerate the organs where it takes place. Describe the steps of irreversible phase of this pathway.
- Name the amino acid which has no asymmetric carbons. What are the important compounds synthesized by this amino acid. Mention the role of this amino acid in detoxification.

Q. 4. Write short notes on:

(3 x 4 = 12)

- β- oxidation of fatty acids.
- Catabolism of pyrimidines.
- Replication.

Q. 5. Describe the following in brief :

(4 x 2 = 8)

- Bronzed diabetes.
- Scurvy.
- Phenylketonuria.
- Von Gierke's disease.

M.B.B.S. FIRST PROF. EXAMINATION, SEPTEMBER - 2013**BIOCHEMISTRY****PAPER-SECOND (MCQ)****Time allotted for MCQ – 20 minutes****SET- B****Q. 1. Multiple Choice questions (Darken the single best response in the OMR sheet)****(0.5 x 20 = 10)**

1. Release of ammonia from amino acids involves:
 - a. Transamination
 - b. Deamination
 - c. Transdeamination
 - d. Transdeamidation
2. Deficiency of homogentisate oxidase causes:
 - a. Phenylketonuria
 - b. Alkaptonuria
 - c. Tyrosinemia type-I
 - d. Tyrosinosis
3. Cystathionine requires for its formation:
 - a. Riboflavin
 - b. Niacin
 - c. Pantothenic acid
 - d. Pyridoxal phosphate
4. In first step of haem synthesis, succinyl CoA combines with:
 - a. Glycine
 - b. Serine
 - c. Alanine
 - d. Threonine
5. Catabolism of haemoglobin:
 - a. Occurs in RBC
 - b. Involves oxidative cleavage of the porphyrin ring
 - c. Results in CO₂ liberation
 - d. Results in formation of protoporphyrinogen
6. Uroporphyrin accumulates in urine in:
 - a. Porphyria cutanea tarda
 - b. Acute intermittent porphyria
 - c. Congenital erythropoietic porphyria
 - d. Hereditary coproporphyria
7. In obstructive jaundice, there is marked rise in the serum level of:
 - a. Alanine transaminase
 - b. Aspartate transaminase
 - c. Alkaline phosphatase
 - d. γ -Glutamyl transpeptidase
8. GFR is best assessed by:
 - a. Urea clearance test
 - b. Creatinine clearance test
 - c. Inulin clearance test
 - d. Hippuric acid clearance test
9. Form of Vitamin K found in humans is:
 - a. Menadione
 - b. Phylloquinone
 - c. Menaquinone
 - d. Ubiquinone
10. Peptide bond is present in:
 - a. Thiamine
 - b. Niacin
 - c. Pantothenic acid
 - d. Pyridoxine
11. Collagen synthesis requires:
 - a. Vit C
 - b. Vit E
 - c. Vit D
 - d. Vit K
12. Iron absorption is inhibited by:
 - a. Acidic pH
 - b. Sulphur containing amino acids
 - c. Vit C
 - d. Phytic acid
13. Unwinding of DNA at the replication fork is catalysed by:
 - a. Helicase
 - b. Topoisomerase
 - c. DNA Polymerase
 - d. RNA Polymerase
14. Source of 4 high energy bonds, required for the addition of one amino acid to the growing polypeptide chain, is:
 - a. 1 from ATP, 3 from GTP
 - b. 2 from ATP, 2 from GTP
 - c. 3 from ATP, 1 from GTP
 - d. All 4 from GTP
15. In muscles, net gain of ATPs, in anaerobic glycolysis is:
 - a. 0
 - b. 2
 - c. 4
 - d. 8
16. Epinephrine raises blood sugar level by activating:
 - a. Protein kinase
 - b. Adenylyl cyclase
 - c. Phosphorylase
 - d. Phosphatase
17. The first dicarboxylic acid formed in TCA cycle is:
 - a. Oxalosuccinic acid
 - b. Ketoglutaric acid
 - c. Succinic acid
 - d. Malic acid
18. β - oxidation of fatty acids occurs in:
 - a. Mitochondria
 - b. Endoplasmic reticulum
 - c. Peroxisomes
 - d. Golgi bodies
19. The regulatory enzyme in cholesterol biosynthesis is:
 - a. HMG CoA synthetase
 - b. HMG CoA lyase
 - c. HMG CoA reductase
 - d. HMG CoA oxidase
20. Primary ketone body is:
 - a. HMG CoA
 - b. Acetoacetate
 - c. β - Hydroxy butyrate
 - d. Acetone

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JULY - 2014**BIOCHEMISTRY
PAPER – SECOND****[Time allotted: Three hours]****[Max Marks: 50]****Note:** Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given**($\frac{1}{2} \times 20 = 10$)****Q. 2.** Give reasons why :**(1 x 5 = 05)**

- Bleeding gums is a symptom of scurvy.
- Polyuria occurs in diabetes mellitus.
- Prolonged fasting causes Ketonuria.
- Vitamin K deficiency prolongs coagulation time.
- Phenyl ketones are excreted in phenylketonuria.

Q. 3. Problem based question:**(1 x 5 = 05)**

A child is suffering from diarrhoea, dermatitis and dementia. The clinical diagnosis is pellagra.

- Deficiency of which vitamin causes this disease? Can it be synthesized in the body? If yes, how?
- What are the co-enzyme forms of the above vitamin?
- Write metabolic reactions utilizing each coenzyme form. Give two examples for each coenzyme form.
- Can deficiency of Vit. B₆ cause deficiency of the above mentioned vitamin? Justify your answer.
- Name the enzyme which catalyzes the conversion of serotonin to 5-hydroxy indole acetic acid.

Q. 4. Write in brief:**(3 x 4 = 12)**

- Significance of HMP shunt
- Metabolism of iron
- Important compounds synthesized from glycine.
- Gluconeogenesis

Q. 5. Structured Questions:

(i). Write the structural and functional apoproteins of all the lipoprotein forms. Describe the metabolism of LDL and HDL.

(1+2+2=5)

(ii). What is the central dogma of life? Describe the process of transcription.

(1+4=5)**Q. 6.** Write short notes on:**(2 x 4 = 08)**

- Transmethylation reaction: two examples.
- Creatinine clearance test.
- Gout.
- Regulation of cholesterol synthesis.

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JULY - 2014**BIOCHEMISTRY****PAPER – SECOND (MCQ)****Time allotted for MCQ – 20 minutes****SET - D****Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet)****(0.5 x 20=10)**

1. The salvage pathways for purine synthesis involves:
 - a. Synthesis of UMP from orotate
 - b. Recovery of NH_4^+ via glutamine synthase
 - c. Formation of purine nucleotides from purine bases.
 - d. Hydrolysis of free nucleotides to yield the free bases.
2. Aldosterone increases:
 - a. Reabsorption of Na^+
 - b. Excretion of Na^+
 - c. Reabsorption of K^+
 - d. Excretion of water
3. Acid phosphatase levels are increased in:
 - a. Prostate cancer
 - b. Lung cancer
 - c. Bone cancer
 - d. Brain cancer
4. All of the following are coenzymes required for pyruvate dehydrogenase complex EXCEPT:
 - a. TPP
 - b. Biotin
 - c. CoA
 - d. Lipoic acid
5. m-RNA is a complementary copy of:
 - a. 5'-3' strand of DNA
 - b. 3'-5' strand of DNA
 - c. Both strands of DNA
 - d. Ribosomal RNA
6. The regulatory enzyme in fatty acid synthesis is:
 - a. Fatty acid synthase
 - b. β -Ketoacyl synthase
 - c. Acetyl CoA carboxylase
 - d. Acyl CoA dehydrogenase
7. In gluconeogenesis, oxaloacetate is converted to:
 - a. Pyruvate
 - b. Phosphoenol pyruvate
 - c. Enol pyruvate
 - d. Citrate
8. Methionine, valine and isoleucine are linked to TCA cycle through which of the following?
 - a. Pyruvate
 - b. α -Ketoglutarate
 - c. Succinyl CoA
 - d. Citrate
9. Glycolysis is inhibited by:
 - a. Fluoride
 - b. Bromide
 - c. Arsenate
 - d. Iodoacetate
10. If the gastric analysis of a patient shows total absence of free acidity and pepsin, the probable condition is:
 - a. Achlorhydria
 - b. Hyperchlorhydria
 - c. Zollinger Ellison syndrome
 - d. Achylia gastrica
11. In case of jaundice, there is no trace of bile pigments in urine, the most probable diagnosis will be:
 - a. Hepatitis
 - b. Infectious hepatitis
 - c. Obstructive jaundice
 - d. Hemolytic jaundice
12. The most common secondary messenger in hormonal action is:
 - a. Diacylglycerol
 - b. Inositol triphosphate
 - c. GMP
 - d. 3'5' cyclic AMP
13. Deficiency of the enzyme phenylalanine hydroxylase causes:
 - a. Alkaptonuria
 - b. Phenylketonuria
 - c. Tyrosinosis
 - d. Tyrosinuria
14. Which of the following is NOT promoted in diabetes mellitus?
 - a. Lipogenesis
 - b. Gluconeogenesis
 - c. Glycogenesis
 - d. Glycolysis
15. Which radioisotope is used to study the life span of red blood cells?
 - a. Co^{57}
 - b. Cr^{51}
 - c. Br^{82}
 - d. Na^{24}
16. The immunoglobulin molecule binds to the antigen via the:
 - a. Variable region
 - b. Constant region
 - c. J region
 - d. Fc region
17. For the synthesis of creatine, glycine combines with:
 - a. Alanine
 - b. Arginine
 - c. Serine
 - d. Threonine
18. In transamination, alanine transfers its amino group to:
 - a. Pyruvate
 - b. Oxaloacetate
 - c. Serine
 - d. α -Ketoglutarate
19. Cysteine is involved in the formation of bile salts by it being converted into:
 - a. Cystine
 - b. Taurine
 - c. Glycine
 - d. Pyruvate
20. Most protein hormones:
 - a. Bind to cell surface receptors that send a signal to the interior of the cell
 - b. Enter the cell and bind to intracellular receptors
 - c. Act by binding irreversibly to their receptors
 - d. Bind immediately to G-proteins on their secretion.

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JULY - 2014**BIOCHEMISTRY
PAPER – FIRST****[Time allotted: Three hours]****[Max Marks: 50]****Note:** Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given**($\frac{1}{2} \times 20 = 10$)****Q. 2.** Give reasons for:**(1 x 5 = 05)**

- Starch is a homopolysaccharide.
- Rancidity of fats.
- Denaturation of proteins on heating.
- Inhibition by substrate analogs.
- Ineffectiveness of amylase in stomach.

Q. 3. Problem based question:**(1+1+1+2 = 05)**

A patient of hyperthyroidism is suffering from pyrexia (high temperature).

- Why does thyroxine cause hyperthermia?
- Differentiate between oxidative phosphorylation & substrate level phosphorylation.
- Name the inhibitors of Complex-I of ETC.
- What is the role of ATP synthase in ATP synthesis?

Q. 4. Write in brief:**(3 x 4 = 12)**

- Draw labelled diagrams of various types of secondary structure of proteins.
- Classification of phospholipids with structure of one of them.
- List all the types of RNA & draw the structure of tRNA.
- Diagrammatic representation of absorption of lipids.

Q. 5. Structured Questions:**(i).** Define carbohydrates, classify it giving examples and explain anomerism.**(1+2+2 = 05)****(ii).** Differentiate between glycoproteins and proteoglycans. Draw the structure of a proteoglycan. List the various types of glycosaminoglycans with details of their structure.**(2+1+2 = 05)****Q. 6.** Write short notes on:**(2 x 4 = 08)**

- Ring structure of Glucose
- Unsaturated fatty acids
- Non-protein amino acids
- Importance of nucleotides.

