March 2009

[KU 150] **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

Branch XIII – BIOCHEMISTRY
(Common to all Candidates)

Paper III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM
Q.P. Code : 202045

Time : Three hours **Maximum : 100 marks**

Draw suitable diagram wherever necessary
Answer ALL questions

I. Essay questions : **(2 x 20 = 40)**

1. Describe the digestion and absorption of lipids and lipid soluble vitamins.
2. Discuss in detail the homeostasis of blood glucose.

II. Write short notes on : **(10 x 6 = 60)**

1. Metabolic syndrome.
2. Phenylketonuria.
3. Classes and functions of apoproteins.
4. Hyperuricemias.
5. Proteins of muscle contraction.
6. Biological antioxidants.
7. Regulation of calcium.
8. Sulfur containing vitamins.
9. Ketogenesis.
10. Iodine and fluorine.

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September 2009

[KV 150] **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

Branch XIII – BIOCHEMISTRY
(Common to all Candidates)

Paper III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM
Q.P. Code : 202045

Time : Three hours **Maximum : 100 marks**

Draw suitable diagram wherever necessary
Answer ALL questions

I. Essay questions : **(2 x 20 = 40)**

1. Describe the antineuritic vitamins, biological reactions in the metabolism and their deficiency disorders.

2. Describe the general reactions of catabolism of amino acids.

II. Write short notes on : **(10 x 6 = 60)**

1. Ketogenesis.
2. Metabolism in erythrocytes.
3. Purine salvage pathway.
4. Proteins of muscle contraction.
5. Disorders of Ion metabolism.
6. Biotransformation.
7. Components of respiratory chain.
8. Metabolism of fructose.
9. Conjugated proteins.
10. Mitochondrial diseases.

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March 2010

[KW 150] **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

Branch XIII – BIOCHEMISTRY
(Common to all Candidates)

Paper III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM
Q.P. Code : 202045

Time : Three hours **Maximum : 100 marks**

Draw suitable diagram wherever necessary
Answer ALL questions

I. Essay questions : **(2 x 20 = 40)**

1. Describe the metabolic alterations occurring in starvation. How do hormones help in adaptation during starvation?

2. Explain the various mechanisms of regulation of enzymes in the body.

II. Write short notes on : **(10 x 6 = 60)**

1. Role of copper in health and disease.
2. Free radicals – formation and elimination.
3. Methemoglobinemias.
4. Refsum's disease.
5. Role of pyridoxine in the body.
6. Metabolism of methionine.
7. Functional importance of glycine.
8. Porphyrias - causes and lab diagnosis.
9. Ethanol metabolism.
10. Coagulation of blood.

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September 2010

[KX 150] **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

Branch XIII – BIOCHEMISTRY

Paper III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

(Common to all Candidates)

Q.P. Code : 202045

Time : Three hours **Maximum : 100 marks**

Draw suitable diagram wherever necessary.
Answer ALL questions.

I. Essay questions : **(2 X 20 = 40)**

1. Describe the metabolic alteration occurring in Diabetes mellitus. Discuss insulin resistance.

2. Describe the formation and elimination of free radicals and the role of antioxidants in health and disease.

II. Write short notes on : **(10 X 6 = 60)**

1. Glycosylated haemoglobin.
2. ELISA.
3. Biochemistry of amniotic fluid.
4. Role of Micronutrients in pregnancy.
5. Haemoglobin electrophoresis.
6. Discuss the concept and significance of

   a) Clearance test b) Tolerance test c) Load test.
7. Quality control.
8. Metabolic changes during starvation.
9. Respiratory acidosis and alkalosis.
10. Metabolism of methionine.

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MAY 2011

[KY 150] **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

INTERMEDIARY METABOLISM, MACRO AND

MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code : 202045

Time : 3 hours **Maximum : 100 marks**

(180 Min)

Answer ALL questions in the same order.

