Highlighted on Page No.13 & 21

MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)
Grade 'A' Accredited by NAAC
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E-mail: registrar@mgmuhs.com; Website :www.mgmuhs.com

COMPETENCY BASED MEDICAL EDUCATION

(CBME)

(with effect from 2019-2020 Batches)

Curriculum for

First M.B.B.S

Human Physiology

Amended upto AC-41/2021, Dated 27/08/2021

Amended History

1. Approved as per BOM 57/2019 [Resolution no. 3.1.1.13], Dated 26/4/2019.
2. Amended upto BOM 63/2021 [Resolution No. 4.1.1.2.ii, Resolution No. 4.4.1.6] Dated 17/02/2021.
3. Amended upto AC-41/2021, [Resolution No. 4.1], [Resolution No. 4.3], [Resolution No. 4.4], [Resolution No. 4.6], [Resolution No. 4.7], [Resolution No. 4.8], [Resolution No. 4.9], [Resolution No. 4.10]; Dated 27/08/2021.

Resolution No. 4.4 of AC-41/2021 - Resolved to include "MGMIHS Graduate Attributes" in 1st MBBS Anatomy Physiology and Biochemistry syllabi and cover them in the foundation course, Journals & logbooks, with effect from the batch admitted in 2021-22 onwards

Annexure-23 of AC-41-2021

MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

GRADUATE ATTRIBUTES

A student graduating from MGM Institute of Health Sciences, Navi Mumbai, should attain the following attributes:

1. Dynamic professionalism
2. Exemplary leadership
3. Effective communication skills
4. Scholarly attitude
5. Element of critical thinking
6. Enthusiasm for research
7. Social commitment
8. Global competencies

Dynamic professionalism:

Abide by professional codes of conduct, demonstrate high personal standards of behaviour, be considerate, trustworthy and honest, act with integrity. Apply effective strategies to maintain their own physical, psychological, social and spiritual well-being. Should be able to apply profession-specific knowledge, clinical skills and professional attitudes in implementation of evidence-based protocols for optimal outcome.

Exemplary leadership:

Focuses on the qualities required to effectively manage a career, as a practitioner or academician , work effectively within a system aiming at quality improvement ,fostering a spirit of team-building.

Effective communication skills:

Communicates effectively and humanely with all stakeholders, their families, colleagues, through a variety of means , gathers and conveys information respectfully , in a culturally acceptable and dignified manner.

Scholarly attitude:

Demonstrates a lifelong commitment to reflective learning, strives to maintain professional competence. Committed to learn, disseminate, apply and translate knowledge

Element of critical thinking:

Will develop a habit of inquiry, use the knowledge gained for dealing with complex situations foster an ambience conducive for effective learning with constructive criticism, exercise critical judgement in evaluating sources of information.

Enthusiasm for research:

Develop intellectual curiosity and embark upon opportunities to develop research capabilities. Imbibe the basic principles of research methodology and engage in ethical research.

Social commitment:

Inculcate values of self-awareness, empathy, mutual respect. Understand our obligation to society and foster an ability to work in a diverse cultural setting. Understand how one's actions can enhance the well-being of others.

Global competencies:

Team- building, communication, self-management, collaborative working, openness and respect for a range of perspectives.

Annexure – C – II

MGM Institute of Health Sciences, Navi Mumbai

CBME-First M.B.B.S. (2019-20 batch)

PHYSIOLOGY COURSE CONTENT

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 1; page no.91-118)

Total Teaching (hours) - 495

- Lectures(hours)-160
- Small group teachings/tutorials/Integrated teaching/Practicals (hours)-310
- Self directed learning (hours)-25
- Early clinical exposure(hours)- 30

1 General Physiology (8 hours)

Competency No.	Topics & subtopics
PY. 1.1	Structure and Functions of a Mammalian Cell
PY. 1.2	Principles of Homeostasis
PY. 1.3	Intercellular communication
PY. 1.4	Apoptosis – Programmed cell death
PY. 1.5	Transport mechanisms across cell membranes
PY. 1.6	Fluid compartment of the body, its ionic composition & measurements
PY. 1.7	Concept of pH & Buffer systems in the body
PY. 1.8	Molecular basis of resting membrane potential and action potential in excitable tissue
PY. 1.9	Methods used to demonstrate the functions of the cells and its products, its communication and their applications in Clinical care andresearch.