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JULY - 2014

BIOCHEMISTRY

PAPER – FIRST (MCQ)

Time allotted for MCQ – 20 minutes

SET - C

Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet)

(½ x 20=10)

1. The antibody class which can pass through placenta to protect the fetus is?
 - a. IgA
 - b. IgG
 - c. IgM
 - d. IgE
2. Which of the following is a dipeptide?
 - a. Glutathione
 - b. Carnosine
 - c. Bradykinin
 - d. Angiotensin
3. If a sample of DNA is found to have the base composition of adenine, 40; thymine, 22; guanine 19; cytosine 19; what conclusion can be drawn?
 - a. The DNA is a circular duplex
 - b. The DNA is a linear duplex
 - c. The DNA is single stranded
 - d. The DNA has a high melting point
4. The international unit (iii) of enzyme activity measurement is defined as:
 - a. The amount of enzyme that catalyzes the transformation of one micromole of substrate per minute under optimal conditions
 - b. The amount of enzyme that catalyzes the transformation of one micromole of substrate per second under optimal conditions
 - c. The amount of enzyme that catalyzes the transformation of one mole of substrate per hour
 - d. The amount of enzyme that catalyzes the transformation of one mole of substrate per second under optimal conditions
5. The substrate analog produces inhibition of which type?
 - a. Non competitive
 - b. Competitive
 - c. Irreversible
 - d. Uncompetitive
6. The rate regulatory committed step of the glycolytic pathway is:
 - a. Hexokinase
 - b. Phosphofructokinase
 - c. Pyruvate kinase
 - d. Phosphoglyceratekinase
7. Which type of RNA molecules can work as ribozymes?
 - a. tRNAs
 - b. mRNAs
 - c. rRNAs
 - d. snRNAs
8. Natural antioxidants are:
 - a. Superoxide dismutase
 - b. Urates
 - c. Bilirubin
 - d. All of the above
9. Complex IV of respiratory chain is inhibited by:
 - a. H₂S
 - b. CO
 - c. CN⁻
 - d. All of the above
10. Receptors of glucocorticoid hormone are present in:
 - a. Cytoplasm
 - b. Nucleus
 - c. Cell membrane
 - d. Both cell membrane & cytoplasm
11. Glucosazone is similar in structure to:
 - a. Fructosazone
 - b. Galactosazone
 - c. Maltosazone
 - d. Lactosazone
12. In the small intestine trypsinogen is activated to trypsin by:
 - a. Enteropeptidase
 - b. Chymotrypsin
 - c. Enterokinase
 - d. Pancreozymin
13. Transport of macromolecules across the cell membrane occurs by:
 - a. Active transport
 - b. Facilitated diffusion
 - c. Passive diffusion
 - d. Endocytosis/Exocytosis
14. Neuraminic acid contains carbon atoms:
 - a. 6
 - b. 7
 - c. 8
 - d. 9
15. Carbohydrates are defined as:
 - a. Hydrated compound of carbon
 - b. Aldehydic derivatives of monohydroxy alcohols
 - c. Aldehydic or ketonic derivatives of monohydroxy alcohols
 - d. Aldehydic or ketonic derivatives of polyhydroxy alcohols
16. Isomaltose has the linkage:
 - a. α-1,4
 - b. β-1,4
 - c. α-1,6
 - d. β-1,6
17. Alcohol present in sphingomyelin is:
 - a. Glycerol
 - b. Sphingol
 - c. Cetyl alcohol
 - d. Ethanol
18. Leukotrienes are formed from:
 - a. Oleic acid
 - b. Linoleic acid
 - c. Linolenic acid
 - d. Arachidonic acid
19. Lecithin contains:
 - a. Choline
 - b. Ethanolamine
 - c. Inositol
 - d. Serine
20. Which of the following is involved in the formation of hydroxyproline in collagen synthesis?
 - a. Vit B₆
 - b. Vit B₁
 - c. Vit C
 - d. Vit B₁₂

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, AUGUST - 2015**BIOCHEMISTRY****PAPER – FIRST****[Time allotted: Three hours]****[Max Marks: 50]****Note:** Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given**($\frac{1}{2} \times 20 = 10$)****Q. 2.** Give reasons:**(1 x 5 = 05)**

- Linoleic acid and linolenic acid are essential fatty acids.
- Aspirin (CSAIDS) acts as analgesic and antiinflammatory agent.
- Deficiency of glucose-6-phosphate dehydrogenase causes hemolysis in a person taking antimalarial (Primaquin) and sulfa drugs.
- Cyanide is a deadly poison.
- Raw egg should not be eaten.

Q. 3. Problem based question:**(1+1+1+1+1 = 05)**

In Hartnup's disease:

- What is the cause?
- What is the inheritance of the disease?
- What are the skin changes and why?
- What is the cause of mental changes?
- Why will you see pellagra like picture in carcinoid syndrome?

Q. 4. Write short notes on:**(2.5 x 4 = 10)**

- Isoenzymes
- G - Proteins
- Nucleotides in cellular metabolism.
- Phospholipids

Q. 5. Structured Questions:

(i). Describe glycosaminoglycans and explain their role in health and disease.

(05)

(ii). Describe various types of metabolic acidosis and their compensation.

(2+1+2 = 05)**Q. 6.** Write in brief:**(2.5 x 4 = 10)**

- ATP synthase
- Sphingomyelin and Niemann Pick disease.
- 21st Amino acid
- Slow and fast acetelators of xenobiotics

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, AUGUST - 2015**BIOCHEMISTRY
PAPER – FIRST (MCQ)****Time allotted for MCQ – 20 minutes****SET - A****Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet) (½ x 20=10)**

1. Cells communicate with each other through all the following except:
 - a. Desmosomes
 - b. Gap junctions
 - c. Ion channels
 - d. Tight junctions
2. One of the roles of peroxisomes is to render H_2O_2 nontoxic by:
 - a. Oxidizing amino acids with O_2
 - b. The action of enzyme catalase
 - c. Transporting H_2O_2 from blood into peroxisomes
 - d. The action of enzyme cathepsins
3. The following amino acid is considered to be the most effective contributor to the buffering action of proteins:
 - a. Methionine
 - b. Arginine
 - c. Lysine
 - d. Histidine
4. High anion gap acidosis does not occur in:
 - a. Diabetic ketoacidosis
 - b. Lactic acidosis
 - c. Renal failure
 - d. Renal tubular acidosis
5. The following GAGs are responsible for corneal transparency:
 - a. Keratan sulfate and dermatan sulfate
 - b. Heparin and Heparan sulphate
 - c. Chondroitin sulphates
 - d. Hyaluronic acid and heparin
6. The following substances inhibit platelet aggregation:
 - a. Thromboxanes
 - b. Phospholipids
 - c. Leukotrienes
 - d. Prostacyclin
7. NANA is present in:
 - a. Cerebrosides
 - b. Gangliosides
 - c. Ether lipids
 - d. All of the above
8. Chaperone proteins play a role in:
 - a. Protein folding
 - b. Protein misfolding
 - c. Protein unfolding
 - d. Protein denaturation
9. Creutzfeldt-Jakob disease is due to a mutation causing the misfolding of:
 - a. β – Amyloid protein
 - b. Prion protein
 - c. Muscle protein
 - d. None of the above
10. Structurally uric acid is:
 - a. 6-Oxypurine
 - b. 2, 6- dioxypurine
 - c. 2, 6, 8- trioxypurine
 - d. 6, 8- dioxypurine
11. Histone proteins undergo the following covalent modification when organized into chromatin:
 - a. Phosphorylation
 - b. Acetylation
 - c. ADP ribosylation
 - d. All of the above
12. Which one of the following amino acids occurs most frequently at active sites?
 - a. Threonine
 - b. Serine
 - c. Glycine
 - d. Proline
13. All the following are metalloenzymes except:
 - a. Xanthine oxidase
 - b. Hexokinase
 - c. Carbonic anhydrase
 - d. Lactate dehydrogenase
14. Regan isoenzyme is increased in:
 - a. Carcinoma of the lung
 - b. Paget's disease
 - c. Osteoporosis
 - d. Cholestasis
15. Which one of the following enzyme is not a protein but RNA molecule?
 - a. Peptidyl transferase
 - b. RNA polymerase
 - c. Restriction endonuclease
 - d. Reverse transcriptase
16. One of the following intermediates of the Krebs cycle serves as a source of cytosolic acetyl coA during fatty acid biosynthesis:
 - a. Citrate
 - b. Isocitrate
 - c. α -ketoglutarate
 - d. oxaloacetate
17. Measuring of following substances in urine samples is used in diagnosis of pheochromocytoma.
 - a. Dopamine
 - b. Catechol O-methyl transferase (COMT)
 - c. Monoamine oxidase
 - d. Vanillylmandelic acid (VMA)
18. All the following hormones but one are derived from proopiomelanocortin:
 - a. HCG
 - b. FSH
 - c. TSH
 - d. β –LPH
19. Thyroid – stimulating IgG is implicated in:
 - a. Myxoedema
 - b. Cretinism
 - c. Grave's disease
 - d. All of the above
20. All the following statements regarding cytochrome P 450 are correct except:
 - a. Take part in the synthesis of steroid hormones
 - b. It catalyses hydroxylation reactions making xenobiotics more hydrophilic
 - c. It contains heme as prosthetic group
 - d. All forms of cytochrome 450 are encoded by the same gene family.

Regn. No.

Paper Code: 104

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, AUGUST - 2015

**BIOCHEMISTRY
PAPER – SECOND**

[Time allotted: Three hours]

[Max Marks: 50]

Note: Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given

($\frac{1}{2} \times 20 = 10$)

Q. 2. Give reasons:

(1 x 5 = 05)

- Acute intermittent porphyria is not associated with photosensitivity.
- Symptoms of pellagra are seen in cases of Argentinifinoma.
- Von Gierke's disease is associated with hyperuricemia.
- Clay coloured stool occurs in post hepatic jaundice.
- Vaccination provides adoptive immunity.

Q. 3. Problem based question:

(1 x 5 = 05)

A mother sought medical help for her child with the complaint that the diapers used for the child were stained dark with urine. On exposure to air the stains became more blackish. Urine gave Benedict's test positive, however Glucose oxidase peroxidase test was negative. FeCl_3 test showed purple black colour. Fasting and post prandial blood sugar levels were within normal range. Serum uric acid was also normal.

- What is the probable diagnosis in this case?
- What is the defect causing this disease?
- Why is Benedict's test positive and GODPOD test negative in this case?
- Why does urine slowly turn black from top to bottom on exposure to air?
- What is ochronosis?

Q. 4. Write short notes on:

(2.5 x 4 = 10)

- Haemoglobinopathies
- Differential diagnosis of Jaundice.
- Post translational modifications.
- Tumour markers.

Q. 5. Structured Questions:

(i). Describe the metabolism of VLDL and LDL. What is the role of LDL in the formation of atherosclerotic plaque?

(3 + 2 = 5)

(ii). Discuss the absorption, transport, biochemical role and deficiency manifestations of vitamin B_{12} .

Add a note on metabolic link between vitamin B_{12} and folic acid.

(4 + 1 = 5)

Q. 6. Write in brief:

(2.5 x 4 = 10)

- Reciprocal regulation of glycogenesis and glycogenolysis by covalent modification.
- Absorption, transport and storage of iron with a flow diagram.
- Draw well labelled diagram of transcription bubble.
- Show diagrammatically the steps of heme synthesis and the enzyme defects leading to different types of porphyrias.

