



હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી

NAAC A (3.02) State University

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પરિપત્ર ક્રમાંક — ૧૧૭ / ૨૦૨૦

વિષય:— પ્રથમ વર્ષ એમ.બી.બી.એસ.ના અભ્યાસક્રમ /સ્કીમ અંગે..

આ યુનિવર્સિટી સંલગ્ન મેડીકલ કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, Medical Council Of India ધ્વારા તૈયાર કરવામાં આવેલ સામેલ પરિશિષ્ટ પ્રમાણેનો પ્રથમ વર્ષ એમ.બી.બી.એસ.ના નવો અભ્યાસક્રમ અને પરીક્ષા સ્કીમ મેડીકલની અભ્યાસ સમિતિની ભલામણ પ્રમાણે જૂન-૨૦૨૦ થી અમલમાં આવે તે રીતે ફેકલ્ટી /એકેડેમિક કાઉન્સિલવતી માન.કુલપતિશ્રીએ મંજૂર કરેલ છે. જેનો અમલ થવા સારૂ સંબંધિતોને આથી આ સાથે મોકલવામાં આવે છે, જેનો યુસ્તપણે અમલ થવા વિનંતી છે.

આ બાબતની સંબંધિત અધ્યાપકો તથા વિદ્યાર્થીઓને આપના સ્તરેથી જાણ કરવા વિનંતી છે.

નોંધ :- (૧) વિદ્યાર્થીઓની જરૂરીયાત માટે પરિપત્રની એક નકલ કોલેજના ગ્રંથાલયમાં મૂકવાની રહેશે.

(૨) ઉપરોક્ત પરિપત્ર યુનિવર્સિટીની વેબ સાઈટ www.ngu.ac.in પર પણ ઉપલબ્ધ કરાવવામાં આવનાર છે.

બિડાણ : ઉપર મુજબ

સહી/-
અધ્યક્ષ
કુલસચિવવતી

નં.—એ કે / અ× સ / ૧૩૬૬ / ૨૦૨૦

તારીખ : ૨૧ / ૦૭ / ૨૦૨૦

પ્રતિ,

- સંલગ્ન મેડીકલ કોલેજોના આચાર્યશ્રીઓ
- ડૉ.અનિલ જે. નાયક, (ડીનશ્રી-મેડીસીન વિદ્યાશાખા), જી.ઈ.એમ.આર.એસ. મેડીકલ કોલેજ, મુ.પો.—ધારપુર તા.જિ—પાટણ.
- પરીક્ષા નિયામકશ્રી, હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (પાંચ નકલ)
- ઈનચાર્જ ઓફિસરશ્રી, સબસેન્ટર, ખેડબ્રહ્મા કેમ્પસ, મુ. વડાલી, જિ. સાબરકાંઠા. (હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ.)
- ગ્રંથપાલશ્રી, હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (વિદ્યાર્થીઓના ઉપયોગ સારૂ રેકર્ડ ફાઈલ માટે)
- સિસ્ટમ એનાલીસ્ટશ્રી, કોમ્પ્યુટર (રીઝલ્ટ) સેન્ટર, હેમ.ઉ.ગુ.યુનિવર્સિટી, પાટણ. તરફ પરિણામ માટે તથા વેબસાઈટ પર મૂકવા સારૂ.
- માન.કુલપતિશ્રી/કુલસચિવશ્રીનું કાર્યાલય, હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ.
- મુખ્ય હિસાબી અધિકારીશ્રી (મહેકમ), હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ તરફ → પરિપત્રની ફાઈલ અર્થે
- સંબંધિત ફાઈલે.

Propose Format of Mark sheet (F.Y. MBBS – New Course: HNGU)

Subject	Division	Internal Assessment			University Assessment			Status P/F/WH
		Max	Min	Obt	Max	Min	Obt	
Anatomy	Theory Paper-I	-	-	-	100	40	XX	
	Theory Paper-II	-	-	-	100	40	XX	
	Theory Total	100	40	XX	200	100	XXX	
	Practical Total	100	40	XX	100	50	XX	
	Total	200	100	XXX	300	-	XXX	
Physiology	Theory Paper-I	-	-	-	100	40	XX	
	Theory Paper-II	-	-	-	100	40	XX	
	Theory Total	100	40	XX	200	100	XXX	
	Practical Total	100	40	XX	100	50	XX	
	Total	200	100	XXX	300	-	XXX	
Biochemistry	Theory Paper-I	-	-	-	100	40	XX	
	Theory Paper-II	-	-	-	100	40	XX	
	Theory Total	100	40	XX	200	100	XXX	
	Practical Total	100	40	XX	100	50	XX	
	Total	200	100	XXX	300	-	XXX	
Aggregate Marks		600	-	XXX	900	-	XXX	
Result: _____ University Exam Total _____/900 University Exam Percentage _____ %								

