



MAHATMA GANDHI UNIVERSITY
of
MEDICAL SCIENCES & TECHNOLOGY
JAIPUR

Syllabus

M.Sc. (Medical) PHYSIOLOGY

(6 SEMESTERS P.G. DEGREE PROGRAM)

[Signature]

2023-24

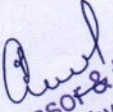
Recommended by Joint meeting of BOS Non clinical/ Para clinical / Clinical at its meeting held on 03/03/2023 and approved by Academic Council at its meeting held on 28/04/2023.

Revised by Faculty of Medicine & Surgery on 29/04/2025 & approved by Academic Council at its meeting held on 01/05/2025

[Signature]
Dr. Aparna Garg
Professor & Head
Dept. of Physiology
Mahatma Gandhi Medical College & Hospital
Jaipur-302022

NOTICE

1. The university reserves the right to make changes in the syllabus /books/ guidelines, fee-structure or any other information at any time without prior notice the decision of the university shall be binding on all.
2. The jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.


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M.Sc.(Medical)Physiology

(6 SEMESTERS P.G. DEGREE PROGRAM)

1. INTRODUCTION:

The Master of Science in Medical field provides the candidate with knowledge, general competence, and analytical skills on an advanced level, needed in consultancy, education, research.

Programme specific outcome: M.Sc. MEDICAL

POS 1. The PG student should acquire basic skills in teaching medical/ para-medical students

POS 2. A post graduate student after undergoing the required training should be able to deal and render services in advanced laboratory investigations.

POS 3. The post graduate student should have knowledge about the principles of research methodology and self-directed learning for continuous professional development.

POS 4 . The post graduate student should be able to carry out a research project from planning to publication and be able to pursue academic interests.

COURSE OUTCOME (CO):

1. A post graduate student having qualified the M.Sc. (Physiology) examination shall achieved competency to:
2. Understand all aspects of general, systemic and applied Physiology.
3. Teach effectively the basic physiological mechanisms of human body with reference to their implications in the pathogenesis of diseases to undergraduate medical, paramedical and all other basic science students.
4. use of appropriate teaching methods and resources.
5. Explain the knowledge of Physiology in a various clinical setting to solve diagnostic and therapeutic problems.
6. Interpret and evaluate research publications critically.
7. Use of the library facilities (Literature database using computer, CD ROM, internet search and any other available newer techniques).
8. Conduct relevant clinical/experimental research which may have significant bearing on human health and patient care.
9. Interpret the research findings in the light of its basic and applied significance.
10. Acquire skills in conducting collaborative research in the field of Physiology with allied sciences, clinical sciences and biomedical engineering.
11. Interact with the allied departments and render services in advanced laboratory investigations.
12. Serve as interface with society at large.
13. Acquire administrative skills to set up concerned department / laboratories and initiate purchase procedure and procure necessary items for running such laboratories.
14. Function as a member of a teaching or research team.

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2. TITLE OF THE COURSE:

M.Sc. (Medical) Physiology

3. DURATION OF THE COURSE:

Duration of the course: 3 Years (6 Semesters)

4. MEDIUM OF INSTRUCTION:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

5. ELIGIBILITY FOR ADMISSION:

MBBS/BDS/ B.Sc.& A.H./ BHMS/BAMS/ BUMS/ BPT/ BOT/B.Sc. Nursing/B. Pharmacy /B.Sc. Biotech/ B.Sc. in Life Sciences (Zoology, Botany, Biochemistry/ Chemistry) with at least 50% marks in the aggregate.

- B.Sc. with at least 50% marks in the aggregate and with Physics and Chemistry subjects are eligible for M.Sc. Medical Physiology).
- B.Sc. (MLT) with at least 50% marks in aggregate are eligible for M.Sc. (Medical) Biochemistry and Microbiology courses only.

6. PROCESS OF ADMISSION:

Admission to M.Sc. (Medical) Physiology Program shall be made on the basis of written entrance examination conducted for the purpose.

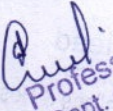
7. RESERVATION POLICY:

Reservation in admissions shall be applicable as per policy of the State Government.