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, AUGUST - 2015**BIOCHEMISTRY****PAPER – SECOND (MCQ)****Time allotted for MCQ – 20 minutes****SET - A****(0.5 x 20=10)****Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet)**

1. Deficiency of which enzyme causes hereditary fructose intolerance?
 - a. Aldolase B
 - b. Aldolase A
 - c. Fructokinase
 - d. Glycerol kinase
2. Accumulation of which metabolite of galactose metabolism is linked with cataract formation?
 - a. Sorbitol
 - b. Lactose
 - c. Galactitol
 - d. GAGs
3. All of the following act as allosteric effectors of phosphofructokinase-I except:
 - a. ATP
 - b. Fructose 2,6 bisphosphate
 - c. Citrate
 - d. Acetyl CoA
4. Acetyl CoA is transported from mitochondria to cytosol after its conversion to:
 - a. Pyruvate
 - b. Oxaloacetate
 - c. Citrate
 - d. Malate
5. The liver can not utilise ketone bodies due to the lack of the enzyme:
 - a. Thiolase
 - b. Thiophorase
 - c. HMGCoA lyase
 - d. β -hydroxy butyrate dehydrogenase
6. Maple syrup urine disease occurs due to the enzyme defect in the metabolism of the following amino acids:
 - a. Sulphur containing amino acids
 - b. Hydroxyamino acids
 - c. Acidic amino acids
 - d. Branched chain amino acids
7. Histidine loading test is done to identify the deficiency of which vitamin?
 - a. B₁₂
 - b. Thiamine
 - c. Folate
 - d. Pyridoxine
8. Tetracyclins:
 - a. Interfere with attachment of tRNA to Asite of eh 70S ribosome
 - b. Bind to 50S subunit and inhibit peptide bond formation
 - c. Bond to 50 S subunit and prevent translocation
 - d. Change shape of 30 S subunit and cause misreading of mRNA
9. Which is not a post transcriptional modification?
 - a. Removal of introns-splicing
 - b. Addition of 3' poly A tail
 - c. Addition of 5' 7 methyl guanosine cap
 - d. Nucleotide excision
10. Which of the following copper containing proteins has an intrinsic ferro-oxidase activity that oxidizes iron?
 - a. Ceruloplasmin
 - b. Albumin
 - c. Metallothionein
 - d. All of the above
11. Biochemical action of selenium is complementary to that of which vitamin?
 - a. C
 - b. A
 - c. E
 - d. D
12. Neurological symptoms occurring in vitamin B6 deficiency can be attributed to the following impaired function of PLP:
 - a. Transamination
 - b. Decarboxylation
 - c. Transulfuration
 - d. Deamination
13. Which of the following renal function test is used to measure the GFR?
 - a. Clearance test
 - b. Urine concentration test
 - c. Urine dilution test
 - d. Urine acidification test
14. In sickle cell, disease there is transversion mutation in the β chain.
 - a. Valine instead of glutamic acid
 - b. Glutamic acid instead of valine
 - c. Glutamine instead of valine
 - d. Valine instead of glutamine
15. Which of the following radiation(s) is (are) mutagenic?
 - a. X ray
 - b. UV rays
 - c. γ rays
 - d. All of the above
16. Which of the following is a tumour suppressor gene?
 - a. ras
 - b. P53
 - c. erb- B
 - d. ablL
17. Which is a pentameric Immunoglobulin?
 - a. IgG
 - b. IgM
 - c. IgD
 - d. EgE
18. Ig classes are differentiated from each other on the basis of their:
 - a. Electrophoretic mobility
 - b. Molecular weight
 - c. Light chains
 - d. Heavy chains
19. Lesch Nyhan syndrome is caused by deficiency of the enzyme:
 - a. HGPR Tase
 - b. APR Tase
 - c. IMP Dehydrogenase
 - d. Xanthine oxidase
20. The following degradation product of Pyrimidine metabolism is excreted in high levels in urine in leukemia and overexposure to X rays:
 - a. β aminoisobutyrate
 - b. β Alanine
 - c. Ammonia
 - d. Uric acid

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, OCTOBER - 2015**BIOCHEMISTRY
PAPER – FIRST****[Time allotted: Three hours]****[Max Marks: 50]****Note:** Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given**($\frac{1}{2} \times 20 = 10$)****Q. 2.** Give reasons:**(5 x 1 = 05)**

- Collagen is a strong fibrous protein.
- DNA follows Chargaff's rule and not RNA.
- Enzymes work best at their optimum temperature only.
- Patients who are deficient in Glucose-6 phosphate dehydrogenase are susceptible to hemolysis on consumption of sulfa drugs and anti malarials.
- Glucokinase is active only in the fed state and Hexokinase is active even during fasting.

Q. 3. Problem based question:**(1 x 5 = 05)**

A child is suffering from protein malnutrition, he is advised to take a protein rich diet and a mixture of nutritionally essential amino acids.

- Why some of them are called nutritionally essential amino acids?
- Why few are called semi essential amino acids?
- Name an essential amino acid which is sulfur containing.
- Is hydroxy- lysine present in proteins? Has it got its specific codon(s)?
- What is the role of vitamin C in the formation of certain amino acids? State with examples.

Q. 4. Write short notes on:**(2.5 x 4 = 10)**

- Mucopolysaccharides
- Functions of phospholipids
- Respiratory and metabolic Acidosis
- Mechanism of action of thyroid hormones

Q. 5. Structured Questions:

(i). Give an account of regulation of enzyme activity.

(05)

(ii). What are lipoproteins? Describe various types of hyperlipoproteinemias.

(2+3 = 05)**Q. 6.** Write in brief:**(2.5 x 4 = 10)**

- Structure of t-RNA
- Secondary structure of protein
- ATP synthase complex
- Absorption of Lipids

BIOCHEMISTRY
PAPER – FIRST (MCQ)

Time allotted for MCQ – 20 minutes

SET - A

(0.5 x 20=10)

Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet)

1. Active transport means:
 - a. Transport with energy expenditure
 - b. Transport without energy expenditure
 - c. Transport against chemical gradient
 - d. Transport against electrical gradient
2. α -D-Glucose and β -D-Glucose are:
 - a. Epimers
 - b. Anomers
 - c. Cis-trans isomers
 - d. Isomers
3. One of the following is a non-protein amino acid :
 - a. Asparagine
 - b. Cysteine
 - c. Taurine
 - d. Glutamic Acid
4. An enzyme that catalyzes the conversion of an aldose sugar to a Ketose sugar is classified as :
 - a. Transferase
 - b. Isomerase
 - c. Oxidoreductase
 - d. Hydrolase
5. Ceramide is a combination of :
 - a. Glycerol and cerebronic acid
 - b. Sphingol and fatty acid
 - c. Sphingol and phosphoric acid
 - d. Sphingol and choline
6. The Watson and crick model of DNA is a :
 - a. Right handed parallel double helix
 - b. Right handed antiparallel double helix
 - c. Left handed parallel double helix
 - d. Left handed antiparallel double helix
7. The phenomenon of Osmosis is opposite to:
 - a. Diffusion
 - b. Adsorption
 - c. Effusion
 - d. Dialysis
8. The pH of blood is 7.4, then the ratio of $[\text{NaHCO}_3]$ and $[\text{H}_2\text{CO}_3]$ will be:
 - a. 4:1
 - b. 10:1
 - c. 15:1
 - d. 20:1
9. Reduction of glucose produces:-
 - a. Dulcitol
 - b. Sorbitol
 - c. Mannitol
 - d. Both Dulcitol and sorbitol
10. The initial rate of an enzyme catalyzed reaction depends on:
 - a. The concentration of the enzyme
 - b. The concentration of the substrate
 - c. The affinity of the enzyme for its substrate
 - d. All of the above
11. The stable ring formation of D-glucose involves carbon numbers:
 - a. 1 and 3
 - b. 1 and 4
 - c. 1 and 5
 - d. 1 and 6
12. Guanosine nucleotide is held with cytosine nucleotide by the no. of hydrogen bonds:
 - a. 1
 - b. 2
 - c. 3
 - d. 4
13. The enzyme which uses H_2O_2 as a substrate is:
 - a. Catalase
 - b. Phosphorylase
 - c. Ascorbic oxidase
 - d. Malate Dehydrogenase
14. In feedback inhibition, the final product binds to:
 - a. Isosteric site
 - b. Allosteric site
 - c. Catalytic site
 - d. Active site
15. The most frequent conjugation reaction, which is a major pathway of drug metabolism is:
 - a. Acetylation
 - b. Glucuronidation
 - c. Methylation
 - d. Sulfation
16. Which of the following does NOT increase blood glucose level:
 - a. Insulin
 - b. Glucagon
 - c. Epinephrine
 - d. Thyroxine
17. The most common second messenger in hormonal action is
 - a. Cyclic AMP
 - b. Cyclic GMP
 - c. AMP
 - d. CTP
18. The immunoglobulin molecule binds to the antigen via the :
 - a. Variable region
 - b. Constant region
 - c. J region
 - d. Fc region
19. Aspirin is detoxified by:
 - a. Oxidation
 - b. Conjugation
 - c. Reduction
 - d. Hydrolysis
20. In Oxidative phosphorylation, oxidation of one molecule of reduced flavoprotein produces:
 - a. 2 ATPs
 - b. 3 ATPs
 - c. 4 ATPs
 - d. 5 ATPs

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, OCTOBER - 2015**BIOCHEMISTRY
PAPER – SECOND****[Time allotted: Three hours]****[Max Marks: 50]****Note:** Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given**(½ x 20 = 10)****Q. 2.** Give reasons why:**(1 x 5 = 5)**

- Bilirubin and bile salts are excreted in urine in obstructive jaundice.
- Alcohol should be avoided by patients of gout.
- Phenyl ketones are excreted in phenylketonuria.
- Hyper uricemia in Vongierke's disease.
- Citrate is an important player during fatty acid synthesis.

Q. 3. Problem based question:**(1 x 5 = 05)**

A 42 year old male patient was found having severe anemia on clinical and laboratory evaluation.

- Which micronutrient deficiency is a common cause of anemia?
- Which vitamin deficiencies can cause anemia?
- Why does anemia occur in protein energy malnutrition?
- If the anemia is due to excess hemolysis, which liver function test will be altered and why?
- Write the first reaction of heme biosynthesis and indicate the coenzyme used.

Q. 4. Write short notes on:**(2.5 x 4 = 10)**

- Gluconeogenesis and its regulation.
- B-oxidation in the mitochondrial matrix.
- Biosynthesis of urea and its regulation.
- Regulation of gene expression in eukaryotes.

Q. 5. Structured Questions:**(i)** What is translation? Write the process of translation and add a note on post translational modifications.**(1+2+2 = 5)****(ii)** What are antioxidant vitamins? Discuss biochemical functions, sources, RDA and deficiency manifestations of any one of them.**(1+4 = 5)****Q. 6.** Write in brief:**(2.5 x 4 = 10)**

- Structure and functions of immunoglobulins.
- Biochemical functions of thyroid hormones and disorders associated with altered thyroid function.
- Principle of polymerase chain reaction.
- Hemoglobinopathies and their clinical relevance.