	Pages (Max.)	Time (Max.)	Marks (Max.)
I. Essay:			
1. Explain the steps in cholesterol synthesis. Add a note on regulation of the same.	6	15	10
2. Explain in detail the components of electron transport chain and the steps involved in the generation of ATP by oxidative phosphorylation.	6	15	10
II. Short Questions:			
1. Hyperuricemia.	3	8	5
2. Absorption, transport and storage of iron.	3	8	5
3. Adipose tissue metabolism.	3	8	5
4. Formation and metabolism of chylomicrons.	3	8	5
5. Galactosemias.	3	8	5
6. Recommended Daily Allowance, sources and biochemical functions of pyridoxine.	3	8	5
7. One carbon pool.	3	8	5
8. Tyrosinemia.	3	8	5
III. Reasoning Out:			
1. Fasting aggravates porphyria. Explain.	4	10	5
2. Excessive ingestion of alcohol leads to hypoglycemia. Explain.	4	10	5
3. Sustained muscle spasm / rigor mortis follows death. Explain.	4	10	5
4. Fructose leads to increased formation of VLDL. Explain.	4	10	5
IV. Very Short Answers :			
1. Differences between coenzymes and cofactors.	1	4	2
2. Lipoprotein a.	1	4	2
3. Aminoacid involved in creatinine synthesis.	1	4	2
4. Primary hyperoxaluria.	1	4	2
5. Mention any two zinc dependent enzymes.	1	4	2
6. Cystinuria.	1	4	2
7. Name the polyamines and mention any two functions.	1	4	2
8. Biochemical defect in Refsum's disease.	1	4	2
9. Applications of double reciprocal plot.	1	4	2
10. Functions of selenium.	1	4	2

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APRIL 2012

[LA 150] **Sub. Code: 2045**

M.D. DEGREE EXAMINATION
BRANCH XIII – BIOCHEMISTRY
INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM
Q.P. Code : 202045

Time : 3 hours **Maximum : 100 marks**
(180 Min)

Answer ALL questions in the same order.

	Pages (Max.)	Time (Max.)	Marks (Max.)
I. Essay:			
1. Discuss in detail the sources, biochemical function, metabolism, recommended dietary allowances, deficiency manifestations and toxicity symptoms of Iron.	9	15	10
2. Discuss in detail regulation of blood glucose levels.	9	15	10
II. Short Questions:			
1. Explain the mechanism of enzyme catalysis.	3	8	5
2. Antioxidant vitamins and their clinical significance.	3	8	5
3. Clinical and biochemical aspects of mitochondrial diseases.	3	8	5
4. Briefly explain the mechanism of free radical damage.	3	8	5
5. Role of Cytochrome p450 species.	3	8	5
6. Explain the mechanism of activation of platelets.	3	8	5
7. Describe in brief the metabolic functions of adipose tissue.	3	8	5
8. Metabolism of alcohol and its effects on liver function.	3	8	5
III. Reasoning Out:			
1. Explain the role of minerals as prosthetic group of enzymes.	5	10	5
2. Compartmentation of metabolic pathways.	5	10	5
3. Atherogenic nature of Lp (a).	5	10	5
4. Physical and biochemical changes associated with oxygenation of Hemoglobin.	5	10	5
IV. Very Short Answers :			
1. Give 2 examples of reactions involving PLP as coenzyme.	1	4	2
2. Differentiate between Active site and Allosteric site of enzymes.	1	4	2
3. Define phosphagens with an example.	1	4	2
4. Explain the function of dioxygenases with an example.	1	4	2
5. Epimers of Glucose.	1	4	2
6. What is Sialic acid?	1	4	2
7. Mention two functions of Choline.	1	4	2
8. Mention two important applications of Liposomes.	1	4	2
9. What is the unique feature of Glycolysis.	1	4	2
10. Location and function of Lipoprotein Lipase.	1	4	2

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(LC 150) **APRIL 2013** **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII - BIOCHEMISTRY

INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 marks**

I. Essay : **(2x10=20)**

1. What are the specialized products synthesized from cholesterol ? Describe the bile acid synthesis and their physiological significance.
2. Write a note on the metabolism and associated disorders of calcium.

II. Short Questions: **(8x5=40)**

1. Receptor mediated endocytosis of LDL.
2. Digestion of proteins
3. Brief on the significance of Glucose – Alanine cycle
4. Functions of Prostaglandins
5. Write a short note on Transamination
6. Role of Cytochrome P450
7. What is Chemiosmotic theory?
8. Types and features of Homocystinuria

III. Reasoning Out: **(4x5=20)**

1. Acute abdominal pain with psychiatric symptoms is seen in acute intermittent porphyria.
2. Conjugated bilirubin levels are elevated during the early recovery phase after the removal of obstruction.
3. Glucose – Alanine cycle utilizes muscle glycogen to maintain blood glucose in the fasting state
4. Selective inhibition of cycloxygenase – 2 is preferred in the treatment of inflammatory conditions.