Propose framework on Assessment in Physiology in First MBBS (As per CBME)

❖ SCHEME FOR INTERNAL ASSESSMENT MARKS:

Theory				Practical					
Sr. No	Component	Fraction	Marks (100)	Sr. No	Component	Fraction	Marks (100)		
1	1 st Internal Examination	15%	15	1	1 st Internal Examination	15%	15		
2	2 nd Internal Examination	15%	15	2	2 nd Internal Examination	15%	15		
3	Preliminary Examination	30%	30	3	Preliminary Examination	30%	30		
4	Day to day assessment	30%	30	4	Day to day assessment + Journal + Logbook	30%	30		
5	Attendance	10%	10	5	Attendance	10%	10		
Total			100%	100	Total			100%	100

❖ UNIVERSITY ASSESSMENT:

University Examination							
Theory				Practical			
Sr. No	Division		Marks		Sr. No	Division	Marks
1	Paper I	MCQ	20	100	1	Haematology	20
		Written	80		2	Clinical/Human Physiology	25
2	Paper II	MCQ	20	100	3	Experimental Physiology	10
		Written	80		4	Spotting	15
					5	Theory Viva	30
Total				200	Total		100

Theory Examination Pattern (Prelim/University):

Theory Paper I

Time: 3 hours

Total marks: 100

Syllabus: [General physiology (1), Haematology (2), Nerve-muscle physiology (3), Respiratory physiology including environmental physiology (6), Cardiovascular physiology (5), Physiology of skin (11), Temperature regulation (11), Sports and exercise physiology (11), Physiology of yoga and meditation (11), AETCOM].

*Number in the bracket indicates competence number.

SECTION – A: MCQ (20 marks)

- Total No. of items: 20 (Each MCQ carry 1 mark)
- Duration: 20 minutes

SECTION – B: (40 marks)

Q.1: Long essay question (1 out of 2)	08 × 1 = 08
Q.2: Case based/Problem based question (1 out of 2)	06 × 1 = 06
Q.3 (A): Short notes (3 out of 4)	04 × 3 = 12
(B): One Short note (AETCOM-compulsory)	04 × 1 = 04
Q.4: Objective questions (5 out of 6)	02 × 5 = 10

SECTION – C: (40 marks)

Q.5: Long essay question (1 out of 2)	08 × 1 = 08
Q.6: Case based/Problem based question (1 out of 2)	06 × 1 = 06
Q.7 (A): Short notes (3 out of 4)	04 × 3 = 12
(B): One Short note (compulsory)	04 × 1 = 04
Q.8: Objective questions (5 out of 6)	02 × 5 = 10

Theory Paper II

Time: 3 hours

Total marks: 100

Syllabus: [Neurophysiology (10), GI physiology including nutrition (4), Renal physiology (7), Endocrine physiology (8), Reproductive physiology (9), Special sense (10), Physiology of infancy (11), Physiology of growth (11), Physiology of ageing (11), Physiology of obesity (11)].

*Number in the bracket indicates competence number.

SECTION – A: MCQ (20 marks)

- Total No. of items: 20 (Each MCQ carry 1 mark)
- Duration: 20 minutes

SECTION – B: (40 marks)

Q.1: Long essay question (1 out of 2)	08 × 1 = 08
Q.2: Case based/Problem based question (1 out of 2)	06 × 1 = 06
Q.3 (A): Short notes (3 out of 4)	04 × 3 = 12
(B): One Short note (compulsory)	04 × 1 = 04
Q.4: Objective questions (5 out of 6)	02 × 5 = 10

SECTION – C: (40 marks)

Q.5: Long essay question (1 out of 2)	08 × 1 = 08
Q.6: Case based/Problem based question (1 out of 2)	06 × 1 = 06
Q.7 (A): Short notes (3 out of 4)	04 × 3 = 12
(B): One Short note (compulsory)	04 × 1 = 04
Q.8: Objective questions (5 out of 6)	02 × 5 = 10

Practical Examination Pattern (Prelim/University):

Prelim/University Practical examination	
Total marks: 100	

Sr. No	Division	Items	Marks	
1	Haematology	A. Major exercise	15	20
		B. Minor exercise	05	
2	Clinical /Human Physiology	A. Major exercise	15	25
		B. Minor exercise	10	
3	Experimental Physiology (Table Viva)	Graph/Charts/Instruments	10	10
4	Spotting	15 spots	15	15
5		Theory Viva	30	30
			Total	100

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Curriculum

HUMAN BIOCHEMISTRY

Phase: First Year M.B.B.S.