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, OCTOBER - 2015**BIOCHEMISTRY
PAPER – SECOND (MCQ)****Time allotted for MCQ – 20 minutes****SET - A****(0.5 x 20=10)****Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet)**

1. For glycogenesis, Glucose should be converted to:
 - a. Glucuronic acid
 - b. Pyruvic acid
 - c. UDP glucose
 - d. Sorbitol
2. Under anaerobic conditions the glycolysis, one mole of glucose yields ___ moles of ATP:
 - a. 1
 - b. 2
 - c. 8
 - d. 30
3. An essential for converting glucose to Glycogen in Liver is :
 - a. Lactic acid
 - b. GTP
 - c. CTP
 - d. UTP
4. Deficiency of glucose-6-phosphate dehydrogenase causes :
 - a. Cataract
 - b. Hypoglycemia
 - c. Hemolytic anemia
 - d. Galactosemia
5. Which one of the following transfers fatty acids from cytosol to mitochondria?
 - a. Carnitine
 - b. Creatine
 - c. Citrate
 - d. ACP
6. Bile acids are derived from :
 - a. Phospholipids
 - b. Triacylglycerol
 - c. Fatty acids
 - d. Cholesterol
7. Phenyl ketonuria results due to the absence of the enzyme:
 - a. Phenylalanine oxidase
 - b. Phenylalanine hydroxylase
 - c. Phenylalanine transaminase
 - d. Phenylalanine oxygenase
8. Transamination of oxaloacetate results in the formation of:
 - a. Aspartic acid
 - b. Valine
 - c. Alanine
 - d. Serine
9. The reactions of urea cycle occur in:
 - a. Cytosol
 - b. Mitochondria
 - c. Mitochondria and cytosol
 - d. Lysosomes
10. In prolonged starvation, the main energy source of brain is:
 - a. Glucose
 - b. Ketone bodies
 - c. Fructose
 - d. Fatty acids
11. Iodine is required for the formation :
 - a. Vitamin B₁₂
 - b. Thyroxine
 - c. Insulin
 - d. Calcitonin
12. The mineral having sparing action of vitamin E:
 - a. Chromium
 - b. Iron
 - c. Iodine
 - d. Selenium
13. The end product of catabolism of heme:
 - a. Bile acids
 - b. Bile salts
 - c. Bile pigment
 - d. Uric acid
14. The end product of purine metabolism in human is :
 - a. Creatinine
 - b. Uric acid
 - c. Urea
 - d. Ammonia
15. Rate controlling step of pyrimidine biosynthesis is catalyzed by:
 - a. Orotidylate decarboxylase
 - b. Aspartate transcarbamoylase
 - c. Carbo moyl phosphate synthase II
 - d. Orotate phosphoribosyl transferase
16. Formation of okazaki fragments occur in the process of :
 - a. Transcription
 - b. Translation
 - c. Replication
 - d. Reverse transcription
17. Polymerase chain reaction is a technique for:
 - a. Amplification of DNA in Vitro
 - b. Amplification of DNA in Vivo
 - c. Amplification of Protein
 - d. Amplification of RNA
18. Free radicals are:
 - a. Chemical species with unpaired electron
 - b. Ion having both negative and positive charge
 - c. Positively charged ion
 - d. Negatively charged ion
19. Which one of the following is not a tumor marker:
 - a. Alpha- Fetoprotein
 - b. Carcino embryonic antigen
 - c. Prostatic acid phosphatase
 - d. Para thromone
20. Beri-Beri is caused by a deficiency of:
 - a. Thiamine
 - b. Thymine
 - c. Theronine
 - d. Tyrosine.

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, OCTOBER - 2016
BIOCHEMISTRY
PAPER – FIRST

[Time allotted: Three hours]

[Max Marks: 50]

Note: - Attempt all Questions.

Draw suitable diagrams wherever necessary.

- Q. 1.** Multiple choice questions- separate sheet given (½ x 20 = 10)
- Q. 2.** Give reasons why: (5 x 1 = 05)
- Deficiency of lecithin causes respiratory distress syndrome in premature new borns.
 - Allopurinol is used in the treatment of gout.
 - Thyroxine causes hyperthermia.
 - Natural steroids, phenytoin, barbiturates cause induction of ALA- synthase enzyme.
 - Starch can be utilized in humans but not cellulose.
- Q. 3.** Problem based question: (1 x 5 = 05)
- A 15 year old boy complains of vomiting, loss of appetite, fever and abdominal discomfort for last 5 days. There is tenderness in right epigastrium, liver is palpable 3 cm., colour of skin and sclera appears light yellow. Following are the laboratory findings;
Total bilirubin - 5 mg/dl, direct bilirubin - 3 mg/dl, indirect bilirubin - 2 mg/dl, ALT-4000IU/L, AST - 3500IU/L, ALP - 20KAU/L, Total protein - 6.2 g/L, Albumin - 3.9 g/L
- What is the probable diagnosis?
 - Write the normal level of bilirubin.
 - What are the normal levels of ALT and AST?
 - Why ALT and AST levels are significantly raised?
 - Explain the cause for normal level of protein.
- Q. 4.** Write short notes on: (2.5 x 4 = 10)
- Essential fatty acids.
 - Lactose intolerance.
 - Inhibitors of electron transport chain.
 - Functions of phospholipids.
- Q. 5.** Structured Questions:
- (i). Define heteropolysaccharides. Enumerate them and write down their biological significance. (2+2+1 = 05)
- (ii). Define protein. Describe primary structure of protein in detail. Give a note on structure of insulin. (1+2+2 = 05)
- Q. 6.** Write in brief: (2.5 x 4 = 10)
- Fluid mosaic model of cell membrane.
 - Enumerate blood buffers. Describe the role of plasma proteins as blood buffer.
 - Chemiosmotic theory of oxidative phosphorylation.
 - Watson –Crick model of DNA.

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, OCTOBER - 2016

BIOCHEMISTRY
PAPER – FIRST (MCQ)

Time allotted for MCQ – 20 minutes

SET - A

Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet)

(0.5 x 20=10)

1. All are reducing sugars EXCEPT:
 - a. Glucose
 - b. Fructose
 - c. Sucrose
 - d. Maltose
2. Following is an example of saturated fatty acid:
 - a. Linoleic acid
 - b. Linolenic acid
 - c. Palmitic acid
 - d. Arachidonic acid
3. Thyroid hormones are synthesized from which amino acid:
 - a. Tyrosine
 - b. Glycine
 - c. Tryptophan
 - d. Valine
4. All are examples of steroid hormones EXCEPT:
 - a. Cortisol
 - b. Vitamin -D
 - c. Insulin
 - d. Estrogen
5. Inulin is a polymer of :
 - a. Glucose
 - b. Fructose
 - c. Maltose
 - d. Ribose
6. Which of the following co-enzyme acts as a prosthetic group:
 - a. TPP
 - b. NAD⁺
 - c. FAD
 - d. Biotin
7. Optically inactive amino acid is:
 - a. Alanine
 - b. Serine
 - c. Glycine
 - d. Cysteine
8. Hydrolysis of cephalin yields Glycerol, Fatty acid an:
 - a. Phosphate & Choline
 - b. Phosphate, Ethanolamine
 - c. Glucose
 - d. Serine
9. Alanine transaminase (ALT) is included in following class of enzyme:
 - a. Oxidoreductases
 - b. Ligases
 - c. Isomerases
 - d. Transferases
10. All of the following are transport proteins in EXCEPT:
 - a. Albumin
 - b. Lipoprotein
 - c. Haemoglobin
 - d. Myosin
11. Hartnup's disease is related with defect in absorption of which amino acid :
 - a. Cysteine
 - b. Serine
 - c. Tryptophan
 - d. Tyrosine
12. All are examples of pyrimidine bases EXCEPT :
 - a. Thymine
 - b. Uracil
 - c. Adenine
 - d. Cytosine
13. The most frequent conjugation reaction is :
 - a. Glucuronidation
 - b. Sulphation
 - c. Acetylation
 - d. Conjugation with glutathione
14. Ratio of bicarbonate to carbonic acid at pH 7.4 will be :
 - a. 5:1
 - b. 20:1
 - c. 10:1
 - d. 25:1
15. Transamination of aspartate results in to formation of:-
 - a. Oxaloacetate
 - b. Pyruvate
 - c. Lactate
 - d. Citrate
16. Glucose is present in ring structure form because :
 - a. It provides stability to the molecule
 - b. Explains why glucose not gives typical aldehyde reaction
 - c. Explains anomerism
 - d. All of the above
17. All are physiological uncouplers EXCEPT:
 - a. Free fatty acids
 - b. Bilirubin
 - c. 2,4 DNP
 - d. Thyroxine
18. Amino acid used in detoxification is :
 - a. Proline
 - b. Glycine
 - c. Histidine
 - d. Lysine
19. Following co-enzyme is required for transamination:
 - a. PLP
 - b. Lipoic acid
 - c. Folic acid
 - d. NAD⁺
20. The cytochrome p450 enzyme complex is localized in:
 - a. Endoplasmic reticulum
 - b. Mitochondria
 - c. Cytoplasm
 - d. Nucleus

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, OCTOBER - 2016

BIOCHEMISTRY

PAPER – FIRST (MCQ)

Time allotted for MCQ – 20 minutes

SET - B

Q.1. Multiple Choice questions (Darken the single best response in OMR sheet)

(0.5 x 20=10)

1. Alanine transaminase (ALT) is included in following class of enzyme:
 - a. Oxidoreductases
 - b. Ligases
 - c. Isomerases
 - d. Transferases
2. All of the following are transport proteins in EXCEPT:
 - a. Albumin
 - b. Lipoprotein
 - c. Haemoglobin
 - d. Myosin
3. Hartnup's disease is related with defect in absorption of which amino acid :
 - a. Cysteine
 - b. Serine
 - c. Tryptophan
 - d. Tyrosine
4. All are examples of pyrimidine bases EXCEPT :
 - a. Thymine
 - b. Uracil
 - c. Adenine
 - d. Cytosine
5. The most frequent conjugation reaction is :
 - a. Glucuronidation
 - b. Sulphation
 - c. Acetylation
 - d. Conjugation with glutathione
6. Ratio of bicarbonate to carbonic acid at pH 7.4 will be :
 - a. 5:1
 - b. 20:1
 - c. 10:1
 - d. 25:1
7. Transamination of aspartate results in to formation of-:
 - a. Oxaloacetate
 - b. Pyruvate
 - c. Lactate
 - d. Citrate
8. Glucose is present in ring structure form because :
 - a. It provides stability to the molecule
 - b. Explains why glucose not gives typical aldehyde reaction
 - c. Explains anomerism
 - d. All of the above
9. All are physiological uncouplers EXCEPT:
 - a. Free fatty acids
 - b. Bilirubin
 - c. 2,4 DNP
 - d. Thyroxine
10. Amino acid used in detoxification is :
 - a. Proline
 - b. Glycine
 - c. Histidine
 - d. Lysine
11. Following co-enzyme is required for transamination:
 - a. PLP
 - b. Lipoic acid
 - c. Folic acid
 - d. NAD+
12. The cytochrome p450 enzyme complex is localized in:
 - a. Endoplasmic reticulum
 - b. Mitochondria
 - c. Cytoplasm
 - d. Nucleus
13. All are reducing sugars EXCEPT:
 - a. Glucose
 - b. Fructose
 - c. Sucrose
 - d. Maltose
14. Following is an example of saturated fatty acid:
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 - b. Linolenic acid
 - c. Palmitic acid
 - d. Arachidonic acid
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 - a. Tyrosine
 - b. Glycine
 - c. Tryptophan
 - d. Valine
16. All are examples of steroid hormones EXCEPT:
 - a. Cortisol
 - b. Vitamin -D
 - c. Insulin
 - d. Estrogen
17. Inulin is a polymer of :
 - a. Glucose
 - b. Fructose
 - c. Maltose
 - d. Ribose
18. Which of the following co-enzyme acts as a prosthetic group:
 - a. TPP
 - b. NAD+
 - c. FAD
 - d. Biotin
19. Optically inactive amino acid is:
 - a. Alanine
 - b. Serine
 - c. Glycine
 - d. Cysteine
20. Hydrolysis of cephalin yields Glycerol , Fatty acid and:
 - a. Phosphate & Choline
 - b. Phosphate , Ethanolamine
 - c. Glucose
 - d. Serine

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, OCTOBER - 2016**BIOCHEMISTRY****PAPER – SECOND****[Time allotted: Three hours]****[Max Marks: 50]****Note:** Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given**(½ x 20 = 10)****Q. 2.** Give reasons why:**(1 x 5 = 05)**

- Polyuria occurs in diabetes mellitus.
- Wound healing is delayed in Vit C deficiency.
- Prolonged fasting causes Ketonuria.
- Phenyl Ketones are excreted in phenyl Ketonuria.
- Selenium has sparing effect on Vitamin E.