2 Haematology (15 hours)

Competency No.	Topics & subtopics
PY. 2.2	Original, forms, variations and functions of plasma proteins
PY. 2.3	Synthesis and functions of Hemoglobin & explain its breakdown. Describe variants of hemoglobin
PY. 2.4	RBC formation (erythropoiesis & its regulation) and its functions
PY. 2.5	Types of anaemias & Jaundice
PY. 2.6	WBC formation (granulopoiesis) & its regulation
PY. 2.7	Formation of platelets, functions & variations
PY. 2.8	Physiological basis of hemostasis and anticoagulants. Describe bleeding & clotting disorders (Hemophilia, purpura)
PY. 2.9	Different blood groups and clinical importance of blood grouping, blood banking and transfusion
PY.2.10	Types of immunity , development of immunity and its regulation,* Covid-19 related – role of nutrition, immunity boosters, cytokine storm

3 Nerve and Muscle Physiology (11 hours)

Competency No.	Topics & subtopics
PY. 3.1	Structure and functions of a neuron and neuroglia; Nerve Growth Factor & other growth factors/cytokines
PY. 3.2	Types, functions & properties of nerve fibers
PY. 3.3	Degeneration and regeneration in Peripheral nerves
PY. 3.4	Structure neuro-muscular junction and transmission of impulses
PY. 3.5	Action of neuro-muscular blocking agents
PY. 3.6	Pathophysiology of Myasthenia gravis
PY. 3.7	Types of muscle fibres and their structure
PY. 3.8	Action potential and its properties in different muscle types (skeletal & smooth)
PY. 3.9	Molecular basis of muscle contraction in skeletal and in smooth muscles
PY. 3.10	Mode of muscle contraction (isometric and isotonic)
PY. 3.11	Energy source and muscle metabolism
PY. 3.12	Gradation of muscular activity
PY. 3.13	Muscular dystrophy: myopathies

4 Gastro-intestinal Physiology (13 hours)

Competency No.	Topics & subtopics
PY. 4.2	Composition, mechanism of secretion, functions, and regulation of saliva, gastric, pancreatic, intestinal, juices and bile secretion
PY. 4.3	GIT movements, regulation and functions, defecation reflex. Role of dietary fibre.
PY. 4.4	Physiology of digestion and absorption of nutrients
PY. 4.5	Source of GIT hormones, their regulation and functions
PY. 4.6	Gut-Brain Axis
PY. 4.7	Structure and functions of liver and gall bladder
PY. 4.8	Gastric function tests, pancreatic exocrine function test & liver function tests
PY. 4.9	Physiology aspectsof; pepticulcer, gastro- oesophagealrefluxdisease, vomiting, diarrhea, constipation, Adynamic ileus, Hirschsprung's disease

5 Cardiovascular Physiology (CVS) (21 hours)

Competency No.	Topics & subtopics
PY. 5.2	Properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions
PY. 5.3	Events occurring during the cardiac cycle
PY. 5.4	Generation, conduction of cardiac impulse

PY. 5.5	Physiology of electrocardiogram (E.C.G.), its applications and the cardiac axis
PY. 5.6	Abnormal ECG, arrhythmias, heart block and myocardial infarction.
PY. 5.7	Haemodynamics of circulatory system
PY. 5.8	Local and systemic cardiovascular regulatory mechanisms
PY. 5.9	Factors affecting heart rate, regulation of cardiac output & blood pressure
PY. 5.10	Regional circulation including microcirculation, lymphatic, coronary, cerebral, capillary, Skin, foetal, pulmonary and splanchnic circulation
PY. 5.11	Patho-physiology of shock, syncope and heart failure

6 Respiratory Physiology (15 hours)

Competency No.	Topics & subtopics
PY. 6.1	Functional anatomy of respiratory tract
PY. 6.2	Mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities, alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs
PY. 6.3	Transport of respiratory gases: Oxygen and Carbon dioxide
	Regulation of respiration -- Neural & chemical
PY. 6.4	Physiology of high altitude deep sea diving
PY. 6.5	Principles of artificial respiration oxygen therapy, *ventilators**,** acclimatization and decompression sickness
PY. 6.6	Pathophysiology of dyspnea, hypoxia, cyanosis asphyxia; drowning, periodic breathing
PY. 6.7	Lung function tests & their clinical significance, *pulse oximetry

7 Renal Physiology (8 hours)

Competency No	Topics & subtopics
PY. 7.1	Structure and function of kidney
PY. 7.2	Structure and functions of juxta glomerular apparatus and role of renin-angiotensin system
PY. 7.3	Mechanism of urine formation and processes involved
PY. 7.4	Significance & implication of Renal clearance
PY. 7.5	Renal regulation of fluid and electrolytes & acid-base balance
PY. 7.6	Innervations of urinary bladder, physiology of micturition and its abnormalities
PY. 7.7	Artificial kidney, dialysis and renal transplantation
PY. 7.8	Renal Function Tests
PY. 7.9	Cystometry and discuss the normal cystometrogram

8 Endocrine Physiology (14 hours)

Competency No	Topics & subtopics
PY. 8.1	Physiology of bone and calcium metabolism
PY. 8.2	Synthesis, secretion, transport, physiological actions, regulation and effects of altered (hypo and hyper) secretion of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas and hypothalamus
PY. 8.3	Physiology of Thymus & Pineal Gland
PY. 8.4	Function tests: Thyroid gland; Adrenal cortex, Adrenal medulla and pancreas
PY. 8.5	Metabolic and endocrine consequences of obesity & metabolic syndrome, Stressresponse. Outline the psychiatry component pertaining to metabolic syndrome
PY. 8.6	Mechanism of action of steroid, protein and amine hormones