IV. Very Short Answers: **(10x2=20)**

1. Functions of Selenium
2. What is ALA synthase?
3. Types and roles of Histones
4. What is Protoporphyria?
5. Significance of FIGLU
6. Biochemical features of Alkaptonuria
7. What is Crigler – Najjar syndrome type II?
8. Significance of Watson shwartz test
9. Uses and adverse effects of Phototherapy
10. What is Hyperuricemia ?

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(LE 150) **APRIL 2014** **Sub. Code:2045**

M.D. DEGREE EXAMINATION

BRANCH XIII - BIOCHEMISTRY

PAPER –III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P.Code: 202045

Time: Three Hours **Maximum: 100 marks**

I. Essay Questions: **(2X10=20)**

1. Describe the regulation of intracellular cholesterol concentration and mention reverse transport of cholesterol.
2. Discuss the metabolism of iron.

II. Short Questions: **(8X5=40)**

1. Regulators of appetite.
2. Methylmalonicaciduria.
3. Cytochrome P450.
4. Regulation of Phosphofructokinase.
5. Digestion of lipids.
6. Regulations of blood calcium.
7. Serene proteases.
8. Neurotransmitters.

III. Reasoning Out: **(4X5=20)**

1. Methionine residues in protein – are they useful.
2. Km value is not always an indicator of affinity of enzyme to the substrate.
3. Reduction of oxygen in complex IV of ETC will not form reactive oxygen species.
4. Disorders of Betaoxidation causes hypoglycemia.

IV. Very Short Answers: **(10X2=20)**

1. Suicide enzyme.
2. Perilipin.
3. Beta-alanine.
4. Functions of selenium.
5. Actions of Nitric Oxide.
6. Anapleurotic role of TCA cycle.
7. ATP.
8. Taurine.
9. Pseudoporphyria.
10. Haemoglobin E.

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(LF 150) **OCTOBER 2014** **Sub. Code:2045**

M.D. DEGREE EXAMINATION

BRANCH XIII - BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P.Code: 202045

Time: Three Hours **Maximum: 100 marks**

I. Essay Questions: **(2 x 10 = 20)**

1. Classify Glycosaminoglycans. How are they synthesised in the body? Add a note on their functions in a cell.
2. Describe in detail the pathway of new glucose formation from various sources Add a note on the point of entry of glucogenic aminoacids into the pathway.

II. Short Questions: **(8 x 5 = 40)**

1. Gla proteins.
2. Regulation of HMP shunt pathway.
3. Structure and functions of Phosphotidyl Inositol.
4. Synergestic role of vitamin C and Vitamin E as anti-oxidants.
5. Protein degradation pathways.
6. Explain 'Futile' cycles in metabolic pathways with an example.
7. Metabolic syndrome
8. Carnitine - Chemistry, causes and biochemical features of its deficiency.

III. Reasoning Out: **(4 x 5 = 20)**

1. Alcoholics are more prone to hypoglycemia – explain.
2. Reason for megaloblastic picture of bone marrow & macrocytic anemia in B12 deficiency.
3. Why ammonia is toxic to the central nervous system?
4. Why ingestion of large quantities of fructose is considered dangerous to the body?

IV. Very Short Answers: **(10 x 2 = 20)**

1. What is Delta bilirubin and what is its clinical significance?
2. Histidine load test.
3. I - Cell disease.
4. Role of LCAT (Lecithin Cholesterol Acyl Transferase)
5. Inhibitors of glycolysis and their mechanism of action.
6. UCP 1-UncouplerProtein 1
7. Diagnostic criteria of Gestational Diabetes Mellitus.
8. Haeber - Weiss reaction.
9. Enzymes requiring selenium as cofactors.
10. Double Reciprocal plot.

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[LG 150] **APRIL 2015** **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 marks**

Answer ALL questions

I. Essay: **(2 x 10 = 20)**

1. Define biochemically- fasting and starvation. Discuss the enzymatic changes and sources of metabolic fuel to the brain, skeletal muscle, liver, adipose tissue during fasting and starvation.
2. Classify lipoproteins. Describe in detail the endogenous pathway of lipoprotein metabolism. Add a note on Frederickson's classification of dyslipoproteinemias.