Q. 3. Problem based question:**(1 x 5 = 05)**

A child is suffering from diarrhea, dermatitis and dementia. The clinical diagnosis is pellagra.

- Deficiency of which vitamin causes this disease? Can it be synthesized in the body? If yes, how?
- What are the co-enzyme forms of the above vitamin?
- Write metabolic reactions utilizing each coenzyme form. Give two examples for each coenzyme form.
- Can deficiency of Vit. B6 cause deficiency of the above mentioned vitamin? Justify your answer.
- Name the enzyme which catalyzes the conversion of serotonin to 5- hydroxyindole acetic acid.

Q. 4. Write short notes on:**(2.5 x 4 = 10)**

- Regulation of cholesterol synthesis.
- Creatinine clearance test.
- Important compounds synthesized from Tyrosine.
- Gluconeogenesis.

Q. 5. Structured Questions:**(i).** Enumerate Ketone bodies. How are they formed? Write down the conditions in which Ketosis develops.**(1+2+2 = 05)****(ii).** Describe the formation and metabolic importance of Active Methionine.**(2+3 = 05)****Q. 6.** Write in brief:**(2.5 x 4 = 10)**

- Significance of HMP shunt.
- Replication fork
- Hemoglobinopathies
- Detoxification by conjugation

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, OCTOBER - 2016**BIOCHEMISTRY
PAPER – SECOND (MCQ)****Time allotted for MCQ – 20 minutes****SET - A****Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet)****(0.5 x 20=10)**

1. In gluconeogenesis, Oxaloacetate is converted to:
 - a. Pyruvate
 - b. Phosphoenol pyruvate
 - c. Citrate
 - d. Enol pyruvate
2. Glycolysis is inhibited by:
 - a. Arsenate
 - b. Bromide
 - c. Fluoride
 - d. Iodoacetate
3. Which amino acid is the major contributor to hepatic gluconeogenesis?
 - a. Alanine
 - b. Glutamine
 - c. Glycine
 - d. Lysine
4. Methionine, valine and isoleucine are linked to TCA cycle through which of the following :
 - a. Pyruvate
 - b. Citrate
 - c. A-Ketoglutarate
 - d. Succinyl COA
5. The alternative catabolite excreted in phenyl-ketonuria is :
 - a. Acetic Acid
 - b. Glutamic Acid
 - c. Lactic Acid
 - d. Phenyl Acetate
6. An important derivative of histidine is the local hormone named as:
 - a. Adrenaline
 - b. Histamine.
 - c. Epinephrine
 - d. Serotonin
7. Substrates required for hemoglobin biosynthesis are:
 - a. Active acetate and Glycine
 - b. Active succinate and Lysine
 - c. Glycine and Formate
 - d. Active succinate and Glycine
8. In sickle-cell hemoglobin the position 6 of glutamyl residue of B- chain of normal adult Hb is replaced by:
 - a. Lysine
 - b. Tyrosine
 - c. Valine
 - d. Leucine
9. The lipoprotein which is responsible for reverse transport of cholesterol is:
 - a. VLDL
 - b. LDL
 - c. IDL
 - d. HDL
10. If the gastric analysis of a patient shows total absence of free acidity and pepsin, the probable condition is:
 - a. Achlorhydria
 - b. Hyperchlorhydria
 - c. Zollinger-Ellison Syndrome
 - d. Achylia gastrica
11. In a case of Jaundice, there is no trace of bile pigments in urine, the most probable diagnosis will be:
 - a. Infections hepatitis
 - b. Obstructive jaundice
 - c. Hepatitis
 - d. Hemolytic jaundice
12. Most of the cancers are associated with the abnormal production of:
 - a. Carbohydrates
 - b. Proteins
 - c. Fats
 - d. Minerals
13. Initiating codon in protein synthesis is:
 - a. AUG
 - b. UAG
 - c. GAU
 - d. UAA
14. End product of Uracil metabolism is:
 - a. Uric Acid
 - b. β -alanine
 - c. β -amino isobutyric acid
 - d. β -urido- isobutyrate
15. Atoms 4, 5 & 7 of purine nucleus are provided by:
 - a. Aspartate
 - b. Glutamine
 - c. Glycine
 - d. Methionine
16. The coenzyme for transamination reaction is:
 - a. TPP
 - b. FMN
 - c. FAD
 - d. PLP
17. In the brain, the major mechanism for removal of ammonia is by the formation of:
 - a. Urea
 - b. Glutamine
 - c. Glutamate
 - d. Aspartate
18. Glycogenolysis is inhibited by :
 - a. Insulin
 - b. Epinephrine
 - c. Norepinephrine
 - d. Glucagon
19. Renal threshold is lowered in:
 - a. Diabetes mellitus
 - b. Hepatic Glycosuria
 - c. Adrenal Glycosuria
 - d. Renal Glycosuria
20. m-RNA is a complimentary copy of:
 - a. A single strand of DNA
 - b. Ribosomal DNA
 - c. Ribosomal RNA
 - d. Transfer RNA

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, OCTOBER - 2016**BIOCHEMISTRY
PAPER – SECOND (MCQ)****Time allotted for MCQ – 20 minutes****SET - B****Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet)****(0.5 x 20=10)**

1. Initiating codon in protein synthesis is:
 - a. AUG
 - b. UAG
 - c. GAU
 - d. UAA
2. End product of Uracil metabolism is:
 - a. Uric Acid
 - b. β -alanine
 - c. β -amino isobutyric acid
 - d. β -urido- isobutyrate
3. Atoms 4, 5 & 7 of purine nucleus are provided by:
 - a. Aspartate
 - b. Glutamine
 - c. Glycine
 - d. Methionine
4. The coenzyme for transamination reaction is:
 - a. TPP
 - b. FMN
 - c. FAD
 - d. PEP
5. In the brain, the major mechanism for removal of ammonia is by the formation of:
 - a. Urea
 - b. Glutamine
 - c. Glutamate
 - d. Aspartate
6. Glycogenolysis is inhibited by :
 - a. Insulin
 - b. Epinephrine
 - c. Norepinephrine
 - d. Glucagon
7. Renal threshold is lowered in:
 - a. Diabetes mellitus
 - b. Hepatic Glycosuria
 - c. Adrenal Glycosuria
 - d. Renal Glycosuria
8. m-RNA is a complimentary copy of:
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 - c. Ribosomal RNA
 - d. Transfer RNA
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 - a. Pyruvate
 - b. Phosphoenol pyruvate
 - c. Citrate
 - d. Enol pyruvate
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 - a. Arsenate
 - b. Bromide
 - c. Fluoride
 - d. Iodoacetate
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 - c. Glycine
 - d. Lysine
12. Methionine, valine and isoleucine are linked to TCA cycle through which of the following :
 - a. Pyruvate
 - b. Citrate
 - c. α -Ketoglutarate
 - d. Succinyl CoA
13. The alternative catabolite excreted in phenyl-ketonuria is :
 - a. Acetic Acid
 - b. Glutamic Acid
 - c. Lactic Acid
 - d. Phenyl Acetate
14. An important derivative of histidine is the local hormone named as:
 - a. Adrenaline
 - b. Histamine
 - c. Epinephrine
 - d. Serotonin
15. Substrates required for hemoglobin biosynthesis are:
 - a. Active acetate and Glycine
 - b. Active succinate and Lysine
 - c. Glycine and Formate
 - d. Active succinate and Glycine
16. In sickle-cell hemoglobin the position 6 of glutamyl residue of B-chain of normal adult Hb is replaced by:
 - a. Lysine
 - b. Tyrosine
 - c. Valine
 - d. Leucine
17. The lipoprotein which is responsible for reverse transport of cholesterol is:
 - a. VLDL
 - b. LDL
 - c. IDL
 - d. HDL
18. If the gastric analysis of a patient shows total absence of free acidity and pepsin, the probable condition is:
 - a. Achlorhydria
 - b. Hyperchlorhydria
 - c. Zollinger-Ellison Syndrome
 - d. Achylia gastrica
19. In a case of Jaundice, there is no trace of bile pigments in urine, the most probable diagnosis will be:
 - a. Infections hepatitis
 - b. Obstructive jaundice
 - c. Hepatitis
 - d. Hemolytic jaundice
20. Most of the cancers are associated with the abnormal production of:
 - a. Carbohydrates
 - b. Proteins
 - c. Fats
 - d. Minerals

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JULY/AUGUST - 2016
BIOCHEMISTRY
PAPER – FIRST

[Time allotted: Three hours]

[Max Marks: 50]

Note: Attempt all Questions.
Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given (½ x 20 = 10)

Q. 2. Give reasons why: (5 x 1 = 05)

- a. At isoelectric point proteins show maximum precipitation.
- b. Glucosazone and fructosazone both are needle shaped.
- c. 7-Dehydrocholesterol is called provitamin D₃.
- d. PUFA is required for cholesterol metabolism.
- e. Enzymes show maximum activity at optimum temperature.

Q. 3. Problem based question: (1 x 5 = 05)

A middle aged patient complaining of severe chest pain, breathlessness and excessive perspiration is suspected to have suffered myocardial infarction. ECG changes have not set in, and the diagnosis has to be confirmed by serum enzyme estimation.

- a. What are the serum enzymes which are raised in this case?
- b. How do you define isoenzymes?
- c. What is the action of LDH in glucose metabolism? Which conenzyme is required for this action?
- d. What is a coenzyme? How does it help an enzymatic reaction?
- e. Mention the sequence of release of myocardial enzymes.

Q. 4. Write short notes on: (2.5 x 4 = 10)

- a. Essential amino acids.
- b. Isomerism in carbohydrates.
- c. Role of hemoglobin as buffer.
- d. Classification of enzymes.

Q. 5. Structured Questions:

(i). Describe the secondary structure of proteins. Explain in brief the structure of collagen. (3+2 = 05)

(ii). Enumerate thyroid hormones. Write synthesis and metabolic functions of thyroxine. (1+2+2 = 05)

Q. 6. Write in brief: (2.5 x 4 = 10)

- a. Phospholipids
- b. Structure of t-RNA
- c. Structure and function of plasma membrane.
- d. Suicide inhibition

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JULY/AUGUST - 2016

BIOCHEMISTRY

PAPER – FIRST (MCQ)

Time allotted for MCQ – 20 minutes

SET - D

Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet)

(0.5 x 20=10)