8. ENROLLMENT:

Every candidate who is admitted to M.Sc. (Medical) Physiology Degree Program in Mahatma Gandhi medical college shall be required to get himself/herself enrolled with the Mahatma Gandhi University of Medical Sciences & Technology (MGUMST) after paying the prescribed eligibility and enrolment fees.

A candidate shall deposit enrolment fees along with tuition fees at the time of his/her admission to the course. Such a candidate who fails to submit, to the college Principal, duly filled enrolment form along with original documents including migration certificate required for enrolment within prescribed period then after he/she shall pay late fee applicable at that time. No student will be allowed to appear in the university examination without his/her enrollment.


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9. ATTENDANCE:

Minimum 75 % attendance is required in each semester, both for theory and practical classes separately; student with deficient attendance will not be permitted to appear in university examination in that subject.

10. WORKING DAYS:

Each semester shall consist of not less than 120 working days including examination.

11. CONDUCTION OF THE UNIVERSITY EXAMINATION:

University semester examination shall be conducted twice in a year with an interval of six months. Even Semester examination shall be conducted after 6 months of odd semester examination

12. ELIGIBILITY TO APPEAR FOR UNIVERSITY EXAMINATION

Student is required to have minimum 75% attendance (in theory and practical separately) /to make him/her eligible to appear in University Examination in individual subject.

Candidates failing in one or more, subject in a semester will be required to appear in their failing subject in the next examination of the same semester next year.

The scheme of "Carry forward" (for the subjects in which the student has failed/ abstained) will be allowed for the current academic year in the universities and every student will be promoted to next semester/year. However, such students may clear the examination for the course in which he/ she has failed/ remained absent, whenever the examination is held next. Student will be allowed to appear in the END SEMESTER EXAM OF FINAL SEMESTER EXAMS ONLY IF HE/SHE HAS CLEARED ALL PERVIOUS SEMESTER AND INTERNAL EXAMS.

A candidate will have to clear all the subjects of First to Fifth semester before appearing at sixth semester university examination.

13. DISSERTATION

- (i) Every student will be required to write a dissertation involving primary research in his/her area of interest. The dissertation includes a critical review of literature pertaining to the specific area of interest, data collection and analysis of the selected problem.
- (ii) One faculty member will be assigned as Guide to each student.
- (iii) Synopsis/protocol of the Dissertation shall be submitted by the student during the third semester to Institutional Ethics Committee (IEC).
- (iv) Dissertation duly completed and signed by Guide shall be submitted to Principal, MGMCH, at least three months before the Sixth semester Exam.
- (v) Dissertation will be examined during Practical Examination by all the examiners. Marks will be awarded as per the assessment done by these examiners.

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- (vi) A student will be considered fit for award of degree only if the Dissertation is evaluated by the examiners.

14. APPOINTMENT OF EXAMINER & PAPER SETTER

- All the examiners - Paper setters, Theory examination answer books evaluators, External and internal Examiners for Practical examinations shall be appointed by the president of the University from the panel submitted by HOD/Convener of the respective BOS/COC through concerned dean of faculty.
- Paper setters for core subjects shall be external. He/she shall also evaluate answers sheets of his paper.
- For Elective courses paper setter and Evaluator shall be from the MGUMST itself.
- External Examiner will be invited from other recognized University/ Institution in the state of Rajasthan or outside the state of Rajasthan
- Practical examiner can be appointed to evaluate answers sheets.
- Professor/ Assoc. Professor /Assistant Professor/ having PG qualification (MD) and 5 years' teaching experience after PG in respective field OR M.Sc. with PhD having 3 years Teaching experience after PG in respective field is eligible to act as Internal/External examiner of theory/practical examination.

15. SCHEME OF EXAMINATION

The University examination for the Course shall be conducted semester wise at the end of every semester.

Continuous Assessment

Internal assessments will be conducted in the form of mid-term Examinations. Internal assessments will consist of departmental examinations, assignments, departmental posting, and evaluations.