9 Reproductive Physiology (7 hours)

Competency No	Topics & subtopics
PY. 9.1	Sex determination; sex differentiation and their abnormalities and outline psychiatry and practical implementation of sex determination
PY. 9.2	Puberty: onset, progression, states; early and delayed puberty and outline adolescentclinical and psychological association
PY. 9.3	Male reproductive system: functions of testis and control of spermatogenesis & factors modifying it and outline its association with psychiatricillness
PY. 9.4	Female reproductive system: (a) functions of ovary and its control; (b) menstrual cycle – hormonal, uterine and ovarian changes
PY. 9.5	Physiological effects of sex hormones
PY. 9.6	Contraceptive methods for male and female. Discuss their advantages & disadvantages
PY. 9.7	Effects of removal of gonads on physiological functions
PY. 9.8	Physiology of pregnancy, parturition & lactation and outline the psychology and psychiatry-disorders associated with it
PY. 9.10	Physiological basis of various pregnancy tests
PY. 9.11	Hormonal changes and their effects during perimenopause and menopause
PY. 9.12	Common causes of infertility in a couple and role of IVF in managing a case of infertility

10 Neurophysiology (41 hours)

Competency No	Topics & subtopics
PY. 10.1	Organization of nervous system
PY. 10.2	Functions and properties of synapse, reflex, receptors
PY. 10.3	Somatic sensations & sensory tracts

PY. 10.4	Motor tracts, mechanism of maintenance of tone, control of body movements, posture and equilibrium & vestibular apparatus
PY. 10.5	Structure and functions of reticular activating system, autonomic nervous system (ANS)
PY. 10.6	Spinal cord, its functions, lesion & sensory disturbances
PY. 10.7	Functions of cerebral cortex, basal ganglia thalamus, hypothalamus. Cerebellum and limbic system and their abnormalities
PY. 10.8	Behavioural and EEG characteristics during sleep and mechanism responsible for its production
PY. 10.9	Physiological basis of memory, learning and speech
PY. 10.10	Chemical transmission in the nervous system. (Outline the psychiatry element)
PY. 10.13	Perception of smell and taste sensation
PY. 10.14	Patho-physiology of altered smell and taste sensation
PY. 10.15	Functional anatomy of ear and auditory pathways & physiology of hearing
PY. 10.16	Pathophysiology of deafness. Hearing tests
PY. 10.17	Functional anatomy of eye, physiology of image formation, physiology of vision including colour vision, refractive errors, colour blindness, physiology of pupil and light reflex
PY. 10.18	Physiological basis of lesion in visual pathway
PY. 10.19	Auditory & visual evoke potentials

11 Integrated Physiology (8 hours)

Competency No	Topics & subtopics
PY. 11.1	Mechanism of temperature regulation
PY. 11.2	Adaptation to altered temperature (heat and cold)
PY. 11.3	Mechanism of fever, cold injuries and heat stroke
PY. 11.4	Cardio-respiratory and metabolic adjustment during exercise; physical training effects
PY. 11.5	Physiological consequences of sedentary lifestyle
PY. 11.6	Physiology of Infancy
PY. 11.7	Physiology of aging; free radicals and antioxidants
PY. 11.8	Cardio-respiratory changes in exercise (isometric and isotonic) with that in the resting state and under different environmental conditions (heat and cold)
PY. 11.9	Interpretation of growth charts
PY. 11.10	Interpretation of anthropometric assessment of infants
PY. 11.11	Concept, criteria for diagnosis of Brain death and its implications
PY. 11.12	Physiological effects of meditation, *Yogic breathing practices, breathing positions

*Applicable from 2020-21 Batch onwards

PRACTICAL COMPETENCIES

Competency Number	COMPETENCY	Suggested Teaching Learning method
Topic: Haematology		
PY2.11	Estimate Hb, RBC, TLC, RBC indices, DLC, Blood groups, BT/CT	DOAP sessions
PY2.12	Describe test for ESR, Osmotic fragility, Hematocrit. Note the findings and interpret the test results etc	Demonstration
Topic: Nerve and Muscle Physiology		
PY3.14	Perform Ergography	DOAP sessions
PY3.15	Demonstrate effect of mild, moderate and severe exercise and record changes in Cardiorespiratory parameters	DOAP sessions
PY3.16	Demonstrate Harvard Step test and describe the impact on induced physiologic parameters in a simulated environment	DOAP sessions
PY3.17	Describe Strength-duration curve	Small group discussion
PY3.18	Observe with Computer assisted learning (i) amphibian nerve - muscle experiments (ii) amphibian cardiac experiments	Demonstration, Computer assisted learning methods
Topic: Gastro-intestinal Physiology		
PY4.10	Demonstrate the correct clinical examination of the abdomen in a normal volunteer or simulated environment	DOAP session
Topic: Cardiovascular Physiology (CVS)		
PY5.12	Record blood pressure & pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment	DOAP sessions
PY5.13	Record and interpret normal ECG in a volunteer or simulated environment	DOAP sessions
PY5.14	Observe cardiovascular autonomic function tests in a volunteer or simulated environment	DOAP sessions
PY5.15	Demonstrate the correct clinical examination of the cardiovascular system in a normal volunteer or simulated environment	DOAP sessions
PY5.16	Record Arterial pulse tracing using finger plethysmography in a volunteer or simulated environment	DOAP sessions, Computer assisted learning methods