1. mRNA is a complementary copy of:
 - a. Transfer RNA
 - b. Ribosomal RNA
 - c. Ribosomal DNA
 - d. A single strand of DNA
2. Mucic acid is produced by oxidation of:
 - a. Glucose
 - b. Mannose
 - c. Fructose
 - d. Galactose
3. Cellulose is made of the molecule of:
 - a. α -glucose
 - b. β -glucose
 - c. α -galactose
 - d. β -galactose
4. All of the following are globular proteins EXCEPT:
 - a. Histones
 - b. Globulin
 - c. Albumin
 - d. Collagen
5. K_m indicates the:
 - a. Turnover number
 - b. Affinity between enzyme and coenzyme
 - c. Affinity between enzyme and substrate
 - d. Concentration of the enzyme
6. Which of the following hormones increase the absorption of glucose from GI tract?
 - a. Insulin
 - b. Glucagon
 - c. Thyroxine
 - d. FSH
7. For the activity of salivary amylase, which of the following is required as activator?
 - a. HCO_3^-
 - b. Na^+
 - c. K^+
 - d. Cl^-
8. In high doses, one of the following hormones acts as a physiological uncoupler:
 - a. Insulin
 - b. Glucagon
 - c. Oestrogen
 - d. Thyroxine
9. All of the following are nucleotides EXCEPT:
 - a. Adenosine triphosphate
 - b. Phospho adenosinephosphosulphate
 - c. 5-adenosyl methionine
 - d. Nicotinamide adenine dinucleotide
10. Which of the following are not synthesized in the endoplasmic reticulum?
 - a. Lipoproteins
 - b. Glycoproteins
 - c. Ribonucleic acid
 - d. Gangliosides
11. The amino acid which has maximum buffering capacity at physiological pH is:
 - a. Arginine
 - b. Alanine
 - c. Histidine
 - d. Glutamic acid
12. Co-enzymes are:
 - a. Dialyzable, non protein molecules
 - b. Colloidal protein molecules
 - c. Structural analogs of enzymes
 - d. Different forms of the same enzyme
13. Glucose and galactose are epimers and they differ in orientation of H and OH on:
 - a. C_1
 - b. C_2
 - c. C_3
 - d. C_4
14. A fatty acid which is not synthesized in human body and has to be supplied in the diet:
 - a. Palmitic acid
 - b. Oleic acid
 - c. Linoleic acid
 - d. Stearic acid
15. Triacylglycerol present in plasma lipoproteins are hydrolysed by:
 - a. Lingual lipase
 - b. Lipoprotein lipase
 - c. Pancreatic lipase
 - d. LCAT
16. Hyaluronic acid is found in:
 - a. Synovial fluid
 - b. Cornea of eye
 - c. Cartilage
 - d. Shells of insects
17. An example of an ω -3 fatty acid is:
 - a. Palmitoleic acid
 - b. Arachidonic acid
 - c. Linoleic acid
 - d. Linolenic acid
18. The enzyme which uses H_2O_2 as a substrate is:
 - a. Catalase
 - b. Phosphorylase
 - c. Ascorbic oxidase
 - d. Malate dehydrogenase
19. In feedback inhibition, the final product binds to:
 - a. Isosteric site
 - b. Allosteric site
 - c. Catalytic site
 - d. Active site
20. The Watson Crick model of DNA is:
 - a. Right handed antiparallel double helix
 - b. Left handed antiparallel double helix
 - c. Right handed parallel double helix
 - d. Left handed parallel

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JULY/AUGUST - 2016
BIOCHEMISTRY
PAPER – SECOND

[Time allotted: Three hours]

[Max Marks: 50]

Note: Attempt all Questions.

Draw suitable diagrams wherever necessary.

Q. 1. Multiple choice questions- separate sheet given

(½ x 20 = 10)

Q. 2. Give reasons why:

(1 x 5 = 5)

- a. Von Gierkes disease is associated with hyperuricemia.
- b. Deficiency of choline may cause fatty liver.
- c. Niacin deficiency occurs in carcinoid syndrome.
- d. DNA polymerase I is the major repair enzyme.
- e. Vit B₁₂ deficiency leads to folate trap.

Q. 3. Problem based question:

(1 x 5 = 05)

A patient presented with recurrent urolithiasis, hematuria and associated recurrent UTI. On renal stone analysis cystine stones were detected. Chromatography and electrophoresis were done on the urine sample to study the amino acid excretion pattern.

- a. What is the probable diagnosis? Which test is done for its confirmation?
- b. Name the other 3 dibasic amino acids which get excreted in urine along with the amino acid involved in the above disease.
- c. Name the enzyme and coenzyme required in the reaction given below:
Homocysteine + Serine $\longrightarrow$ cystathionine
- d. What is the activated form of methionine? Give one example of a transmethylation reaction.
- e. Name the two non protein amino acids synthesized from cysteine and where are they used.

Q. 4. Write short notes on:

(2.5 x 4 = 10)

- a. Reverse cholesterol transport
- b. Bronzed diabetes
- c. TCA cycle as an amphibolic pathway
- d. Phenylketonuria

Q. 5. Structured Questions:

- a. Enumerate specialized products synthesized from tyrosine. Add a note on the inborn errors of tyrosine metabolism. (2.5+2.5 = 5)

- b. Describe the fatty acid synthase complex. Draw the flow chart of the steps of synthesis of palmitate. (2.5+2.5 = 5)

Q. 6. Write in brief:

(2.5 x 4 = 10)

- a. Oncofetal tumour markers
- b. Differential diagnosis of jaundice
- c. Phenylketonuria *Gluconeogenesis*
- d. Replication *AL*

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JULY/AUGUST - 2016

**BIOCHEMISTRY
PAPER – SECOND (MCQ)**

Time allotted for MCQ – 20 minutes

SET - B

- Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet) (0.5 x 20=10)**
- In brain the major metabolism for removal of ammonia is the formation of :
 - Glutamate
 - Aspartate
 - Asparagine
 - Glutamine
 - One of the following is NOT a lipotropic factor:
 - Lecithin
 - Glycolipid
 - Choline
 - Phospholipid
 - In beta-oxidation of fatty acids, which of the following are utilized as coenzymes:
 - NAD⁺ and NADP⁺
 - FADH₂ and NADH + H⁺
 - FAD and FMN
 - FAD and NAD⁺
 - Magenta tongue is found in the deficiency of the vitamin:
 - Riboflavin
 - Thiamin
 - Nicotinic acid
 - Pyridoxine
 - Subacute combined degeneration of cord is caused due to deficiency of:
 - Niacin
 - Cobalamine
 - Biotin
 - Thiamine
 - Pyridoxine deficiency can be diagnosed by measuring the urinary excretion of xanthurenic acid following a test dose of :
 - Tyrosine
 - Histidine
 - Tryptophan
 - Pyridoxine
 - Major symptom of acute intermittent porphyria includes:
 - Abdominal pain
 - Photosensitivity
 - No neuropsychiatric signs
 - Dermatitis
 - Normal reference range for serum calcium in human adults is:
 - 10-12 mg/dL
 - 9-11 mg/dL
 - 5-10 mg/dL
 - 11-15 mg/dL
 - In hepatic disease:
 - Both the bound iron and total iron binding capacity of the plasma may be low
 - Both the bound iron and TIBC of the plasma may be high
 - Only bound iron may be high
 - Only TIBC may be high
 - Lesch-Nyhan syndrome, the sex linked recessive absence of HGPRTase, may lead to :
 - Compulsive self destructive behavior with elevated levels of urate in serum
 - Hypouricemia due to liver damage
 - Failure to thrive and megaloblastic anemia
 - Protein intolerance and hepatic encephalopathy
 - The core enzyme of RNA polymerase recognizes the promoter site with the help of:
 - Rho(p) factor
 - σ factor
 - β factor
 - σ factor
 - Initiation of protein synthesis begins with binding of :
 - 40S ribosomal unit on mRNA
 - 60S ribosomal unit
 - Charging of tRNA with specific amino acid
 - Attachment of aminoacyl tRNA on mRNA
 - Erythromycin acts on ribosomes and inhibits :
 - Formation of initiation complex
 - Binding of aminoacyl tRNA
 - Peptidyl transferase activity
 - Translocation
 - Which of the following is NOT TRUE about sickle cell anemia:
 - Point mutation
 - Transition
 - Partially acceptable missense mutation
 - Substitution
 - Primer is used in all EXCEPT:
 - Replication
 - PCR
 - Glycogenesis
 - Transcription
 - In achylia gastrica there is no secretion of :
 - HCl only
 - Pepsin only
 - Gastric lipase + Pepsin
 - HCl + pepsin
 - In citric acid cycle, GDP is phosphorylated by:
 - Succinate dehydrogenase
 - Aconitase
 - Fumarase
 - Succinate thiokinase
 - Glucose-6-phosphatase is absent or deficient in:
 - Van Gierke's disease
 - Pompe's disease
 - Cori's disease
 - McArdle's disease
 - The apolipoprotein which acts as a ligand for LDL receptor is:
 - B-48
 - B-100
 - A-I
 - C-II
 - In carcinoid syndrome the argentaffin tissue of the abdominal cavity overproduces:
 - Serotonin
 - Histamine
 - Tryptophan
 - Tyrosine

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JULY/AUGUST - 2016**BIOCHEMISTRY
PAPER – SECOND (MCQ)****Time allotted for MCQ – 20 minutes****SET - C****Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet) (0.5 x 20=10)**

1. Pyridoxine deficiency can be diagnosed by measuring the urinary excretion of xanthurenic acid following a test dose of :
 - a. Tyrosine
 - b. Histidine
 - c. Tryptophan
 - d. Pyridoxine
2. Major symptom of acute intermittent porphyria includes:
 - a. Abdominal pain
 - b. Photosensitivity
 - c. No neuropsychiatric signs
 - d. Dermatitis
3. Normal reference range for serum calcium in human adults is:
 - a. 10-12 mg/dL
 - b. 9-11 mg/dL
 - c. 5-10 mg/dL
 - d. 11-15 mg/dL
4. In hepatic disease:
 - a. Both the bound iron and total iron binding capacity of the plasma may be low
 - b. Both the bound iron and TIBC of the plasma may be high
 - c. Only bound iron may be high
 - d. Only TIBC may be high
5. Lesch-Nyhan syndrome, the sex linked recessive absence of HGPRTase, may lead to :
 - a. Compulsive self destructive behavior with elevated levels of urate in serum
 - b. Hypouricemia due to liver damage
 - c. Failure to thrive and megaloblastic anemia
 - d. Protein intolerance and hepatic encephalopathy
6. The core enzyme of RNA polymerase recognizes the promoter site with the help of:
 - a. Rho(p) factor
 - b. δ factor
 - c. β factor
 - d. σ factor
7. Initiation of protein synthesis begins with binding of :
 - a. 40S ribosomal unit on mRNA
 - b. 60S ribosomal unit
 - c. Charging of tRNA with specific amino acid
 - d. Attachment of aminoacyl tRNA on mRNA
8. Erythromycin acts on ribosomes and inhibits :
 - a. Formation of initiation complex
 - b. Binding of aminoacyl tRNA
 - c. Peptidyl transferase activity
 - d. Translocation
9. Which of the following is NOT TRUE about sickle cell anemia:
 - a. Point mutation
 - b. Transition
 - c. Partially acceptable missense mutation
 - d. Substitution
10. Primer is used in all EXCEPT:
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 - b. PCR
 - c. Glycogenesis
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 - c. Fumarase
 - d. Succinate thiokinase
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 - b. Pompe's disease
 - c. Cori's disease
 - d. McArdle's disease
14. The apolipoprotein which acts as a ligand for LDL receptor is:
 - a. B-48
 - b. B-100
 - c. A-I
 - d. C-II
15. In carcinoid syndrome the argentaffin tissue of the abdominal cavity overproduces:
 - a. Serotonin
 - b. Histamine
 - c. Tryptophan
 - d. Tyrosine
16. In brain the major metabolism for removal of ammonia is the formation of :
 - a. Glutamate
 - b. Aspartate
 - c. Asparagine
 - d. Glutamine
17. One of the following is NOT a lipotropic factor:
 - a. Lecithin
 - b. Glycolipid
 - c. Choline
 - d. Phospholipid
18. In beta-oxidation of fatty acids, which of the following are utilized as coenzymes:
 - a. NAD^+ and NADP^+
 - b. FADH_2 and $\text{NADH} + \text{H}^+$
 - c. FAD and FMN
 - d. FAD and NAD^+
19. Magenta tongue is found in the deficiency of the vitamin:
 - a. Riboflavin
 - b. Thiamin
 - c. Nicotinic acid
 - d. Pyridoxine
20. Subacute combined degeneration of cord is caused due to deficiency of:
 - a. Niacin
 - b. Cobalamine
 - c. Biotin
 - d. Thiamine

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JULY/AUGUST - 2016

**BIOCHEMISTRY
PAPER – SECOND (MCQ)**

Time allotted for MCQ – 20 minutes

SET - D

Q. 1. Multiple Choice questions (Darken the single best response in OMR sheet) (0.5 x 20=10)

1. Initiation of protein synthesis begins with binding of :
 - a. 40S ribosomal unit on mRNA
 - b. 60S ribosomal unit
 - c. Charging of tRNA with specific amino acid
 - d. Attachment of aminoacyl tRNA on mRNA
2. Erythromycin acts on ribosomes and inhibits :
 - a. Formation of initiation complex
 - b. Binding of aminoacyl tRNA
 - c. Peptidyl transferase activity
 - d. Translocation
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 - b. Transition
 - c. Partially acceptable missense mutation
 - d. Substitution
4. Primer is used in all EXCEPT:
 - a. Replication
 - b. PCR
 - c. Glycogenesis
 - d. Transcription
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 - c. Cori's disease
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 - b. Hypouricemia due to liver damage
 - c. Failure to thrive and megaloblastic anemia
 - d. Protein intolerance and hepatic encephalopathy
20. The core enzyme of RNA polymerase recognizes the promoter site with the help of:
 - a. ρ factor
 - b. δ factor
 - c. β factor
 - d. σ factor

BIOCHEMISTRY PAPER- FIRST

Note: Attempt all questions.