Total number of teaching hours allotted to Human Biochemistry: **250 hours for**

1	Didactic (Lecture) Teaching	80 Hours
2	Non Lecture Teaching I. Practical II. Demonstrations III. Tutorials IV. Small Group Teaching.	150 Hours
3	Self Directed Learning	20 Hours
Total Hours		250

i) GOAL:

Biochemistry is one of the basic sciences and is perhaps the most rapidly developing subject in medicine. By learning this subject student should be able understand the events taking place in an extremely synchronized way at the cellular and molecular level. The knowledge acquired should help them to orient themselves towards its application and in finding solution to clinical problems.

ii) OBJECTIVES:

a) KNOWLEDGE

At the end of the course, the student should be able to:

(1) describe the molecular and functional organization of a cell and list its subcellular components;

- (2) delineate structure, function and inter-relationships of biomolecules and consequences of deviation from normal;
- (3) summarize the fundamental aspects of enzymology and clinical application wherein regulation of enzymatic activity is altered;
- (4) describe digestion and assimilation of nutrients and consequences of malnutrition;
- (5) integrate the various aspects of metabolism and their regulatory pathways;
- (6) explain the biochemical basis of inherited disorders with their associated sequelae;
- (7) describe mechanisms involved in maintenance of body fluid and pH homeostasis;
- (8) outline the molecular mechanisms of gene expression and regulation, the principles of genetic engineering and their application in medicine;
- (9) summarize the molecular concepts of body defence and their application in medicine;
- (10) outline the biochemical basis of environmental health hazards, biochemical basis of cancer and carcinogenesis;
- (11) familiarize with the principles of various conventional and specialized laboratory investigations and instrumentation analysis and interpretation of a given data;
- (12) the ability to suggest experiments to support theoretical concepts and clinical diagnosis.

b) SKILLS:

At the end of the course, the student should be able to:

- (1) make use of conventional techniques/instruments to perform biochemical analysis relevant to clinical screening and diagnosis;
- (2) analyze and interpret investigative data;

- (3) demonstrate the skills of solving scientific and clinical problems and decision making;
- (4) design, plan and execute a research project.

Thus the knowledge acquired in Biochemistry shall help the students to understand the functional aspects of the body at cellular and molecular level and help to formulate the investigations as a part of diagnosis and prognosis in disease conditions.

c) INTEGRATION

The knowledge acquired in biochemistry should help the students to integrate molecular events with structure and function of the human body in health and disease.

SYLLABUS FOR HUMAN BIOCHEMISTRY FOR I M.B.B.S.

Introduction: Scope of Biochemistry, Biotechnology, Molecular Biology, Biochemical Concept of Health and Disease.

Biochemical Morphology of the Eukaryotic cell (Molecular and functional organization of cell and cellular organelles): Composition, functions and structure of cell membrane, Transport systems across the cell membrane and their mechanism, Membrane receptors, Molecular and functional organization of sub-cellular organelles, Peroxisomal and Lysosomal disorders, ABC families of transporters.

Chemistry of Carbohydrates: Definition, classification and importance of carbohydrates; chemistry, properties and functions of monosaccharides, disaccharides and polysaccharides; sugar derivatives and their biological importance; location, composition and functions of Glycosaminoglycans (mucopolysaccharides) and its disorders.

Chemistry of Amino Acids and Proteins: Classification and properties of amino acids, peptide bond, biologically important peptides, classification, properties and functions of proteins, structural organization of proteins (with reference to hemoglobin, insulin and collagen) Denaturation of proteins.

Plasma Proteins: Functions and clinical significance of various fractions, methods of separation and electrophoretic pattern in different disorders, acute phase proteins.

Chemistry and functions of Nucleic acids: Concept of purine and pyrimidine base, nucleoside & nucleotide, biologically important free nucleotides, synthetic nucleotide analogues.

Molecular Biology: Structure and higher organization of DNA, structure and types of RNAs , DNA replication, transcription, post-transcriptional processing, genetic code, translation, post translational modifications ; inhibitors of protein biosynthesis, protein targeting and sorting along with its associated disorders. Molecular mechanism of gene expression & its regulation,

Mutations, mutagens. Rb protein, p53. Cell cycle. DNA damage and its repair mechanisms. Apoptosis.

Chemistry of Lipids: Classification of lipids, Definition, distribution, classification, properties and function of fatty acids, triglycerides, phospholipids, sterols & others compound lipids, Structure, properties and functions of cholesterol, Eicosanoids/Prostaglandins, Lipoproteins – structure, types and functions.

Enzymology: Classification, properties and mechanism of enzyme action, co-enzymes. Specificity, regulation (repression & induction) and inhibition of enzyme action; factors affecting enzyme activity, K_m value and its significance (derivation not required and no details of enzyme kinetics). Isoenzymes – definition and separation. Clinical importance (diagnostic, therapeutic and analytical) of enzymes and isoenzymes.