Ability Enhancement courses (AEC)

The AEC from Semester I to V will be conducted and Evaluated by the respective departments. The marks will be sent to the principal's office by them after evaluation .

End of Semester Examination (EOSE)

I. Theory

- (a) There shall be five Theory papers in each semester of the study.
- (b) Each Theory paper examination from the Core subject shall be of 3 hours duration and of maximum 70 marks.
- (c) Each Theory paper examination from the Elective shall be of 3 hours duration and of maximum 70 marks.

- (d) If a student fails in any paper in University Semester Examination, she/he will be allowed to write the exam whenever the next semester exam is conducted by the University till N+3 criteria is valid. For any subsequent attempt her/his Internal Assessment (IA) marks secured will be carried forward.
- (e) Continuous Internal assessment (CIA) shall be of 30 for both core and elective subjects.
- (f) The Paper Setter shall set the questions within the prescribed course of study of the concerned paper. There will be a set pattern of question papers duly approved by Academic Council.
- Pattern of question papers (Annexure 1)
- (g) Passing Marks: A candidate will have to obtain at least 50% marks including internal assessment in each theory paper to pass.

II. Practical and Viva-Voce Examination

At the end of semester VI there shall be practical and viva-voce examination of 140 marks. It shall be conducted after the Theory examination is over. A candidate will have to obtain at least 50% marks in practical and viva-voce examination

Semester	Practical /Dissertation Marks					Practical Examiners
	End of Semester Examination (EOSE)			Total Marks	Min. Pass Marks	
	Practical	viva-voce	CIA			
VI	100	40	60	200	100	Two Internal & Two External Examiner

- (i) The practical examination will consist of skill test (long case), presentation on Dissertation and viva voce.
- (ii) Board of Examiners for University Practical and Viva Voce Examination will be as under:
- o 02 Internal Faculty
 - o 02 External Examiner

PRACTICAL, DISSERTATION AND GRAND VIVA AT THE END OF SIXTH SEMESTER OF 4 CREDITS OF 100 MARKS

III Result

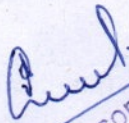
1. A candidate will have to obtain at least 50% marks separately in each Theory paper including internal assessment and a minimum of 50% marks in the practical examination including viva-voce for him to be declared pass.
2. A Candidate who has failed in a subject(s) will reappear in respective paper(s) in next examination of the same semester next year.
3. Candidate who has failed in Practical examination will reappear in practical examination only.

IV. Supplementary/Remanded Examination

- (a) There shall be a supplementary examination of VI semester only within two months of the declaration of the result of the main examination of VI Semester.
- (b) Continuous assessment marks obtained in main examination in the concerned failed paper(s)/practical shall be carried forward for working out the result of next Theory paper(s) and/or practical examination.
- (c) A failing candidate, if opt for improvement his/her internal assessment marks shall be allow to do so. In case he does appear for improvement or gets lesser marks in internal assessment, his earlier marks will be considered for working out the result of the failing subject.

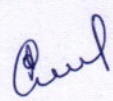
V. Promotion to Next Semester

- 1. A candidate who has passed or failed in one or more subjects shall be promoted to respective next semester.
- 2. A candidate will be allowed to appear for the VI semester examination only when the backlog of all papers (theory papers and practical) of I semester to V semester exams including elective papers (if any) is cleared.
- 3. The student is required to clear all the University examination within 6 years from the joining of the course .


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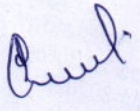
M.Sc. (Medical) Physiology Marks Distribution of Semester – I Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOSE	CA	Total	Pass Marks
Anatomy	MSCM0523S101T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Physiology	MSCM0523S102T	4	70	30	100	
Biochemistry	MSCM0523S103T	4	70	30	100	
ELECTIVE COURSES (ANY TWO)						
National Health care System	MSCM0523S104T	2	70	30	100	
Basics of Computer	MSCM0523S105T	2	70	30	100	
Basics of Healthcare IT	MSCM0523S106T	2	70	30	100	
ABILITY ENHANCEMENT COURSE						
Journal Club Presentation		1		50		
Practical Classes/ Lab Posting		1		50		
TOTAL		20	350	250	600	