II. Short Questions: **(8 x 5 = 40)**

1. Explain mechanism based inactivation with a suitable example.
2. Regulation of heme biosynthesis.
3. Binding change mechanism.
4. Describe the sources, carriers and end products of 1- Carbon atoms.
5. Write the energetics of gluconeogenesis from a) pyruvate b) glycerol c) alanine d) odd chain fatty acids as substrates.
6. Oxidation and energetics of linoleic acid.
7. Meistter's cycle and its associated inherited disorders.
8. Lipoprotein 'a' - structure and clinical significance.

III. Reasoning Out: **(4 x 5 = 20)**

1. Explain the mechanism of toxicity of lead & the enzymes which are inhibited by lead.
2. Explain the basis of biochemical findings in von Gierke's diseases.
3. Explain the biochemical basis of ketone 'bodies' production in starvation and DM.
4. Why pyruvate kinase deficiency is associated with hemolytic anemia?

IV. Very Short Answers: **(10 x 2 = 20)**

1. Site directed mutagenesis.
2. Fenton reaction and its significance.
3. CETP and its role.
4. Inhibitors of TCA cycle and their mechanism of action.
5. Why ATP is called a high energy compound and what is its $\Delta G^{0/}$?
6. Medium chain acyl CoA dehydrogenase deficiency disorder.
7. Sources of atoms of purine nucleus.
8. Mechanism of Vitamin E as an anti oxidant.
9. Hereditary fructose intolerance.
10. HGPRTase.

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[LH 150] **OCTOBER 2015** **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 marks**

Answer ALL questions

I. Essay: **(2 x 10 = 20)**

1. Discuss the regulation and anapleurotic role of TCA cycle.
2. What are one carbon groups? How are they generated and utilised?

II. Short Questions: **(8 x 5 = 40)**

1. Digestion and absorption of carbohydrates.
2. Oxidative phosphorylation.
3. Low density Lipoproteins.
4. Regulation of iron metabolism.
5. Biochemical role of vitamin E.
6. Cystinuria.
7. Metabolic Syndrome.
8. Fatty liver.

III. Reasoning Out: **(4 x 5 = 20)**

1. Vitamin K is necessary for clotting.
2. Glycogen synthase does not belong to the class ligase. Why?
3. Bile acid is important for lipid digestion and aborption.
4. Cirrhosis patients are prone for hypoglycemia.

IV. Very Short Answers: **(10 x 2 = 20)**

1. Acute intermittent porphyria.
2. Orotic aciduria.
3. cAMP.
4. LCAT.
5. Gaucher’s disease.
6. Coenzyme Q.
7. Hartnups disease.
8. Maple syrup urine disease.
9. Neonatal tyrosinemia.
10. NADPH generating reactions.

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(LI 150) APRIL 2016 **Sub. Code:2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P.Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 10 = 20)**

1. Discuss the metabolism of glycogen, and explain the role of calmodulin in the regulation of glycogen metabolism.
2. Describe the metabolic adaptations in diabetes mellitus.

II. Short Questions: **(8 x 5 = 40)**

1. Leptin.
2. Watson Schwart's test.
3. Prostaglandins.
4. Control of Pentose Phosphate Pathway.
5. Metabolism of HDL.
6. Glycine Cleavage system.
7. Vitamin K.
8. Hyperphenylalaninemias.

III. Reasoning Out: **(4 x 5 = 20)**

1. Role of Nitric oxide in the various clinical conditions.
2. Dietary fibers are good for health.
3. Bile acid is important for lipid digestion and absorption.
4. Iron absorption is decreased by cereals.

IV. Very Short Answers: **(10 x 2 = 20)**

1. Functions of Zinc.
2. Markers of bone resorption.
3. Transport of Vitamin B12.
4. Hartnup disease.
5. Free radicals.
6. Formation of Vitamin D_3.
7. Carboxypeptidases.
8. Proteosomes.
9. Tay-Sachs disease.
10. Lipoprotein lipase.

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(LJ 150) OCTOBER 2016 **Sub. Code:2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P.Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 10 = 20)**

1. Describe metabolic and biochemical derangements in diabetes mellitus.
2. Discuss the metabolism of tyrosine and the significance of the specialized products and its related disorders.

II. Short Questions: **(8 x 5 = 40)**

1. Reverse cholesterol transport.
2. Porphyria cutanea tarda.
3. Regulation of serum Calcium.
4. Apolipo proteins.
5. Phenyl ketonuria.
6. Gout.
7. Isoenzymes.
8. Brown adipose tissue.