Bioenergetics – Electron transport chain: General concept of oxidation and reduction. Role of enzymes and coenzymes, structure of mitochondrion and organization of electron transport chain, oxidative phosphorylation, inhibitors and uncouplers. High energy compounds. Concept of substrate level phosphorylation.

Chemistry and Metabolism of Haemoglobin: Structure and functions of Porphyrin and Haemoglobin, Biosynthesis and catabolism of heme. Fate of bilirubin. Types of jaundice, porphyrias (in brief), haemoglobinopathies, derivatives of haemoglobin.

Vitamins: Classification, sources, chemistry (in brief), active forms, Biochemical role, deficiency manifestations, recommended daily allowance (RDA) of fat soluble and water soluble vitamins. Hypervitaminosis.

Nutrition: Balance diet, calorific value of foodstuffs, nitrogen balance, BMR, SDA, RQ, Nutritional importance of carbohydrates, proteins & lipids; Dietary fibre, Glycemic index, Assessment of nutritional value of proteins, Protein energy malnutrition – Types, Causes effects. Obesity (causes,

effects and health risks). Dietary advice for optimal health in childhood and adult, in disease conditions like diabetes mellitus, coronary artery disease and in pregnancy.

Carbohydrate Metabolism: Biochemical aspects of digestion and absorption of carbohydrates. Glycolysis & its regulation; Rapaport Leubering cycle, TCA Cycle & its regulation, Cori's cycle, Gluconeogenesis, Hexose Monophosphate Shunt (HMP) pathway and its significance; Uronic acid pathway; Biosynthesis & catabolism of Glycogen, glycogen storage diseases; Metabolism of Galactose and Galactosemia, Metabolism of Fructose, Sorbitol pathway; Regulation of blood glucose level, GTT, Glycosuria, Inborn errors of carbohydrate metabolism. Biochemistry of Diabetes Mellitus.

Amino acids and Protein Metabolism: Biochemical aspects of digestion and absorption of proteins. Fate of amino acids in the body - Transamination, Oxidative & non-oxidative deamination, Transamidation, decarboxylation. Ammonia toxicity & Fate of ammonia - urea cycle, Disorders of urea cycle. Metabolism of individual amino acids - Glycine, Phenylalanine, Tyrosine, Tryptophan, sulphur containing amino acids, branched chain amino acids and their inborn errors, Nitric oxide (NO).

Lipid Metabolism: Biochemical aspects of digestion and absorption of lipids. Oxidation of fatty acids - types and regulation, Biosynthesis of fatty acids and its regulation, Biosynthesis and transport of cholesterol and its regulation, catabolism of cholesterol, Metabolism of adipose tissue - lipogenesis & lipolysis, fatty liver & lipotropic factors, Ketogenesis, ketolysis & ketosis; Metabolism of plasma lipoproteins, Disorders of plasma lipoproteins, Alcohol metabolism, inborn errors of lipid metabolism, Atherosclerosis.

Integration of metabolisms: Metabolic interrelationship of carbohydrates, lipids and protein metabolism. Metabolism in starvation and fed condition.

Metabolism of Purines & pyrimidines: Biosynthesis of purines and pyrimidines - De novo pathway and regulatory steps. Salvage pathway of purine and pyrimidines, catabolism of purines & pyrimidines; Gout, Lesch - Nyhan syndrome, Orotic Aciduria.

Mineral Metabolism: Sources, absorption, transport, functions, dietary requirement, excretion, deficiency manifestations (as applicable) of calcium, phosphorus, magnesium, Iron, Iodine, copper, sodium, potassium, chloride & Trace elements – manganese, selenium, zinc & fluoride.

Hormones: General characteristics, classification, mechanism of hormone action, second messengers and their role.

Water and electrolyte balance, Body fluids: Distribution & composition. Water & electrolyte balance /imbalance in health & disease, Donnan membrane equilibrium.

Acid - Base balance & pH: Acids & bases, Henderson – Hasselbalch equation, buffers, buffers of body fluids, Acid – base balance & pH homeostasis, Metabolic acidosis & alkalosis; Respiratory acidosis & alkalosis. Anion gap. Arterial Blood Gas analysis.

Organ Function Tests: Liver function tests; Kidney function tests, Thyroid function tests, Pancreatic and Gastric functions tests.

Biotransformation (detoxification mechanism): Phase I reactions – oxidation, reduction & hydrolysis; Phase II reactions – conjugation.

Genetic Engineering: Recombinant DNA technology, restriction endonuclease, vectors, chimeric molecule, applications of recombinant DNA technology in relation to medicine. Human Genome project. Gene Therapy.