Draw suitable diagrams (wherever necessary)

Q. 2. Give reasons why:

(1 x 5 = 05)

- a. Oedema is seen in kwashiorkor.
- b. Hyperbilirubinemia is seen in sickle cell disease.
- c. Patients of von Gierkes disease suffer from gout.
- d. Enzymes show maximum activity at optimum pH.
- e. DNA follows Chargaffs rule and not RNA.

Q. 3. Problem based question:

(1+2+1+1 = 05)

A five-year old, fair, chubby boy was brought to the hospital with complaints of delayed developmental milestones, mental retardation, seizures and eczema. He exhibits light-coloured hair, skin and eyes and mousy odour in urine.

- a. What is the probable diagnosis?
- b. Write the defective biochemical pathway with its enzymes and co-enzymes.
- c. Name any two tests which can confirm the diagnosis.
- d. How can the above condition be managed?

Q. 4. Write short notes on:

(2.5 x 4 = 10)

- a. Lac operon model of gene expression
- b. Gene therapy
- c. BMR and factors affecting it
- d. Heme catabolism (formation & excretion of bilirubin)

Q. 5. (i) Draw labeled diagram of TCA cycle and write its energetics. Describe its amphibolic nature.

(2+1½+1½ = 5)

(ii) Define enzymes and classify them with examples. Describe isoenzymes with one example.

(1+2+2 = 5)

Q. 6. Write in brief:

(2.5 x 4 = 10)

- a. Classify immunoglobulins and give an account of their function.
- b. Write the principle of electrophoresis and its applications.
- c. Draw a well labelled detailed diagram of fluid mosaic model of plasma membrane.
- d. Draw the structure of the purine ring and indicate the sources of each atom of the ring.

Regn. No.

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, AUGUST/ SEPTEMBER - 2017

BIOCHEMISTRY

PAPER - FIRST

SET - D

[Max Marks: 50]

[Time allotted: Three hours]

Q. 1. Multiple choice questions (attempt all MCQs in the allotted first 20 minutes in the OMR sheet) ($\frac{1}{2} \times 20 = 10$)

1. The limiting amino acids in rice protein are-
 - a. Cysteine & methionine
 - b. Arginine & histidine
 - c. Aspartate & glutamate
 - d. Lysine & threonine
2. In high doses, one of the following hormones acts as a physiological uncoupler-
 - a. Insulin
 - b. Glucagon
 - c. Estrogen
 - d. Thyroxine
3. The amino acid which has maximum buffering capacity at physiological pH is-
 - a. Arginine
 - b. Alanine
 - c. Histidine
 - d. Glutamic acid
4. All the following classes of lipids are components of biological membranes **except**-
 - a. Phospholipids
 - b. Glycolipids
 - c. Cholesterol
 - d. Triacylglycerols
5. Transmembrane proteins serve as-
 - a. Ion channels
 - b. Carriers
 - c. Receptors
 - d. All the above
6. Bacteria are engulfed by which of the following process-
 - a. Phagocytosis
 - b. Pinocytosis
 - c. Exocytosis
 - d. Plasmolysis
7. Optical isomerism is **not** exhibited by-
 - a. Glycine
 - b. Alanine
 - c. Leucine
 - d. Valine
8. The number of hydrogen bonds between guanine and cytosine are-
 - a. One
 - b. Two
 - c. Three
 - d. Four
9. The DNA strand that is transcribed or copied into the RNA molecule is referred to as-
 - a. Template strand
 - b. Sense strand
 - c. Coding strand
 - d. Non template strand
10. Digestive enzymes belong to the class of-
 - a. Transferases
 - b. Lyases
 - c. Hydrolases
 - d. Ligases
11. Which one of the following enzymes acts as biomarker in the diagnosis of prostate cancer?
 - a. Amylase
 - b. Lipase
 - c. Acid phosphatase
 - d. Alkaline phosphatase
12. Which one of the following enzymes is used as an anti-cancer drug?
 - a. Alpha-1-antitrypsin
 - b. Streptokinase
 - c. Asparaginase
 - d. Papain
13. Initiating codon for protein synthesis is-
 - a. AUG
 - b. UAG
 - c. GUA
 - d. GGG
14. Which immunoglobulin takes part in first line of defense (primary immune response)?
 - a. IgG
 - b. IgM
 - c. IgA
 - d. IgE
15. All the following porphyrias are inherited as autosomal dominant **except**-
 - a. Acute intermittent porphyria
 - b. Congenital erythropoietic porphyria
 - c. Porphyria cutanea tarda
 - d. Variegate porphyria
16. Formation of Okazaki fragments occur in the process of-
 - a. Transcription
 - b. Translation
 - c. Replication
 - d. Reverse transcription
17. In feedback inhibition, the final product binds to-
 - a. Isosteric site
 - b. Allosteric site
 - c. Catalytic site
 - d. Active site
18. mRNA is a complementary copy of-
 - a. Transfer RNA
 - b. Ribosomal RNA
 - c. Ribosomal DNA
 - d. A single strand of DNA
19. Km indicates the-
 - a. Turnover number
 - b. Affinity between enzyme and coenzyme
 - c. Affinity between enzyme and substrate
 - d. Concentration of the enzyme
20. PCR is a technique for-
 - a. Amplification of DNA *in vitro*
 - b. Amplification of RNA
 - c. Amplification of protein
 - d. Amplification of DNA *in vivo*

BIOCHEMISTRY PAPER- SECOND

Note: Attempt all questions.
Draw suitable diagrams (wherever necessary)

Q. 2. Give reasons why:

(1 x 5 = 05)

- a. Copper deficiency may result in iron deficiency anemia.
- b. Excessive alcohol intake may lead to fatty liver.
- c. GAGs function as cushions against mechanical shock.
- d. Abdominal cramps and flatulence occurs in lactose intolerance.
- e. Clay coloured stools occur in post hepatic jaundice.

Q. 3. Problem based question:

(1 x 5 = 05)

A 30-year-old man, a strict vegetarian who does not consume any dairy products, presented with complaints of weakness, pallor, loss of sensation in the extremities and mental confusion. On investigation his Hb was 7 gm% and blood picture showed large, abnormal and immature RBC. Methyl malonic acid was detected in his urine sample.

- a. What is the probable diagnosis and the cause of the disorder?
- b. Explain biochemically the reason for large, abnormal and immature RBC.
- c. What is the cause for neurological symptoms?
- d. Why methyl malonate was being excreted in his urine?
- e. What is folate trap?

Q. 4. Write short notes on:

(2.5 x 4 = 10)

- a. Glucose tolerance test
- b. Regulation of cholesterol biosynthesis
- c. Phase I reactions of detoxification
- d. Anion gap

Q. 5. (i) Enumerate the substrates for gluconeogenesis. Trace the pathway of gluconeogenesis from lactate to glucose. Add a note on its regulation.

(1+2.5+1.5 = 05)

(ii) What are ketone bodies? How they are formed? Describe role of ketone bodies in starvation and severe uncontrolled diabetes mellitus.

(1+2+2 = 05)

Q. 6. Write in brief about:

(2.5 x 4 = 10)

- a. Metabolic acidosis - causes and compensation
- b. List glycogen storage diseases and describe any one of them.
- c. Iron overload
- d. One carbon metabolism

Regn. No.

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, AUGUST/ SEPTEMBER - 2017**BIOCHEMISTRY****PAPER - SECOND****SET - A****[Max Marks: 50]****[Time allotted: Three hours]****Q. 1. Multiple Choice questions (attempt all MCQs in the allotted first 20 minutes in the OMR sheet) ($\frac{1}{2} \times 20 = 10$)**

1. The fate of CO_2 generated by the body is that it is:
 - a. Exhaled through the lungs
 - b. Converted to bicarbonate in the RBC
 - c. Converted to bicarbonate in the renal tubules
 - d. All the above
2. The radio isotope used for nucleic acid research and treatment of polycythemia is:
 - a. ^{32}P
 - b. ^{131}I
 - c. ^{51}Cr
 - d. ^{60}Co
3. Which of the following serves as donor of sulphate in detoxification by conjugation?
 - a. SAM
 - b. FSH
 - c. PAPS
 - d. GSH
4. De-novo synthesis of fatty acids requires all of the following vitamins **except**:
 - a. Pantothenic acid
 - b. Riboflavin
 - c. Niacin
 - d. Biotin
5. Phospholipid that acts as second messenger to ADH:
 - a. Phosphatidyl choline
 - b. Phosphatidyl serine
 - c. Phosphatidyl inositol
 - d. Phosphatidyl ethanol amine
6. Deficiency of glucose-6-phosphate dehydrogenase may cause:
 - a. Diabetes mellitus
 - b. Hemolytic anemia
 - c. Wernicke-Korsakoff syndrome
 - d. Hypoglycemia
7. Rappaport-Leubering cycle is associated with synthesis of:
 - a. 1,3-Bisphosphoglycerate
 - b. 2,3-Bisphosphoglycerate
 - c. Phosphoenol pyruvate
 - d. Glyceraldehyde-3-phosphate
8. Conjugated hyperbilirubinemia with raised alkaline phosphatase level are characteristic of:
 - a. Obstructive jaundice
 - b. Hemolytic jaundice
 - c. Viral hepatitis
 - d. Physiological jaundice
9. All of the following hormones are synthesized by the placenta **except**:
 - a. Estrogen
 - b. HCG
 - c. Progesterone
 - d. Oxytocin
10. Which of the following enzymes are used as markers of hepatocellular injury?
 - a. ALP and GGT
 - b. ALT and AST
 - c. LDH and CK
 - d. AST and ALP
11. Enzyme for reverse cholesterol transport is:
 - a. LCAT
 - b. ACAT
 - c. HMG CoA reductase
 - d. Cholesteryl ester hydrolase
12. Which water soluble vitamin is stored in the body?
 - a. Vitamin B12
 - b. Vitamin B6
 - c. Vitamin C
 - d. Vitamin B3
13. Renal function test used as a measure of GFR is:
 - a. Clearance test
 - b. Urine concentration test
 - c. Urine dilution test
 - d. Urine acidification test
14. The ammonium (NH_4^+) ions excreted through urine are derived from:
 - a. Glutamate
 - b. Lysine
 - c. Aspartate
 - d. Glutamine
15. Calcium forms hydroxyapatite crystals in bones along with:
 - a. Potassium
 - b. Sodium
 - c. Fluoride
 - d. Phosphorus
16. Action exerted by thyroid hormones is to:
 - a. Decrease protein synthesis
 - b. Increase BMR
 - c. Favour hypoglycemia
 - d. Promote lipogenesis
17. Tumour suppressor gene is:
 - a. Ras
 - b. P53
 - c. Erb-B
 - d. Abl
18. Carcinoembryonic antigen level in serum is increased in:
 - a. Hepatoma
 - b. Germ cell tumour of the testis
 - c. Colorectal cancer
 - d. Choriocarcinoma
19. Receptor for which of the following hormone has intrinsic tyrosine kinase activity?
 - a. Insulin
 - b. Glucagon
 - c. ADH
 - d. Steroids
20. Total Iron Binding Capacity (TIBC) of plasma refers to the maximum binding capacity of:
 - a. Transferrin
 - b. Ferritin
 - c. Hemosiderin
 - d. Ceruloplasmin

BIOCHEMISTRY PAPER- FIRST

Note: Attempt all questions.