III. Reasoning Out: **(4 x 5 = 20)**

1. The basis of using Benzoic acid and arginine in treating urea cycle enzyme defects.
2. Zinc is an antioxidant.
3. Flurosis is more dangerous than caries.
4. Bantu tribe in Africa is prone to Hemosiderosis.

IV. Very Short Answers: **(10 x 2 = 20)**

1. Folate trap.
2. Futile cycle.
3. Fates of Glucose 6 phosphate.
4. Ceruloplasmin.
5. Biotin independent carboxylation reaction.
6. Formation of bile acids.
7. Functions of phospholipids.
8. Advanced glycation end products.
9. ATP binding cassette protein (ABC).
10. Fetal Haemoglobin.

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(LK 150) MAY 2017 **Sub. Code:2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P.Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 10 = 20)**

1. Describe in detail the normal metabolism of galactose. Add a note on the causes, features and biochemical basis and lab diagnosis of various types of galactosemia.
2. Describe in detail the different types of enzyme inhibition with examples.

II. Short Questions: **(8 x 5 = 40)**

1. Fate of glucose 6- phosphate in the body.
2. What is ROS and how are they formed and handled by a cell?
3. Role of hormones in regulating energy balance and body weight.
4. Regulation of de novo synthetic pathway of purines.
5. Explain the causes of Fatty Liver and agents which prevent fatty liver.
6. Metabolism of ethyl alcohol.
7. Biochemical defect in Wilson's disease and laboratory diagnosis.
8. What is mucosal block theory of iron absorption? What are the factors influencing iron absorption?

III. Reasoning Out: **(4 x 5 = 20)**

1. Type II hyperammonemia presents with orotic aciduria. Why?
2. In Von Gierke's disease, hypoglycemia does not respond to counter regulatory hormone administration. Explain.
3. Why hemolytic anemia is a feature of G6PD deficiency?
4. Only less than 10% of Apolipoprotein E2 homozygotes present with Type III hyperlipoproteinemia. Why?

IV. Very Short Answers: **(10 x 2 = 20)**

1. Energetics of urea cycle.
2. What is the enzyme defect in Lesch-Nyhan Syndrome Why hyperuricemia is a feature of the disease?
3. What is the biochemical basis of painful muscle spasm following prolonged exercise?
4. Assessment of Vitamin B_{12} status.
5. Name the clotting factor found in serum. Why?
6. What is the biochemical basis of Jamaican Vomiting sickness? Mention two biochemical features of the same.
7. Location and Role of ACAT.
8. Any 2 biologically important compounds derived by decarboxylation reactions and their synthesis.
9. Tangier's disease.
10. Isoforms of NOS, their location and function.

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(LL 150) OCTOBER 2017 **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P.Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 10 = 20)**

1. Write in detail about sources, RDA, biochemical functions and deficiency manifestations of Vitamin D.
2. Explain the synthesis of Glucose from various amino acids.

II. Short Questions: **(8 x 5 = 40)**

1. Theories explaining the mechanism of action of Enzymes.
2. Megavitamin therapy.
3. Mitochondrial encephalomyopathy lactic acidosis stroke like episodes (MELAS).
4. Digestion and Absorption of Carbohydrates.
5. β oxidation of Fatty acids.
6. Metabolic Adaptation in Starvation.
7. Metabolism in Lens of Eye.
8. Metal activated Enzymes.

III. Reasoning Out: **(4 x 5 = 20)**

1. Caloric values of Fats is about twice that of Sugars.
2. Cellular concentration of Pyruvate and αKeto Glutarate increase in BeriBeri.
3. Pentose Phosphate pathway is described as Shunt pathway.
4. Free redox – active metal ion complexes are dangerous in biological systems.

IV. Very Short Answers: **(10 x 2 = 20)**

1. Active site of Enzyme.
2. Competitive Inhibition of Enzyme.
3. Complex I of Electron Transport Chain.
4. ATP synthase.
5. Fructose Intolerance.
6. Malignant Hyperthermia.
7. Fatty acid Synthase.
8. Non Ketotic Hyper glycinemia.
9. Functions of Serotonin.
10. Propionyl CoA Carboxylase.

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[LM 150] MAY 2018 **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P.Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. Discuss in detail the synthesis and regulation of Heme. Add a note on Hepatic Porphyrias.