Molecular Biology Techniques: Principle and applications of DNA hybridization techniques, southern blot, northern blot, western blot, restriction length polymorphism (RFLP), DNA fingerprinting technique, polymerase chain reaction (PCR), Hybridoma technology.

Molecular concept of body defense and their applications: Cellular and humoral components of the immune system. Immunoglobulins: structure & functions. Innate and adaptive immune

responses, self/non-self recognition and the central role of T-helper cells in immune responses. Antigens and concepts involved in vaccine development.

Free Radicals: Definition, generation, mode of action, damage done to biomolecules, Lipid peroxidation, free radical scavenging systems – enzymatic & non - enzymatic antioxidants , Role of free radicals in disease process.

Radioisotopes: Radiations, units of radioactivity, therapeutic and diagnostic uses of radioisotopes. Biological effects of radiations, Radiation hazards.

Biochemistry of cancer: Carcinogens, oncogenes, onco-suppressor genes, antimutagens, mechanism of carcinogenesis, tumor markers, Anti cancer drugs.

Environmental Biochemistry: Chemical hazards; air, water and noise pollution, Heavy metal poisons.

Biochemistry of AIDS: Transmission, Natural course of the disease, HIV genes and gene products, Immunology of AIDS, laboratory analysis anti – HIV drugs.

Extracellular Matrix (ECM): Functions and components of extracellular matrix. Involvement of ECM components in health and diseases.

Advanced Techniques: Principle and applications of - Electrophoresis, Chromatography, Colorimeter, Spectrophotometer, pH meter, Immunoassay (RIA, ELISA etc), Ion Selective Electrode (ISE), Arterial Blood Gas (ABG) Isolation of DNA from blood and tissues.

Curriculum for Practical Training in Biochemistry 1st M.B.B.S

Biochemistry practical's are designed to enable the students to understand the basic aspects of normal and abnormal conditions and interpretation of the investigations so as to help in clinical screening and diagnosis. Practical will be followed by the discussion on the theoretical concepts of disease, different techniques employed and instrumentation.

SYLLABUS FOR PRACTICAL

A. Quantitative & Qualitative Estimations

- 1) Estimation of plasma glucose and capillary blood glucose.
- 2) Estimation of serum cholesterol.
- 3) Estimation of serum HDL-cholesterol.
- 4) Estimation of serum triglycerides and calculation of LDL-cholesterol.
- 5) Estimation of plasma urea.
- 6) Estimation of serum uric acid.
- 7) Estimation of serum creatinine.
- 8) Estimation of urine creatinine & creatinine clearance.
- 9) Estimation of serum total protein & albumin and calculation of A/G ratio.
- 10) Estimation of serum bilirubin.
- 11) Estimation of serum Transaminases (ALT and AST).
- 12) Estimation of alkaline phosphatase.
- 13) Estimation of serum inorganic phosphorus.
- 14) Determination of serum calcium.
- 15) Normal urine: Physical characteristics and composition - organic & inorganic constituents.
- 16) Urine report for abnormal constituents: Physical characteristics and constituents, including:
 - i. Perform and interpretation of urine ketone bodies estimation with dipstick.
 - ii. Perform and interpretation of urine glucose estimation with dipstick.
- 17) Composition of C.S.F.

B. Lecture cum Demonstration (LCD) Topics.

- 1)** Glucose tolerance test
- 2)** pH meter.
- 3)** Colorimetry and Spectrophotometry
- 4)** Sample collection (blood collecting vaccutte) and centrifugation.
- 5)** Electrophoresis.
- 6)** Chromatography.
- 7)** Cardiac profile
- 8)** Diabetic profile
- 9)** Lipid profile
- 10)** Liver profile
- 11)** Renal profile
- 12)** Immunoassay (RIA and ELISA)
- 13)** Biological waste management.
- 14)** Autoanalyzer
- 15)** Quality control
- 16)** Ion Selective Electrode
- 17)** Arterial Blood Gas Analysis
- 18)** Screening of urine for inborn error of metabolism.
- 19)** Discussion of reference biological interval of indices and their interpretation.
- 20)** Interpretative clinical chemistry with case report.

Theory Examination :

There shall be **two papers** of three hours duration each. The papers shall be of **100 marks** each. All the questions shall be compulsory with internal choice. While setting the paper the care shall be taken to give coverage to the entire syllabus.

Paper-wise distribution of Theory topics. (Structural formulae are not essential).