Topic: Respiratory Physiology		
PY6.8	Demonstrate the correct technique to perform & interpret Spirometry	DOAP sessions
PY6.9	Demonstrate the correct clinical examination of the respiratory system in a normal volunteer or simulated environment	DOAP sessions
PY6.10	Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment	DOAP sessions
Topic: Reproductive Physiology		
PY9.9	Interpret a normal semen analysis report including (a) sperm count, (b) sperm morphology and (c) sperm motility, as per WHO guidelines and discuss the results	Small group discussion
Topic: Neurophysiology		
PY10.11	Demonstrate the correct clinical examination of the nervous system: Higher functions, sensory system, motor system, reflexes, cranial nerves in a normal volunteer or simulated environment	DOAP sessions
PY10.12	Identify normal EEG forms	Small group teaching
PY10.20	Demonstrate (i) Testing of visual acuity, colour and field of vision and (ii) hearing (iii) Testing for smell and (iv) taste sensation in volunteer/ simulated environment	DOAP sessions
Topic: Integrated Physiology		
PY11.9	Interpret growth charts	Small group teaching
PY11.10	Interpret anthropometric assessment of infants	Small group teaching
PY11.13	Obtain history and perform general examination in the volunteer / simulated environment	DOAP sessions
PY11.14	Demonstrate Basic Life Support in a simulated environment	DOAP sessions

*** Resolution No. 4.1 of AC-41/2021 : Resolved to continue the same AETCOM questions and their distribution for Anotomy, Physiology & Biochemistry as per syllabus in 2019-20, for subsequent batches.**

*	**Common questions on AETCOM modules - Physiology**
1	Describe professional qualities of a physician.
2	Outlook &Expectations of patient from physician
3	Empathy in patient care.
4	Describe role of a physician in patient care
5	Rights of patients,
6	Responsibilities of patients
7	Human dignity
8	Duties of doctors

***Resolution No. 4.7 of AC-41/2021:** Resolved to approve the distribution of the MCQs marks system/topic wise for Theory Paper I & II of 1st MBBS (CBME) Physiology and Biochemistry, effect from the batch admitted in 2020-21 onwards

Annexure-26A of AC-41-2021

I MBBS – CBME – PHYSIOLOGY

PAPER WISE TOPIC DISTRIBUTION

PHYSIOLGY PAPER – I	
SECTION A	All topics of paper I
SECTION B	General Physiology, Blood, CVS
SECTION C	RS, Endocrine, Reproduction, AETCOM
PHYSIOLGY PAPER – II	
SECTION A	All topics of paper II
SECTION B	Nerve and Muscle Physiology, GIT, Special senses
SECTION C	CNS, Renal, Integrated Physiology

* SPECIFIC TOPIC DISTRIBUTION IN MCQ PHYSIOLOGY PAPER FOR I MBBS

Sr. No.	Topic	No. of questions
PHYSIOLGY PAPER – I		
1	General Physiology	2
2	Blood	3
3	CVS	5
4	RS	4
5	Endocrine	4
6	Reproduction	2
	Total	20
PHYSIOLGY PAPER – II		
1	Nerve and Muscle Physiology	3
2	GIT	3
3	Special senses	3
4	CNS	6
5	Renal system	4
6	Integrated Physiology	2
	Total	20

MGMIHS

1st year MBBS. CBME

Format for Internal assessment examinations

Sr. No.	Exam	Theory	Practical
1.	Internal assessment examinations	200	100
2.	Preliminary examination	200	100
Total		**400**	**200**

- Preliminary examination pattern will be as per University examination
- Respective colleges/ departments will conduct internal assessment examinations and maintain records of the same.

Physiology Practical internal assessment exam pattern

Midterm & Terminal (50 Marks)

S.No	Heading	Marks
1.	Haematology	10
2.	Clinical	10
3.	Human Experiment & Spots	10
4.	Communication skill	05
5.	Journal	05
6.	Viva	10
	Total =	50

***Prelim & University exam (100 Marks)**

Sr. No.	Heading	Marks
1.	Haematology	15
2.	Clinical I (RS & CVS)	15
3.	Clinical II (Abdomen & CNS)	15
4.	Human Experiment (Spirometry, Ergography, Perimetry, Harvard step test, Posture, Mild& moderate exercise effects on Cardiorespiratory system)	10
5.	Spots	20
6.	Communication skill	05
7.	Viva	20
	Total =	100

* Applicable from 2020-21batch onwards.