2. Name the aromatic amino acids. Discuss in detail the metabolism and specialized products formed from Tryptophan.

II. Short notes: **(10 x 5 = 50)**

1. Metabolism and clinical significance of High Density Lipoprotein.
2. Anti-oxidant Vitamins and their significance.
3. One Carbon Metabolism.
4. Oxygenases and their importance.
5. Iron toxicity.
6. Synthesis of ketone bodies and its regulation.
7. Metabolic disorders of Sulfur containing Aminoacids.
8. Carnitine transport and its significance.
9. Regulation of blood calcium.
10. Non – ketotic Hyperglycinemia.

III. Reasoning Out: **(4 x 5 = 20)**

1. Vitamin A deficiency has a more severe effect on Thyroid Hormone function.
2. Substrate cycle allows the fine tuning and rapid response of metabolism.
3. Glutamine analogs block the Purine nucleotide biosynthesis.
4. Acyl-CoA plays a dual role in Thermogenesis of Brown adipose tissue.

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[LN 150] OCTOBER 2018 **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. Write in detail the Sources, RDA, Functions and Deficiency manifestations of Folic acid. Add a note on Folate antagonists.

2. Write in detail organization, reactions of Electron Transport Chain and the inherited disorders of Oxidative phosphorylation.

II. Short notes: **(10 x 5 = 50)**

1. Metabolism and significance of Low Density Lipoprotein.
2. Digestion and absorption of Lipids.
3. Disposal of Ammonia.
4. Synthesis and functions of Prostaglandins.
5. Regulation of Glycolysis.
6. Selenium.
7. Biochemical importance of Glycine.
8. Significance of Hepcidin.
9. Polyamines.
10. Metabolism of Red Blood Cell.

III. Reasoning Out: **(4 x 5 = 20)**

1. Glucokinase functions as Glucose sensor in blood glucose Homeostasis.
2. Enzyme -3 Deficient form of Maple Syrup Urine disease is associated with Lactic acidosis.
3. Adipose tissue is an endocrine organ.
4. Class B scavenger receptor B1 has dual role in HDL metabolism.

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[LO 150] MAY 2019 **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. What are the sources, requirement, Biochemical functions and deficiency manifestations and assay of Menaquinone?
2. Write an essay on Metabolism during fed state and how it is regulated in various tissues?

II. Short notes: **(10 x 5 = 50)**

1. Cytochrome P450.
2. Digestion and absorption of proteins.
3. Transmethylation.
4. Glucuronic acid.
5. Congenital hyperbilirubinemia.
6. Zinc –Biochemical functions and deficiency manifestation.
7. Different mechanisms of enzyme inhibition.
8. NADPH.
9. HbA1c.
10. Shuttles of Electron transport chain.

III. Reasoning Out: **(4 x 5 = 20)**

1. Calcitriol is a hormone.
2. Intake of fruits increases lipid level.
3. Increased intake of fiber rich whole grain inhibits Calcium absorption.
4. Fatty acids need activation before oxidation.

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[LP 150] OCTOBER 2019 **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. What are the different types of fatty acid oxidation? Explain how even chain fatty acids are oxidized and how it differs from odd chain fatty acids oxidation.
2. Write an essay on the metabolism of the mineral causing Hypo chromic microcytic anemia, Biochemical assessment of the deficiency manifestation.

II. Short notes: **(10 x 5 = 50)**

1. Cytochromes in Electron transport chain.
2. Metabolism of Fructose.
3. Hyperuricemia.
4. Poly unsaturated fatty acids.
5. Hepatic Porphyrias.
6. Menke's disease.
7. Factors affecting enzyme activity.
8. GLA protein.
9. Anion gap.
10. Reverse cholesterol transport.

III. Reasoning Out: **(4 x 5 = 20)**

1. Histidine load test is indicative of Folic acid deficiency.
2. Fasting hypoglycenina occur in which disorder and why?
3. Ascorbic acid is needed for Tyrosine metabolism.
4. Part of the Urea cycle occurs in Mitochondria.

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[LQ 150] AUGUST 2020 **Sub. Code: 2045**

(MAY 2020 SESSION)

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. Discuss in detail the sources, biochemical function, metabolism, recommended dietary allowances, deficiency manifestations and toxicity symptoms of Calcium
2. Discuss in detail the regulation of blood glucose levels.