Paper: I (100 Marks)

1. Molecular and functional organization of cell and cellular organelles.
2. Chemistry and metabolism of Carbohydrates and related disorders.
3. Chemistry and metabolism of lipids and related disorders.
4. Enzymology.
5. Bioenergetics – biological oxidation, Electron transport chain.
6. Chemistry and metabolism of Hemoglobin.
7. Water and electrolyte balance and imbalance.
8. Body fluids, pH, Buffers, Acid base balance and imbalance
9. Cancer Biochemistry- Biochemical basis of cancer and carcinogenesis.
10. Organ functions tests.
11. Molecular concept of body defense and their role, Free radicals and Antioxidants
12. Environmental biochemistry, Extracellular matrix.

Paper: II (100 Marks)

1. Chemistry and metabolism of protein and related disorders including plasma proteins.
2. Chemistry and metabolism of purines & pyrimidines and related disorders.
3. Chemistry and functions of Nucleic acids, Molecular Biology.
4. Genetic engineering and its applications in medicine, including molecular biology techniques.
5. Integration of metabolisms, Starvation and fed condition metabolism.
6. Mineral metabolism.
7. Vitamins.
8. Nutrition
9. Mechanism of hormone action.
10. Biotransformation (Detoxication) mechanisms.
11. Advanced techniques/LCD topics.
12. Radioisotopes.

PAPER PATTERN

NATURE OF THEORY QUESTION PAPER I AND II:

PAPER I

(Allotted Time: 3 Hours; Maximum Marks: 100)

(Paper comprises of three sections, viz Section I, Section II and Section III)

- Distribution of Marks (Section wise)
 - Section I : 20
 - Section II : 40
 - Section III : 40
- Section I consisting of MCQs will be given to the candidates at the beginning of the examination. After 20 minutes section I will be collected. Paper containing Section II and Section III will then be handed over to the candidates.
- Section II and Section III are to be written in separate answer sheets.

Section I

Q 1. Multiple choice questions (MCQs: 20) 1 X 20 = 20
(From the topic covered under Paper I; 20 minutes duration)

Section II

Q 2. Give an account on ANY TWO out of THREE (Structured LAQ) 8 X 2 = 16
(Applied aspect on topics covered under Paper I)

Q 3. (A) Short notes on ANY TWO out of THREE 4 X 2 = 08
(B) Short Notes on ANY ONE out of TWO 4 X 1 = 04
(AETCOM Based)

Q 4. Short explanatory question; SIX out of EIGHT in the form of comment 2 X 6 = 12
or justify the given statement. (from the topics covered under Paper I)

Section III

Q 5. Give an account on ANY TWO out of THREE (Structured LAQ) 8 X 2 = 16

Q 6. Short notes on ANY THREE out of FOUR 4 X 3 = 12

Q 7. A description of clinical-biochemical case is given and on its basis six 2 X 6 = 12
objective questions are framed, each carrying one mark
(Case drawn from the topics covered under Paper I)

PAPER II

(Allotted Time: 3 Hours; Maximum Marks: 100)

(Paper comprises of three sections, viz Section I, Section II and Section III)

- Distribution of Marks (Section wise)
 - Section I : 20
 - Section II : 40
 - Section III : 40
- Section I consisting of MCQs will be given to the candidates at the beginning of the examination. After 20 minutes section I will be collected. Paper containing Section II and Section III will then be handed over to the candidates.
- Section II and Section III are to be written in separate answer sheets.

Section I

- Q 1.** Multiple choice questions (MCQs: 20) **1 X 20 = 20**
(From the topic covered under Paper II; 20 minutes duration)

Section II

- Q 2.** Give an account on ANY TWO out of THREE **(Structured LAQ)** **8 X 2 = 16**
(Applied aspect on topics covered under Paper II)
- Q 3.** **(A)** Short notes on ANY TWO out of THREE **4 X 2 = 08**
(B) Short Notes on ANY ONE out of TWO **4 X 1 = 04**
(From LCD Topics)
- Q 4.** Short explanatory question; SIX out of EIGHT in the form of comment **2 X 6 = 12**
or justify the given statement. **(from the topics covered under Paper II)**

Section III

- Q 5.** Give an account on ANY TWO out of THREE **8 X 2 = 16**
- Q 6.** Short notes on ANY THREE out of FOUR **4 X 3 = 12**
- Q 7.** A description of clinical-biochemical case is given and on its basis six objective questions are framed, each carrying one mark **2 X 6 = 12**
(Case drawn from the topics covered under Paper II)

Practical and Viva-voce Examination

There shall be at least four examiners up to 100 candidates appearing in examination, thereafter for every incremental increase of 25 candidates appearing in examination one examiner will add up i.e. for 150 candidates appearing in examination; number of examiner shall be six. Out of whom not less than 50% shall be external examiners.