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M.Sc. (Medical) Physiology Marks Distribution of Semester – II Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOSE	C A	Total	Pass Marks
Pathology	MSCM0523S201T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Microbiology	MSCM0523S202T	4	70	30	100	
Pharmacology	MSCM0523S203T	4	70	30	100	
ELECTIVE COURSES(ANY TWO)						
Pharmacovigilance	MSCM0523S204T	2	70	30	100	
Communication Skills and Academic Writing	MSCM0523S205T	2	70	30	100	
Legal and Medical Issues in Hospitals	MSCM0523S206T	2	70	30	100	
ABILITY ENHANCEMENT COURSE						
Journal Club Presentation		1		50		
Practical Classes/ Lab Posting		1		50		
TOTAL		20	350	250	600	


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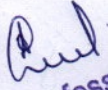
M.Sc. (Medical) Physiology Marks Distribution of Semester – III Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOSE	CA	Total	Pass Marks
Cell Physiology, Muscle Nerve Physiology AND Environmental Physiology	MSCM0523S301T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Blood & it's components	MSCM0523S302T	4	70	30	100	
Biostatistics & Research Methodology	MSCM0523S303T	4	70	30	100	
ELECTIVE COURSES(ANY TWO)						
Organizational Behavior	MSCM0523S304T	2	70	30	100	
Stress Management	MSCM0523S305T	2	70	30	100	
Basic Instrumentation and Lab Practices	MSCM0523S306T	2	70	30	100	
ABILITY ENHANCEMENT COURSE						
Plan presentation		1		50		
Practical Classes/ Lab Posting		1		50		
TOTAL		20	350	250	600	


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M.Sc. (Medical) Physiology Marks Distribution of Semester – IV Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOSE	CA	Total	Pass Marks
Cardiovascular System	MSCM0523S401T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Respiratory System	MSCM0523S402T	4	70	30	100	
Digestive System	MSCM0523S403T	4	70	30	100	
ELECTIVE COURSES (ANY TWO)						
Database Management System	MSCM0323S404T	2	70	30	100	
Disaster Management	MSCM0323S405T	2	70	30	100	
Sports Nutrition	MSCM0323S406T	2	70	30	100	
ABILITY ENHANCEMENT COURSE						
Seminar Presentation		1		50		
Practical Classes/ Lab Posting		1		50		
TOTAL		20	350	250	600	


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M.Sc. (Medical) Physiology Marks Distribution of Semester – V Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOS E	CA	Total	Pass Marks
Reproductive system	MSCM0523S501T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Endocrinology System	MSCM0523S502T	4	70	30	100	
Renal System	MSCM0523S503T	4	70	30	100	
ELECTIVE COURSES(ANY TWO)						
Professional Ethics and Human Rights	MSCM0523S504T	2	70	30	100	
Basics of Yoga	MSCM0523S505T	2	70	30	100	
Hospital Equipment Management	MSCM0523S504T	2	70	30	100	
PRACTICAL/ABILITY ENHANCEMENT COURSE						
Seminar Presentation		1		50		
Practical Classes/ Lab Posting		1		50		
TOTAL		20	350	250	600	


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M.Sc. (Medical) Physiology Marks Distribution of Semester – VI Examination

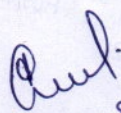
Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			EOSE	CA	Total	Pass Marks
Central Nervous System	MSCM0523S601T	4	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Special Senses	MSCM0523S602T	4	70	30	100	
Recent Advances	MSCM0523S603T	4	70	30	100	
And Others						
ELECTIVE COURSES(ANY TWO)						
Biomedical Waste Management	MSCM0523S604T	2	70	30	100	
Teaching Methodology	MSCM0523S605T	2	70	30	100	
Basic Life Support (BLS)	MSCM0523S606T	2	70	30	100	
PRACTICAL/ABILITY ENHANCEMENT COURSE						
Practical /Viva and Dissertation Viva	MSCM0323S607P	4	160	40	200	
TOTAL		22	510	190	700	

16. REVALUATION / SCRUTINY:

Revaluation of answer book(s) and security of the marks shall be permissible as per the policy of the university.