***Resolution No. 4.8 of AC-41/2021:** Resolved to approve the change in the pattern of Internal Assessment calculations, to be implemented from current batch of 1st MBBS (CBME) (i.e. AY- 2020-21) onwards

Annexure-27C of AC-41-2021

MGM Medical College, Navi Mumbai & Aurangabad

1st year MBBS CBME

INTERNAL ASSESSMENT CALCULATION

Sr. No.	Criteria	Theory	Practical
1.	*All internal assessment examinations including preliminary examination	50	50
2.	Day to Day assessment		
	➢ Day to Day assessment (PBL/ TBL/ Seminar/ MCQ test etc)	30	
	➢ Day to Day assessment (Viva/ Spotters/ OSPE / OSVE etc)		30
3.	Logbooks (Foundation Course, AETCOM, Competency logbook, SDL – each 5 marks)	20	
	Journals + ECE Logbook		20
Total		**100**	**100**

FORMAT FOR INTERNAL ASSESSMENT EXAMINATIONS

Sr. No.	Exam	Theory	Practical
1.	Internal assessment examinations (Midterm + Terminal)	200 (100 + 100)	100 (50 + 50)
2.	Preliminary examination	200	100
3.	Additional examination forstudents who have missed any of 3 internal assessment exams or are not qualifying	200	100

***Internal assessment examinations marks conversion to internal assessment marks -**
Student's internal assessment examinations scores [Midterm, Terminal, Preliminary and additional (where applicable)] will be converted to 50 marks eachfor theory and practical internal assessment.

Resolution No. 4.9 of AC-41/2021
with effect from the batch admitted in 2021-22 onwards

Annexure -28B of AC-41-2021

BLUEPRINT OF UNIVERSITY QUESTION PAPER

1. THEORY EXAMINATION PATTERN

1. 1. Theory Question Paper Pattern:

Two papers each of 3 hours duration and carrying 100 marks each.

1.2. Marks distribution for each paper:

Type of question	Numbers X Marks	Total marks
Multiple Choice Questions	20 X 1	20
Long Answer Questions (LAQ)	2 X 10	20
Short Answer Questions (SAQ)	6 X 5	30
Brief Answer Questions (BAQ)	10 X 3	30
Total		**100**

Each Paper is divided into 3 sections:
Section A: MCQ 20 marks
Section B: BAQ 5/6 x 3= 15; SAQ 3/4 x 5= 15; LAQ 1/2 x 10 = 10, Total 40
Section C: BAQ 5/6 x 3= 15; SAQ 3/4 x 5= 15; LAQ 1/2 x 10 = 10, Total 40

1.3. Paper I & Paper II Contents

PHYSIOLGY PAPER-I	
SECTION A	All topics of Paper-I
SECTION B	General Physiology, Blood, CVS, AETCOM
SECTION C	RS, Endocrine, Reproduction,
PHYSIOLGY PAPER-II	
SECTION A	All topics of Paper-II
SECTION B	Nerve and Muscle Physiology, GIT, Special senses

SECTION C	CNS, Renal, Integrated Physiology

1.4. Note to exam paper setters (Ref.: GMER 2019 - Assessment)

1.4.A Multiple Choice Questions (MCQs) (20X1=20 Marks)		
• 10 % of MCQ marks should be from clinically based questions (Any 2)		
1.4. B Brief Answer Questions (BAQs) (10X3=30 Marks)		
Various Levels of Cognitive Domain must be considered as follows:		
Level of cognitive domain	**Number of questions**	**Marks**
Knowledge	3	3X3=9
Comprehension	3	3X3=9
Application	2	2X3=6
Analysis	2	2X3=6
Synthesis	1	1X3=3
Evaluation	1	1X3=3
1.4. C Short Answer Questions (SAQs) (6X5=30 Marks)		
1 SAQ will be clinical application based (In section B)		
1 SAQ will be from AETCOM modules (In Paper I)		
Various Levels of Cognitive Domain must be considered as follows:		
Level of cognitive domain	**Number of questions**	**Marks**
Knowledge	2	2X5=10
Comprehension	2	2X5=10
Application	1	1X5=5
Analysis	1	1X5=5
Synthesis	1	1X5=5
Evaluation	1	1X5=5
1.4.D Long Answer Question (LAQ) (2X10=20 Marks)		
• Long Answer Questions (LAQ) in both Papers I & II must be structured, covering various levels of cognitive domain.		

1.4.E Percentage of marks allotted to various levels of cognitive domains:

Level of cognitive domain	**Marks (Total = 76)**	**Percentage (%)**
1. Knowledge	19	25
2. Comprehension	19	25
3. Application	11	15
4. Analysis	11	15

5. Synthesis	8	11
6. Evaluation	8	10

1.4.F Verbs in various levels in Knowledge domain.