II. Short notes: **(10 x 5 = 50)**

1. Explain the mechanism of enzyme catalysis.
2. Antioxidant vitamins and their clinical significance
3. Clinical and biochemical aspects of mitochondrial diseases.
4. Briefly explain the mechanism of free radical damage.
5. Role of Cytochrome P450 species.
6. Explain the mechanism of activation of platelets.
7. Describe in brief the metabolic functions of adipose tissue.
8. Metabolism of alcohol and its effects on liver function.
9. Explain the process of dissolution of fibrin clot
10. Metabolic functions of Kidney

III. Reasoning Out: **(4 x 5 = 20)**

1. Explain the role of minerals as prosthetic group of enzymes.
2. Compartmentation of metabolic pathways.
3. Atherogenic nature of Lp(a).
4. Physical and biochemical changes associated with oxygenation of Hemoglobin.

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[LS 150] NOVEMBER 2020 **Sub. Code: 2045**

(OCTOBER 2020 SESSION)

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. Discuss in detail the sources, biochemical function, metabolism, recommended dietary allowances, deficiency manifestations and toxicity symptoms of folic acid.
2. Glycogen synthesis and its regulation.

II. Short notes: **(10 x 5 = 50)**

1. Classification of enzymes with examples.
2. Functions of Vitamin A
3. Mitochondrial transport systems
4. Metabolic functions of Erythrocytes
5. Glycolytic pathway and its significance.
6. Mechanism of action of anticoagulants
7. Conjugation reactions of Xenobiotics
8. Non – enzymatic antioxidants.
9. Vitamin K cycle and is clinical significance
10. Metabolism of Xenobiotics.

III. Reasoning Out: **(4 x 5 = 20)**

1. Role of minerals in membrane transport.
2. Acetyl CoA is the meeting point of major metabolic pathways.
3. Beneficial effects of HDL.
4. Transport functions of Hemoglobin

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[MD 0721] JULY 2021 **Sub. Code: 2045**

(MAY 2021 SESSION)

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. What are the sources, recommended dietary allowances, biochemical role and deficiency manifestations of Vitamin A?
2. Write in detail about the complexes of respiratory chain. Write a note on inhibitors of respiratory chain.

II. Short notes: **(10 x 5 = 50)**

1. Digestion and absorption of lipids.
2. Fructose 2, 6 bisphosphate.
3. Fatty liver.
4. Metabolism of chylomicrons.
5. Metabolism in kidneys.
6. Biologically important products from tyrosine.
7. Intrinsic pathway of blood coagulation.
8. Alteplase.
9. Hypo natremia.
10. Chromium.

III. Reasoning Out: **(4 x 5 = 20)**

1. Cytochrome p450 participates in the synthesis of steroid hormones.
2. Helper T cells are drastically reduced in acquired immuno deficiency syndrome.
3. Hyper glycemia inhibits glycolysis.
4. Consumption of Alcohol in malnourished person can cause hypoglycemia.

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THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[MD 1121] NOVEMBER 2021 **Sub. Code: 2045**

(OCTOBER 2021 SESSION)

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. What are the sources, Recommended Dietary Allowances, biochemical role and deficiency manifestations of Vitamin B_{12}?
2. Explain the process of Biosynthesis of Fatty acids. Write a note on its regulation.

II. Short notes: **(10 x 5 = 50)**

1. Digestion and absorption of Carbohydrates.
2. Glucose 6 phosphate dehydrogenase.
3. Regulation of Ketogenesis.
4. Lipotropic factors.
5. Metabolism of High Density Lipoproteins.
6. Metabolism in Heart.
7. Lactic acidosis.
8. Biologically important products from Tryptophan.
9. Extrinsic Pathway of Blood Coagulation.
10. Hypokalemia.

III. Reasoning Out: **(4 x 5 = 20)**

1. Phosphorylase a is a "Glucose Receptor" in Liver.
2. Fatty acids act as regulator molecules.
3. Homocystinemia causes Atherosclerosis.
4. Glutathione concentration affects response to Toxins.

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THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY

[MD 0522] **MAY 2022** **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. List the sources requirement and functions of calcium. Detail calcium homeostasis.
2. What is ammonia pool? Detail ammonia catabolism and its associated disorders.

II. Short notes: **(10 x 5 = 50)**

1. Isoenzymes.
2. Functions and deficiency manifestation of vit.B6.
3. Glycogen storage disorders.
4. HDL Cycle.
5. Derived products of tyrosine metabolism.
6. Oroticaciduria.
7. Hemoglobinopathies.
8. Free radicles.
9. Selenium and its applications.
10. Mitochondrial diseases.