17. AWARD OF DEGREE:

The degree shall be awarded by the University only after receipt of Course completion certificate and NO dues from the Head of Institution. (Principal of the college) .


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18. LETTER GRADES AND GRADE POINTS

LETTER GRADE	GRADE	PERCENTAGE OF MARKS
O (Outstanding)	10	100 %
A+(Excellent)	9	90-99.99 %
A(Very Good)	8	80-89.99 %
B+(Good)	7	70-79.99 %
B(Above Average)	6	60-69.99 %
C(Average)	5	50-59.99 %
F(Fail)	0	0 Less than 50 %
Ab (Absent)	0	0 Absent

19. Grades Qualifying for Pass:

Theory and Practical Examination

1. **Minimum 5 Grade** in the university examination and **5 Grade** in internal assessment evaluated by the department are required to pass **who fails to obtain 5 Grade shall be declared failed.**

2. A student obtaining **Grade F** shall be considered **failed** and will be required to reappear in the examination.

3. Letter Grade **Ab (Absent)** will be showing the absent of the candidate in examination and will be required to reappear in the examination.

20. Credit Weightage Distribution

Item	Credit Weight (30)
1.Internal Assessment (30)	
Mid-term Exam	20
Class participation/presentation, Attendance	5
Departmental Postings, Assignment, quizzes	5
2.University Exam (70)	
Total	100


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21. Authority to issue transcript

The Controller of Examination of the University shall be the authority for issuing transcript after receiving the described fee from the candidate.

22. Working Hours/Days

Duration	3 Years(6 Semesters)
Working Days	6 Days in A Week
Working Hours	36 Hours in A Week

23. Distribution of Courses Semester-Wise

Semester	Core Course Component (CCC)	Elective Course Component(ECC)	Practical / Ability Enhance Component	Total No. Of Courses/Papers
Semester I	3	2	2	5
Semester II	3	2	2	5
Semester III	3	2	2	5
Semester IV	3	2	2	5
Semester V	3	2	2	5
Semester VI	3	2	1	5
Total	18	12	11	30

24. Distribution of Courses in Each Semester

Sr. No.	Type of Course	Numbers
1	Core Course	3
2	Elective Course	2
Total		05 (Five)

25. Types of Courses in M.Sc. (Medical) Physiology: -

1. **Core Course**-course designed under this category aim to cover the basics that a student is expected to imbibe in the discipline of M.Sc. (Medical) Physiology. A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

2. **Elective Course**-it is a course which can be chosen from a pool of courses it is specific or specialized or advanced or supportive to the discipline of M.Sc. (Medical) Physiology. Students must **CHOOSE ANY TWO COURSE IN EACH SEMSTER** from the pool of course given to that semester.
3. **Practical/ Ability Enhancement Courses (AEC:** The Ability Enhancement (AE) Courses or practical are the courses based upon the content that leads to Knowledge enhancement. They are skill-based and are aimed at providing hands-on-training, competencies, skills, etc.


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SEMESTER I-PAPER I (THEORY)

PAPER CODE-

MSCM0123S101T

MSCM0223S101T

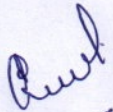
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MSCM0423S101T

MSCM0523S101T

ANATOMY

- (1) Anatomical terminology, Anatomical planes, Anatomical positions, Clinical positions,
Terms related to movements
- (2) Musculoskeletal system:
 - (a) Bones & their classification, Morphology, ossification, blood supply
 - (b) Muscles: Morphology, classification, blood supply, innervations, functions
- (3) Integumentary system: Thick Skin, Thin skin, layers of dermis & epidermis, Skin appendages, blood supply, innervations, functions
- (4) Cardiovascular system: Morphology of blood vessels, classification of blood vessels, blood capillaries, blood circulation, functions
- (5) Nervous system: Central Nervous system & Peripheral Nervous system, Gross basic Anatomy, Cranial nerves, Spinal nerves, Functions of nerves, Autonomic nervous system
- (6) Lymphatic system: Formation of lymph, Lymphatic ducts, Thoracic duct, Lymph circulation, functions
- (7) Digestive system: Parts of digestive system, gross anatomy and functions
- (8) Excretory system: Parts of excretory system, gross anatomy of kidney, ureter, urinary bladder, and their functions
- (9) Reproductive system: Male reproduction system- gross anatomy of penis, testis, epididymis, vas-deferens, seminal vesicles and prostate. Female reproductive system- gross anatomy of ovaries, uterine tube, uterus, vagina, menstruation cycle.