Level	Suggested Verbs
Knowledge (Remember)	Define, describe, Draw, Find, Enumerate, Cite, Name, Identify, List, Label, Match, Sequence, Write, State
Comprehension (Understand)	Discuss, Conclude, Articulate, Associate, Estimate, Rearrange, Demonstrate understanding, Explain, Generalise, Identify, Illustrate, Interpret, Review, Summarise
Application (Apply)	Apply, Choose, Compute, Modify, Solve, Prepare, Produce, Select, Show, Transfer, Use
Analysis (Analyze)	Analyse, Characterise, Classify, Compare, Contrast, Debate, Diagram, Differentiate, Distinguish, Relate, Categorise
Synthesis (Create)	Compose, Construct, Create, Verify, Determine, Design, Develop, Integrate, Organise, Plan, Produce, Propose, Rewrite
Evaluation (Evaluate)	Appraise , Assess, Conclude, Critic, Decide, Evaluate, Judge, Justify, Predict, Prioritise, Prove, Rank

(Reference GMER-2019, Assessment Module Page no.17& Revised Bloom's Taxonomy by Anderson, L.W. et al in (2001))

1.5. Paper I

S. No.	Topics	MCQ (20 x 1 = 20 marks)	Brief Answer Question (BAQ) (10 x 3 = 30 marks)	Short Answer Question (SAQ) (6 x 5 = 30 marks)	Long Answer Question (LAQ) (2 x 10 = 20 marks)	Total Marks
	Section-B					
1.	General Physiology	3X1=3	1X3=3 (1 more in option)	1X5=5		11(+3 as options)
2.	Blood	3X1=3	2X3=6	1X5=5	1X10=10 (option)	14 (+10 as options)
3	CVS	4X1=4	2X3=6	1X5=5 (option)	1X10=10	20 (+5 as options)
4	AETCOM			1X5		5
	Section-C					
4	RS	3X1=3	1X3=3 (1 more in option)	1X5=5 (1 more in option)	1X10=10	21(+8 as options)
5	Endocrine,	4x1=4	2X3=6	1X5=5 (1 more in option)	1X10=10 (option)	15(+15 as options)
6	Reproduction	3X1=3	2X3=6 (1 more in option)	1X5=5	1X10=10 (option)	14(+13 as options)
	Total	**20**	**30**	**30**	**20**	**100**

1.6. Paper II

S. No.	Topics	MCQ (20 x 1 = 20 marks)	Brief Answer Question (BAQ) (10 x 3 = 30 marks)	Short Answer Question (SAQ) (6 x 5 = 30 marks)	Long Answer Question (LAQ) (2 x 10 = 20 marks)	Total Marks
	Section-B					
1.	Nerve and Muscle Physiology	4X1=4	1X3=3 (1 more in option	1X5=5	1X10=10	22(+3 as options)
2.	GIT	3X1=3	2X3=6	1X5=5 (1 more in option	1X10=10 (option)	14(+!5 as options)
3	Special senses	2X1=2	2X3=6	1X5=5 (1 more in option	1X10=10 (option)	13(+15 as options)
	Section-C					
4	CNS	5X1=5	2X3=6	1X5=5	1X10=10	26
5	Renal	3x1=3	2X3=6	1X5=5 (1 more in option	1X10=10 (option)	14(+15 as options)
6	Integrated Physiology	3X1=3	1X3=3 (1 more in option	1X5=5	1X10=10 (option)	11(+13 as options)
	Total	**20**	**30**	**30**	**20**	**100**

2. PRACTICAL EXAMINATION PATTERN

Total Practical Marks **100 marks**

Sr. No	Heading	Marks
1	Haematology	15
2	Clinical-I (RS & CVS)	15
3	Clinical-II (Abdomen& CNS)	15
4	Human Experiment (Spirometry, Ergography, Perimetry, Harvard step test, Posture, mild & moderate exercise on cardiovascular system)	10
5	Spots	20
6	Communication skill	05
7	Viva	20
	Total=	**100**

2.1 Haematology	**15 marks**
Practical performance **(**Any one of- Hemoglobin estimation, RBC count, WBC count, DLC, Blood group determination, determination of BT &CT)	10 X 1 = 10 marks
Application based question discussion	5 marks
Total	**15 marks**

2.2. Clinical –I (CVS & RS)	**15 Marks**
Perform One skill from CVS	8
Perform One skill from RS	7
Total	**15 marks**

2.3. Clinical –II (CNS & ABDOMEN)	**15 Marks**
Perform One skill from CNS including cranial nerves	8
Perform One skill from Abdomen	7
Total	**15 marks**

2.4. Human Experiment **(**Performance of Any one of- Spirometry, Ergography, Perimetry, Harvard step test, Posture, mild & moderate exercise on cardiovascular system)	**10 Marks**
Total	**10 marks**

2.5. Spots	**20 Marks**
Spots – 10 questions X 2 marks each	10X2
Total	**20 marks**

2.5.a. Spots Distribution	**Marks**
Amphibian graphs	3x2=6
Charts	2X2=4
Calculation	1x2=2
Endocrine photographs	2X2=4
Demonstration topics (Not included in any other heads of practicals)	2X2=4
Total	**20 Marks**