III. Reasoning Out: **(4 x 5 = 20)**

1. Methanol poisoning can be treated by ethanol administration. Explain.
2. Explain the biochemical basis in Hartnups disease.
3. A Newborn was delivered with a cataract. Explain the biochemical basis.
4. Biochemical defect in refsum's disease.

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THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSTIY

[MD 1022] **OCTOBER 2022** **Sub. Code: 2045**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. Define isoenzymes. Discuss in detail about various isoenzymes with its clinical applications.

2. Detail the steps of heme synthesis and its associated disorders.

II. Short notes: **(10 x 5 = 50)**

1. Functions of Vitamin A.
2. Functions and deficiency manifestation of Selenium.
3. Anti oxidants.
4. Regulation of Ketogenesis.
5. Lipid storage disorders.
6. Galactosemia.
7. Inhibitors and uncouplers of oxidative phosphorylation.
8. Mega vitamin therapy.
9. Km value.
10. Gout.

III. Reasoning Out: **(4 x 5 = 20)**

1. Some individual even after consuming large quantity of food are lean.
2. What is the first line of defense body adopts in ammonia detoxification.
3. Erythrocyte derives energy mainly from which pathway. Why?
4. Hyperbaric O2 therapy is given for acute carbon monoxide poisoning.

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THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSTIY

[MD 0723] **JULY 2023** **Sub. Code: 2045**

(MAY 2023 EXAM SESSION)

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. A 6-year old boy is brought to his pediatrician with profound mental retardation. Upon questioning the mother, several members of both the mother's and father's family have had mental retardation. On examination, the boy appears restless and his speech is significantly delayed and incomprehensible. The boy has coarse facial features but otherwise normal. Laboratory tests reveal an elevated level of Heparin Sulfate.
   a) What is the most likely diagnosis? Justify.
   b) What is the inheritance pattern of this disorder?
   c) Discuss in detail about Mucopolysaccharidoses.

2. Describe the Antineuritic vitamins, biological reactions in the metabolism and their deficiency disorders.

II. Short notes: **(10 x 5 = 50)**

1. Disorders associated with abnormalities in the metabolism of Bilirubin.
2. Dyslipoproteinemias.
3. Disorders of Iron metabolism.
4. Metabolic consequences that occur due to ingestion of large quantities of Fructose.
5. Metabolism in the Lens of Eye.
6. Deficiency manifestations of Folic acid with a note on Folate antagonists.
7. Metabolic adaptations in Obesity.
8. Various types of Inhibition of enzymes.
9. Nucleotide analogues in Chemotherapy.
10. Cytochromes in Electron Transport Chain.

III. Reasoning Out: **(4 x 5 = 20)**

1. Allosteric enzymes are not only catalysts, but also information sensors.
2. Hemolytic anemia is a feature of Glucose-6-Phosphate Dehydrogenase deficiency and Pyuvate kinase deficiency.
3. Urea cycle enzyme defects can be treated by using Benzoic Acid and Arginine.
4. Very Low Carbohydrate Diets Promote Weight Loss.

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THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSTIY

[MD 1223] **DECEMBER 2023** **Sub. Code: 2045**

(OCTOBER 2023 EXAM SESSION)

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – INTERMEDIARY METABOLISM, MACRO AND MICRO NUTRIENTS AND INBORN ERRORS OF METABOLISM

Q.P. Code: 202045

Time: Three Hours **Maximum: 100 Marks**

I. Essay Questions: **(2 x 15 = 30)**

1. Write an essay on Glycogen Synthesis and breakdown and regulation of both with a note on Glycogen Storage disorders.
2. What is the Metabolic Fate of Tryptophan? What are the special products from Tryptophan? How are they formed write a note on errors in Tryptophan Metabolism.

II. Short notes: **(10 x 5 = 50)**

1. Q cycle.
2. Enzyme profile in Icterus.
3. Acute complications of Diabetes.
4. Fatty Liver.
5. Metabolism of Imino acids.
6. Role of Menaquinone / Menadione in Coagulation pathway.
7. Vitamins in conversion of Fat to Glucose.
8. Role of Sulphur in metabolism.
9. Inborn errors of Fructose metabolism.
10. Lipases.

III. Reasoning Out: **(4 x 5 = 20)**

1. Arsenate poisoning cause lactic acidosis.
2. Niacin deficiency causes Folate deficiency.
3. Calpain / Calpastatin system in neurovascular exocytosis.
4. Urine ketones positive does not infer diabetic complications.

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