Draw suitable diagrams (wherever necessary)

(1 x 5 = 05)

Q. 2. Give reasons why:

- a. Exposure to excessive radiation energy has been proved to be carcinogenic.
- b. Phospholipids are more abundant in the cell membrane.
- c. DNA is more stable than RNA.
- d. Sulpha drugs have a bacteriostatic effect.
- e. Xanthurenic acid estimation in urine helps to detect PLP deficiency.

(1+1+1+1+1 = 05)

Q. 3. Problem based question:

A patient presented with recurrent urolithiasis, hematuria and associated recurrent UTI. On renal stone analysis, cystine stones were detected. Chromatography and electrophoresis was done on the urine sample to study the amino acid excretion pattern.

- a. What is the probable diagnosis and what is the defect?
- b. What is Garrod's tetrad?
- c. Name the co-enzymes required to convert homocysteine to methionine.
- d. At which step does methionine enter the TCA cycle?
- e. What is active methionine? Write its role with one example.

(2.5 x 4 = 10)

Q. 4. Write short notes on:

- a. Acute intermittent porphyria
- b. Specific dynamic action (SDA)
- c. Chemiosmotic theory
- d. Principle and clinical application of PCR

Q. 5. (i) Define isoenzymes. Differentiate between plasma functional and plasma non-functional enzymes.

Give an account of enzyme profile as liver function tests.

(1+1+3 = 5)

(ii) Describe the process of translation in prokaryotes in detail.

(5)

Q. 6. Write in brief about:

- a. Proximate principle of food
- b. Amphibolic role of TCA cycle
- c. Biochemical basis of gout and Lesch-Nyhan syndrome
- d. Functions of plasma proteins

(2.5 x 4 = 10)

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, NOVEMBER - 2017**BIOCHEMISTRY****PAPER - FIRST****SET - B****[Max Marks: 50]****[Time allotted: Three hours]****Q. 1. Multiple choice questions (attempt all MCQs in the allotted first 20 minutes in the OMR sheet) ($\frac{1}{2} \times 20 = 10$)**

1. Okazaki fragments are part of:
 - a. Leading strand
 - b. Lagging strand
 - c. Template strand
 - d. None of the above
2. Which enzyme is **not** involved in catabolism of haem?
 - a. Haemoxygenase
 - b. UDP-glucuronosyl transferase
 - c. Biliverdin reductase
 - d. Ferrochelatase
3. Enzyme aldolase is an example of which class of enzyme?
 - a. Oxidoreductase
 - b. Ligase
 - c. Lyase
 - d. Transferase
4. An uncoupler of oxidative phosphorylation:
 - a. Allows electron transport to occur without ATP formation
 - b. Inhibits electron transport without impairment of ATP synthesis
 - c. Inhibits transfer of electrons from cytochrome aa3 to molecular oxygen
 - d. Inhibits electron transport and ATP synthesis
5. Chemical score of egg protein is:
 - a. 10
 - b. 50
 - c. 25
 - d. 100
6. A co-enzyme required in carboxylation reactions is:
 - a. Coenzyme Q
 - b. Lipoic acid
 - c. Biotin
 - d. NAD^+
7. Pyridoxal phosphate is a cofactor in all of the following reactions **except**:
 - a. Decarboxylation
 - b. Deamination
 - c. Dehydrogenation
 - d. Transamination
8. Which one of the following is a dipeptide?
 - a. Glutathione
 - b. Bradykinin
 - c. Angiotensin
 - d. Carnosine
9. In ETC, the vitamin involved is:
 - a. Thiamine
 - b. Folic acid
 - c. Riboflavin
 - d. Cobalamin
10. In the urea cycle, ammonia in the presence of carbon dioxide and ATP forms:
 - a. Argininosuccinate
 - b. Ornithine
 - c. Carbamoyl phosphate
 - d. Citrulline
11. Which enzymes help in reduction of oxidative stress?
 - a. Phosphatases
 - b. Oxygenases
 - c. Hydroperoxidases
 - d. Kinases
12. One of the following factors is needed for initiation of RNA synthesis:
 - a. Rho factor
 - b. Delta factor
 - c. Sigma factor
 - d. Beta factor
13. An increased melting temperature of duplex DNA results from a high content of:
 - a. Adenine + Guanine
 - b. Thymine + Cytosine
 - c. Cytosine + Guanine
 - d. Cytosine + Adenine
14. Primosome is:
 - a. Primase
 - b. Helicase
 - c. Topoisomerase
 - d. Both a and b
15. Basal metabolic rate (BMR) is increased in:
 - a. Myxoedema
 - b. Addison's disease
 - c. Hyperthyroidism
 - d. Diabetes insipidus
16. Which of the following porphyria is not associated with photosensitivity?
 - a. Porphyria cutanea tarda
 - b. Variegate porphyria
 - c. Acute intermittent porphyria
 - d. Erythropoietic protoporphyria
17. Which enzyme acts as gene cutter in recombinant DNA technology?
 - a. Helicase
 - b. Topoisomerase
 - c. Ligase
 - d. Restriction endonuclease
18. The enzyme mainly used in ELISA technique is:
 - a. Acid phosphatase
 - b. Alkaline phosphatase
 - c. Alanine transaminase
 - d. Hexokinase
19. Which coenzyme is required for ALA synthase?
 - a. TPP
 - b. FAD
 - c. NAD^+
 - d. PLP
20. Proof reading activity required for DNA synthesis in prokaryotes:
 - a. Occurs after the synthesis has been completed
 - b. Is a function of the 3'-5' exonuclease activity of the DNA polymerases
 - c. Requires the presence of an enzyme separate from the DNA polymerase
 - d. Is a function of the 5'-3' exonuclease activity of the DNA polymerases

BIOCHEMISTRY PAPER- SECOND

Note: Attempt all questions.

Draw suitable diagrams (wherever necessary)

Q. 2. Give reasons:

(1 x 5 = 05)

- a. Iron in the body is regulated at the level of absorption.
- b. Excessive oxidation of fatty acids leads to metabolic acidosis.
- c. Deficiency of vitamin B₁₂ causes methylmalonic aciduria and homocystinuria.
- d. Assessment of serum proteins is included in LFT.
- e. Plasmalogens are called ether lipids.

Q. 3. Problem based question:

(1 x 5 = 05)

A 50 year old male with history of chronic alcoholism had fatty liver.

- a. What is fatty liver?
- b. What are the various causes of fatty liver? List any four of them.
- c. What are lipotropic factors? Name any two.
- d. What is the nutritional therapy for fatty liver?
- e. What are the biochemical investigations for fatty liver?

Q. 4. Write in brief on:

(2.5 x 4 = 10)

- a. Diagnostic and therapeutic uses of radioisotopes in medicine.
- b. Functions of thyroid gland and how would you investigate them?
- c. Integrated metabolism of carbohydrates, fats and proteins.
- d. Anomerism and its importance.

Q. 5. Structured questions:

- (i). Describe the processes of glycogenesis and glycogenolysis. Explain how they are reciprocally regulated.

(4+1=05)

- (ii). Write the metabolic role of vitamin D and deficiency of vitamin D. Why is vitamin D considered to be a prohormone?

(2+1+2 = 05)

Q. 6. Write short notes on:

(2.5 x 4 = 10)

- a. Carnitine shuttle
- b. Cardiac function tests
- c. Phase-II of detoxification
- d. Tumor markers

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, NOVEMBER - 2017**BIOCHEMISTRY****PAPER - SECOND****[Time allotted: Three hours]****SET - A****[Max Marks: 50]****Q. 1. Multiple choice questions (attempt all MCQs in the allotted first 20 minutes in the OMR sheet) ($\frac{1}{2} \times 20 = 10$)**

1. A regulator of the enzyme glycogen synthase is:
 - a. Citric acid
 - b. Pyruvate
 - c. Glucose-6-phosphate
 - d. GTP
2. An essential for converting glucose to glycogen in liver is:
 - a. GTP
 - b. UTP
 - c. Lactic acid
 - d. Pyruvic acid
3. How many ATP molecules will be required for conversion of two molecules of lactic acid to glucose?
 - a. 2
 - b. 4
 - c. 6
 - d. 8
4. In β -oxidation of fatty acids, which of the following are utilized in their coenzyme form?
 - a. Riboflavin and niacin
 - b. Only niacin
 - c. Only riboflavin
 - d. Riboflavin and pyridoxine
5. Triacylglycerol present in VLDL is hydrolyzed by:
 - a. Intestinal lipase
 - b. Lipoprotein lipase
 - c. Pancreatic lipase
 - d. Hormone sensitive lipase
6. How many ATP are produced when palmitoyl-CoA, a 16-carbon saturated fatty acid is oxidized completely to CO_2 and H_2O ?
 - a. 96
 - b. 111
 - c. 108
 - d. 125
7. NADPH, utilized for synthesis of fatty acid, can be generated partly from:
 - a. Citrate lyase
 - b. Malic enzyme
 - c. Citrate synthase
 - d. Acetyl CoA carboxylase
8. Which of the following intermediates in the oxidation of odd chain fatty acids is likely to appear in the urine in vitamin B_{12} deficiency?
 - a. Succinic acid
 - b. Methylmalonic acid
 - c. Malonic acid
 - d. Butyric acid
9. Glycosaminoglycans include all **except**:
 - a. Heparin
 - b. Hyaluronic acid
 - c. Collagen
 - d. Chondroitin sulfate
10. Glycosidic linkage in lactose is:
 - a. α (1-4)
 - b. β (1-4)
 - c. α (1-6)
 - d. β (1-6)
11. All the following hormones use cAMP as second messenger **except**:
 - a. FSH
 - b. Epinephrine
 - c. LH
 - d. Estrogen
12. In diagnosis of pregnancy, which hormone is commonly measured in urine?
 - a. HCG
 - b. FSH
 - c. Progesterone
 - d. LH
13. Unconjugated bilirubin is raised mostly in :
 - a. Hemolytic jaundice
 - b. Obstructive jaundice
 - c. Carcinoma of pancreas
 - d. Stone in gall bladder
14. Pellagra occurs due to deficiency of :
 - a. Biotin
 - b. Nicotinic acid
 - c. Pantothenic acid
 - d. Folic acid
15. Excretion of FIGLU in urine occurs in deficiency of:
 - a. Thiamine
 - b. Folate
 - c. Ascorbate
 - d. Niacin
16. Thiamine pyrophosphate is required for the following enzymatic activity:
 - a. Hexokinase
 - b. Transketolase
 - c. Transaldolase
 - d. Glucose-6-phosphatase
17. Iron is absorbed from:
 - a. Stomach
 - b. Duodenum and jejunum
 - c. Duodenum
 - d. Stomach and jejunum
18. All of the following are true for cytochrome P_{450} **except**:
 - a. It is also called mixed function oxidase
 - b. It uses NADPH
 - c. It is associated with smooth endoplasmic reticulum
 - d. It is allosteric in nature
19. Genes capable of causing cancer are all, **except**:
 - a. Mutagenes
 - b. Oncogenes
 - c. Carcinogenes
 - d. Anti-oncogene
20. The dicarboxylic acid formed from glucose under strong oxidation conditions is called:
 - a. Aldonic acid
 - b. Saccharic acid
 - c. Gluconic acid
 - d. Uronic acid