2.6. Communication Skills	**5 Marks**

2.7. VIVA VOCE		**20 marks**
Viva-1	**Topics of paper-I** General Physiology, Blood, CVS, RS, Endocrine, Reproduction	10 marks
Viva-2	**Topics of paper-II** Nerve and Muscle Physiology, GIT, Special senses, CNS, Renal, Integrated Physiology	10 marks
Total		**20 marks**

Eligibility to appear for university exams	
Internal Assessment (Theory + Practical)	50% - Combined theory & practical [Theory - minimum 40% Practical- minimum 40%]
Criteria for pass in university exams	
Theory	50% aggregate (Paper I + II) (Each Paper minimum 40%)
Practical	50%

I MBBS (Anatomy, Physiology & Biochemistry)

Time – 3 hrs. **Preliminary / University examination**

(* Applicable from 2020-21 Batch onwards)

Each subject – 2 papers (I / II) – 100 X 2 = **Total 200 Marks**

Each paper –

- **Section A** – MCQ – 20 X 1 mark = **20 Marks**
  - **10% MCQ i.e. 2 in each paper must be clinical based**

- **Section B** -

Q1. **Answer any 5 out of 6 (BAQ)** **(5X3 marks =15 marks)**

Q2. **Answer any 3 out of 4 (SAQ)** **(3X5 marks =15 marks)**

- 1 SAQ will be clinical application based
- **1 SAQ will be from AETCOM modules (in Paper I)**

Q3. **Answer any 1 out of 2(LAQ)** **(1X10 marks =10marks)**

- LAQ should be structured (With defined marks distribution)

- **Section C** –

Q1. **Answer any 5 out of 6 (BAQ)** **(5X3 marks =15marks)**

Q2. **Answer any 3 out of 4 (SAQ)** **(3X5 marks =15 marks)**

Q3. **Answer any 1 out of 2 (LAQ)** **(1X10 marks =10marks)**

- LAQ should be structured (With defined marks distribution)

Resolution No. 4.10 of AC-41/2021
effective from 2021-22 onwards and
to be revised as per question paper blue printing format
as per 4.9 of AC-41/2021 in next BOS

Annexure-29B of AC-41-2021

DEPARTMENT OF PHYSIOLOGY

I MBBS –CBME

Model question paper- Physiology Paper I

Total Marks: 100 **Duration: 3 hours**

Instructions to students:

1. Attempt all questions.
2. Maximum marks are indicated in the right.
3. Draw diagrams where ever necessary.

Section-A **MCQ** **Mark: 1X20=20**

Section-B **Marks: 40**

Q1. **Answer any 5 out of 6 (BAQ)** **(5X3 marks =15 marks)**

A. Facilitated diffusion
B. Positive feedback mechanism with one example
C. Functions of plasma proteins
D. Name 3 Anticoagulants with their action
E. Factors affecting Venous return
F. Empathy in patient care

Q2. **Answer any 3 out of 4 (SAQ)** **(3X5 marks =15 marks)**

1. Primary active transport
2. Normal ECG waves with the help of a diagram. Mention uses of ECG
3. Factors regulating the heart rate
4. A 6-year-old boy came with the history of swelling in the knee joint. His elder brother, 8 years old also had similar episodes of swelling. Mother gave history of profuse bleeding after a fall in both children. On general examination child was afebrile , pulse rate was 98/min, respiratory rate 20/min, BP= 102/72 mm of Hg. Swelling around the right knee of Circumference 30cm .It was warm and tender.The range of movement was reduced
    a. What condition does the case history suggest? (1 mark)
    b. What are the tests you would recommend to make a diagnosis (2mark)
    c. Mention any 2 bleeding disorders and describe any one (2 mark)

Q3. Answer any 1 out of 2(LAQ) **(1X10 marks =10marks)**

1. Define erythropoiesis. List the different stages of erythropoiesis. Describethe changes in each stage. What are the factors necessary for erythropoiesis. (1+2+4+3)

2. Define shock. Enumerate different types of shock .What are the signs andsymptoms of shock. Describe the compensatory mechanism in Hypovolaemic shock. (1+3+2+4)

Section-C

Marks: 40

Q1. Answer any 5 out of 6 (BAQ) **(5X3 marks =15 marks)**

1. Functional residual capacity
2. Classify Hypoxia with one example for each type.
3. Classify hormones with one example for each type
4. Cretinism
5. Spermatogenesis
6. Ovulation

Q2. Answer any 3 out of 4 (SAQ) **(3X5 marks =15 marks)**

1. Describe the transport of CO_2 in the blood.
2. Pulmonary surfactant
3. Actions of Growth hormone
4. A 40 year old male presented to medical officer with signs of Tetany
    a. What is the cause of Tetany? (1 mark)
    b. Enlist the signs of this disorder. (2 mark)
    c. What are the hormones involved in prevention of Tetany (2)

Q3. Answer any 1 out of 2(LAQ) **(1X10 marks =10marks)**

1. Describe the actions of insulin. Add a note on Diabetes Mellitus (7+3)

2. How is respiration regulated? Describe the neural regulation of respiration.(2+8)

DEPARTMENT OF PHYSIOLOGY
I MBBS –CBME

Model question paper- Physiology Paper II

Total Marks: 100 **Duration: 3 hours**
Instructions to students:

1. Attempt all questions.
2. Maximum marks are indicated in the right.
3. Draw diagrams where ever necessary.

Section-A **MCQ** **Mark: 1X20=20**

Section-B **Marks: 40**

Q1. **Answer any 5 out of 6 (BAQ)** **(5X3 marks =15 marks)**

A. Difference between fast twitch and slow switch muscle fibres
B. Enteric nervous system
C. Endo-cochlear potential
D. Compound Action Potential
E. Secretin
F. Errors of refraction

Q2. **Answer any 3 out of 4 (SAQ)** **(3X5 marks =15 marks)**

A. Sarcomere
B. Peristalsis
C. Light and Dark adaptation
D. A 8-year-old boy was referred to doctor for a hearing test. His parents reported that more recently they noticed him turning his head when spoken to. He had experienced a few ear infections that responded well to antibiotics. The parents mentioned a maternal aunt who is "nearly totally deaf" and wears binaural hearing aids. Otoscopic examination showed a clear ear canal and a normal-appearing tympanic membrane on the both side.
   1) What type of hearing loss the case history suggestive of? (1 mark)
   2) If you were asked to perform Rinne test and Weber test, how would you interpret the findings? (2 mark)
   3) Classify deafness. Write two causes for each. (2 mark)

Q3. Answer any 1 out of 2(LAQ) **(1X10 marks =10marks)**

A. Describe the Neuro-muscular junction under following headings.
   - ❖ Structure with neat, labeled diagram (3)
   - ❖ Transmission of an impulse (4)
   - ❖ Neuro muscular blocking agents (3)

B. Describe the composition, functions and regulation of gastric juice secretion. (3+3+4)

Section-C

Marks: 40

Q1. Answer any 5 out of 6 (BAQ) **(5X3 marks =15 marks)**

A. Withdrawal reflex
B. Functions of Prefrontal lobe
C. Renal clearance
D. Juxtraglomerular apparatus
E. Heat Gain Mechanism
F. Physiological effects of meditation

Q2. Answer any 3 out of 4 (SAQ) **(3X5 marks =15 marks)**

A. Synaptic inhibition
B. Acidification of urine
C. Acute effects of exercise on cardio-respiratory system
D. A 60 year old male presented to medical officer with signs of flexion attitude, pill rolling movement of thumb over fingers, resting tremors.
    1) What is the likely diagnosis?(1 mark)
    2) What is the cause of the same? (1 mark)
    3) Enlist all the signs of this disorder. (3 mark)

Q3. Answer any 1 out of 2(LAQ) **(1X10 marks =10marks)**

A. Describe the sleep under following heading.

- ❖ Physiological changes during sleep (4)
- ❖ Characteristic features of different types of sleep. (3)
- ❖ EEG changes during sleep. (3)

B. Describe the concentration and dilution mechanism of urine formation under following headings.

- ❖ Counter current multiplier (3)
- ❖ Counter current exchanger (3)
- ❖ Role of urea (2)
- ❖ Role of ADH (2)

Resolution No. 4.3 of AC-41/2021: Resolved to approve the booklist for 1st MBBS (CBME) Physiology with effect from the batch admitted in 2021-22 onwards

Annexure-22B of AC-41-2021

LIST OF PHYSIOLOGY BOOKS FOR FIRST MBBS-CBME

(UNDERGRADUATE COURSE)

A. TEXT BOOKS

S.N.	Name of the book	Name of the Author
1.	Textbook of Physiology Volumes I & II	A. K. Jain
2.	Textbook of Medical Physiology	Guyton & Hall
3.	Comprehensive Textbook of Medical Physiology Vol I & Vol II	G.K. Pal
4.	Fundamentals of Medical Physiology	L. Prakasam Reddy

B. PRACTICAL BOOKS

S.N.	Name of the book	Name of the Author
1.	Practical Physiology	A. K. Jain
2.	Practical Physiology	G. K. Pal
3.	Textbook of Practical Physiology	C. L. Ghai

C. REFERENCE BOOKS

S.N.	Name of the book	Name of the Author
1.	Textbook of Physiology	Indu Khurana
2.	Ganong's review of medical physiology	Barrett & Barman
3.	Understanding Medical Physiology: A textbook for medical students	R. L. Bijlani&Manjunatha
4.	Effective Medical Communication	Subhash Parija&BalachandraAdkoli
5.	Humanities in Medical Education	Rajiv Mahajan &Tejinder Singh

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Resolution No. 4.13 of AC-41/2021: Resolved to approve the two books - Communication skills & Early clinical Exposure, as reference books for Medical College Library and departments

1. Communication Skills in Clinical Practice - KR Sethuraman
2. Textbook of Early clinical Exposure Setting and Planning - Dr. Motilal C Tayade

MGM INSTITUTE OF HEALTH SCIENCES

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Grade 'A' Accredited by NAAC

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