Practical examination in Biochemistry shall be of 2 hours duration:

70 Marks

Exercise	Description of Exercise	Marks
Question 1	One quantitative experiment from group A (Perform and interpretation)	01X40: 30
Question 2	One qualitative/quantitative experiment from group B	01X20: 20
Question 3	<p>Ten Spots</p> <ul style="list-style-type: none"> • Interpretation of biochemical findings of clinico-biochemical case. • Identification of selected test. • General concept and Principle of biochemical test. • Identification and use of instrument or equipment. • Identification of osazone slide under microscope. • Identification and interpretation of various graphs. • Interpretation of image showing characteristics of disease state. • Identification and use of blood collection tubes. • Identification and use of biomedical waste containers. • Reference biological interval of indices • Calculation of various biochemical values (e.g. LDL-Cholesterol, Clearance of urea/creatinine, Specific gravity and or total solids, A/G ratio and/or globulin fractions,) 	02X10: 20

Group A

Quantitative estimations using plasma or serum (as applicable) of: Glucose, Urea, Creatinine, Total proteins, Albumin (A/G ratio), Uric acid, Inorganic phosphorus, Calcium, Cholesterol, Triglycerides, HDL-cholesterol, Bilirubin, ALT (SGPT), AST (SGOT), Alkaline Phosphatase.

Group B:

- I. Qualitative tests for: Composition of CSF. Organic/inorganic constituents of normal urine including physical properties, Urine report for abnormal constituents including physical properties.
- II. Quantitative tests for: Estimation of capillary blood glucose, Estimation of urine creatinine (so as to calculate creatine clearance).
- III. Urine Dipstick test for glucose, ketone bodies and proteins along with its interpretation.

Viva-voce examination in Biochemistry shall be of **30 Marks** and shall be taken by pair of examiners (one external and one internal) for each candidate.

Internal Assessment

Scheme of internal evaluation marks in Biochemistry is as:

	Theory	Practical
	Marks	Marks
Internal examination (I & II)	20	20
Periodic examination	15	15
Preliminary examination	25	25
Seminar Presentation	15	-
Case Presentation	15	-
Practical Journal	-	15
Day to day Practical skill assessment	-	15
Attendance	10	10
Total	100.0	100.0

- Internal marks should be in percentage (round off).
- There will be two internal examinations viz Internal Examination I and II in the month of December and March respectively.
- Preliminary Examination will be in the month of July.
- 75% of attendance in a subject for appearing in examination is compulsory (in Didactic and non-didactic teaching each)

Marks fractionation:

- **Theory:**

- Paper I **100 Marks**

- Paper II **100 Marks**

Total (Theory) **200 Marks**

- **Practical:** **70 Marks**

- **Viva-voce** **30 Marks**

Total (Practical) **100 Marks**

Total Marks: Theory + Practical + Viva voce = 300.

ASSESSMENT IN HUMAN ANATOMY (As per CBME)

Phase: First Year M.B.B.S.

THEORY EXAMINATION:

There will be **two papers** of three hours duration each. The papers will be of **100 marks** each. All the questions will be compulsory with internal choice. While setting the paper the care will be taken to give coverage to the entire syllabus.

Paper: I (100 Marks)

Paper-wise distribution of Theory topics.	
1.	Upper Limb
2.	Head and neck
3.	Neuroanatomy
4.	General Anatomy
5.	General histology
6.	Systemic histology related to Upper Limb, head and neck, and neuroanatomy
7.	Systemic embryology related to Upper Limb, head and neck, and neuroanatomy

Paper: II (100 Marks)

Paper-wise distribution of Theory topics.	
1.	Lower Limb
2.	Thorax
3.	Abdomen & pelvis
4.	Systemic histology related to Lower Limb, Thorax, Abdomen & pelvis
5.	Systemic embryology related to Lower Limb, Thorax, Abdomen & pelvis
6.	Genetics
7.	Attitude, ethics and communication to develop affective skill (AETCOM)
8.	General Embryology

PAPER PATTERN

Paper: I (100 Marks)

(Allotted Time: 3 Hours; Maximum Marks: 100)

(Paper consist of three sections, viz Section I, Section II and Section III)

- ❖ Distribution of Marks (Section wise)
 - Section I : 20
 - Section II : 40
 - Section III : 40
- ❖ Section I consisting of Multiple Choice Questions will be given to the candidates at the beginning of the examination. After 20 minutes, section-I will be collected.
- ❖ Section II and Section III are to be written in separate answer sheets

<u>Section I</u>		
Q. 1	Multiple Choice Questions (MCQs: 20 N.) (Equal marks distribution from the topic covered under Paper I; 20 minutes duration)	1 × 20 = 20
<u>Section II</u>		
Q. 1	Long answer questions (1 out of 2) Structured essay question with breakup of marks (Upper limb)	1 × 10 = 10
Q.2.	Case based questions (2 out of 3) (Upper limb, Head & Neck and Neuroanatomy)	2 × 5 = 10
Q.3.	Short answer questions:(Short Notes)	
	a. General Anatomy (1 out of 2)	1 × 5 = 5
	b. General Histology (1 out of 2)	1 × 5 = 5

Q.4.	Short answer questions:(Short Notes) (2 out of 3) Upper Limb, Head & Neck	2 × 5 = 10
	<u>Section III</u>	
Q.5.	Long answer questions (1 out of 2) Structured essay question with breakup of marks (Head & neck)	1 × 10 = 10
Q.6.	Short answer questions:(Short Notes) (2 out of 3) (Neuroanatomy)	2 × 5 = 10
Q.7.	Short answer questions: (Short Notes)	
	a. Systemic Histology (1 out of 2)	1 × 5 = 5
	b. Systemic embryology (1 out of 2)	1 × 5 = 5
Q.8.	Write answer in one or two sentences: (5 out 6) One question each from Upper limb, Head & neck, Neuroanatomy, General Histology & two questions from General anatomy	5 × 2 = 10

Paper: II (100 Marks)

(Allotted Time: 3 Hours; Maximum Marks: 100)

(Paper consist of three sections, viz Section I, Section II and Section III)

- ❖ Distribution of Marks (Section wise)
 - Section I : 20
 - Section II : 40
 - Section III : 40
- ❖ Section I consisting of Multiple Choice Questions will be given to the candidates at the beginning of the examination. After 20 minutes section I will be collected.
- ❖ Section II and Section III are to be written in separate answer sheets

<u>Section I</u>		
Q. 1	Multiple Choice Questions (MCQs: 20 N.) (Equal marks distribution from the topic covered under Paper II; 20 minutes duration)	1 × 20 = 20
<u>Section II</u>		
Q. 1	Long answer questions (1 out of 2) Structured essay question with breakup of marks(Lower limb)	1 × 10 = 10
Q.2.	Case based questions (2 out of 3) (Lower Limb, Thorax and Abdomen)	2 × 5 = 10
Q.3.	Short answer questions:(Short Notes)	
	a. Genetics (1 out of 2)	1 × 5 = 5
	b. General Embryology (1 out of 2)	1 × 5 = 5
Q.4.	Short answer questions:(Short Notes) (2 out of 3) Lower Limb , Abdomen	2 × 5 = 10

	<u>Section III</u>	
Q.5.	Long answer questions (1 out of 2) Structured essay question with breakup of marks (Abdomen)	1 × 10 = 10
Q.6.	Short answer questions:(Short Notes) (2 out of 3) (Thorax)	2 × 5 = 10
Q.7.	Short answer questions: (Short Notes)	
	a. Systemic Histology (1 out of 2)	1 × 5 = 5
	b. Systemic embryology (1 out of 2)	1 × 5 = 5
Q.8.	Write answer in one or two sentences: (5 out 6) One question each from Lower limb, Thorax ,Abdomen, General Embryology & two questions from AETCOM	5 × 2 = 10

Practical and Viva-voce Examination (Marks - 100)

There will be at least four examiners up to 100 candidates appearing in examination, then after for every incremental increase of 25 candidates appearing in examination one examiner will be added i.e. for 150 candidates appearing in examination; number of examiners will be six. Out of whom not less than 50% shall be external examiners.

Practical Examination (Total Marks: 100)		Marks
Table 1	Soft tissue: Upper Limb, Head & neck; and Neuroanatomy	15
Table 2	Soft tissue: Lower Limb, Thorax, Abdomen & pelvis	15
Table 3	Osteology: Axial skeleton + Embryology	20
Table 4	Osteology: Appendicular skeleton	15
Table 5	Histology slides for discussion: (1 slide of General histology; 1 slide of Systemic histology).	20
Table 6	Surface Anatomy(5) +living anatomy (5) +Radiological Anatomy (5)	15

Note : Table 3 will be counted for Viva Marks

Internal Assessment

Scheme of internal evaluation marks in Anatomy is as follows:

	Theory (100 Marks)	Practical (100 Marks)
I Internal Examination	15	15
II Internal examination	15	15
Preliminary Examination	30	30
Day to day assessment (periodic examination, Journal and Logbook, Seminar, etc.)	30	30
Attendance	10	10
Total	100	100

MARKS FRACTIONATION

❖ Theory

- Paper I: 100 Marks
- Paper II: 100 Marks

Total (Theory) 200 Marks

❖ Practical 80 Marks

❖ Viva-voce 20 Marks

Total (Practical) 100 Marks

Total Marks: Theory + Practical + Viva-voce = 300