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SEMESTER I-PAPER II (THEORY)

PAPER CODE-

MSCM0123S102T

MSCM0223S102T

MSCM0323S102T

MSCM0423S102T

MSCM0523S102T

PHYSIOLOGY

CELL PHYSIOLOGY:

- (1) Membrane transport, Bio-membrane potentials, Nernst equation,
- (2) Composition of ECF and ICF, Goldmann equation.

NERVE-MUSCLE:

- (1) Neuron (structure, functions and classification) and neuroglia,
- (2) Action potential, neuromuscular junction,
- (3) Skeletal muscle (structure, mechanism of contraction).
- (4) Smooth muscle (structure, mechanism of contraction).

BLOOD:

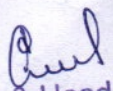
- (1) Function and composition,
- (2) Erythrocytes,
- (3) Hemoglobin,
- (4) Blood groups,
- (5) Leucocytes,
- (6) Thrombocytes,
- (7) Immunity (basics).

CARDIOVASCULAR SYSTEM:

- (1) Cardiac muscle,
- (2) Physiological Anatomy of heart and conduction system,
- (3) Normal ECG, cardiac cycle, heart sounds,
- (4) Cardiac output and blood pressure,
- (5) Coronary circulation,
- (6) Common symptoms of cardiovascular illness (basics only).

RESPIRATORY SYSTEM:

- (1) Functional Anatomy of the respiratory system,
- (2) Mechanism of breathing, dead space, surfactant, dynamic and static lung volumes and capacities,
- (3) Transport of oxygen and carbon dioxide,
- (4) Regulation of respiration: neural and chemical
- (5) Cyanosis,
- (6) Hypoxia,
- (7) Oxygen therapy,


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- (8) Artificial respiration.

GASTROINTESTINAL SYSTEM:

- (1) Functional Anatomy,
- (2) salivary glands (secretion and functions of saliva, deglutition),
- (3) Stomach (composition, regulation of secretion and functions of the gastric juice),
- (4) Liver and its functions.
- (5) Pancreas (secretion and function),
- (6) Intestinal secretion (composition and functions), movement of intestines,
- (7) Hormones of GIT (Basic only).

EXCRETORY SYSTEM:

- (1) Functions of kidney,
- (2) Juxta glomerular apparatus,
- (3) Formation of urine, counter current mechanism,
- (4) Role of kidney in maintenance of acid base balance,
- (5) Renal function tests

AUTONOMIC NERVOUS SYSTEM:

- (1) Organization of the ANS,
- (2) Neurotransmitters,
- (3) Effect of Sympathetic and Parasympathetic stimulation on different organ systems.

ENDOCRINE SYSTEM

- (1) Introduction
- (2) Enumerate the endocrine glands and their functions

REPRODUCTIVE SYSTEM

- (1) Introduction
- (2) Menstrual cycle, male/female sex hormones
- (3) Methods of contraceptions.

CENTRAL NERVOUS SYSTEM

- (1) General organization of CNS & PNS,
- (2) Sensory system (general sensations, receptors, sensory pathways, sensory areas of brain)
- (3) Motor system: (Spinal reflexes, reflex arc, corticospinal and extra pyramidal tracts)
- (4) Special senses

SEMESTER I-PAPER III (THEORY)

PAPER CODE-

MSCM0123S103T

MSCM0223S103T

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BIOCHEMISTRY

BASICS OF BIOCHEMISTRY:

- (1) Cell structure and function and transport through the biological membrane.
- (2) Chemistry of Biomolecules – carbohydrate, lipids, amino acids, proteins and nucleic acids.
- (3) Chemistry of Blood & Haemoglobin.
- (4) Enzymes – Nature and classification, concepts, Kinetic, mechanism of action.
- (5) Bioenergetics and Biological oxidation.
- (6) Metabolism of Carbohydrates, Proteins, Lipids.
- (8) Nutrition, Vitamins & Minerals.
- (10) Molecular Biology.
- (11) Organ function tests (Renal Function Tests, Liver function tests, Thyroid Function tests & pancreatic Function tests).
- (12) Immunology – General outline
- (14) Principles, working & applications of Basic Biochemical techniques: a) Colorimetry
b) Spectrophotometry c) Chromatography d) Electrophoresis e) ELISA


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SEMESTER II-PAPER I (THEORY)

PAPER CODE-

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PATHOLOGY

INTRODUCTION TO PATHOLOGY:

- (1) Definition
- (2) Cause of cell injury
- (3) Reversible and irreversible injury
- (4) Pathologic calcification
- (5) Cellular adaptations in brief.

INFLAMMATION AND REPAIR:

- (1) Acute and Chronic inflammation
- (2) Chemical mediators of inflammation

HEALING:

- (1) By primary and secondary intention
- (2) Factors affecting wound healing

HEMODYNAMIC DISORDERS:

- (1) Edema
- (2) Shock

NEOPLASIA:

Definition, Nomenclature

- (1) Characteristic of benign and malignant neoplasm
- (2) Metastasis in brief
- (3) Carcinogenesis in brief.

HAEMOPOIETIC SYSTEM:

- (1) Anemia
- (2) IDA, Megaloblastic, Thalassemia, SCA, G6PD, deficiency, Hemophilia, Leukemia
- (3) Lab investigation of hemorrhagic disorders.

LIVER:

- (1) Liver function test, Jaundice, Hepatitis-B

KIDNEY:

- (1) Stones, Nephrotic Syndrome, Renal Function Test
- (2) ARF, CRF
- (3) Glomerular nephritis in brief.

THYROID:

- (1) Goiter, Thyroiditis
- (2) Hypo and Hyperthyroidism

BONE:

- (1) Osteomyelitis, TB
- (2) Common Tumors

GALL BLADDER:

- (1) Gall stones, Cholecystitis

BLOOD GROUPS AND COAGULATION

PANCREAS: Diabetes Mellitus, Pancreatic Function Test

SEMESTER II-PAPER II (THEORY)**PAPER CODE-**

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MICROBIOLOGY

- (1) Cell Structure
 - (a) Microscopy, staining,
 - (b) Detailed structure in comparison to Eukaryotic cell, Morphological change during growth.
- (2) Microscopy
 - (a) Various optical methods available for viewing microorganism and their applications.
- (3) Overview of Microbial Worlds
 - (a) Basic principles and Purpose of Classification systems
- (4) Growth Survival of Micro-organism
 - (a) Growth
 - (b) Growth parameters
 - (c) Definition and measurement of bacterial growth
 - (d) Survival of micro-organisms in natural environment
 - (e) Role of antimicrobial agents.
- (5) Cultivation of micro-organisms
 - (a) Growth requirements
 - (b) Sources of metabolic energy
 - (c) Nutrition
 - (d) Environmental and other factors affecting growth
 - (e) Methods of cultivation
- (6) Microbial Metabolism
 - (a) Metabolism of biosynthesis and growth
 - (b) Biosynthesis pathways

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- (c) Energy Yielding metabolism
- (d) Regulation of metabolic pathways
- (7) Bacterial Genetics
 - (a) Structure and replication of bacterial DNA plasmids
 - (b) Variation:
 - i. Mutation
 - ii. Transfer of genetic material
 - (c) Recombine DNA technology
- (8) Control of micro-organism
 - (a) Sterilization & Disinfection
 - (b) Antimicrobial agents & bacterial resistance
- (9) General Principles in clinical microbiology
 - (a) Collection and handling of various samples
 - (b) Laboratory safety
 - (c) Quality control
 - (d) Antimicrobial susceptibility and assay
 - (e) Laboratory animals-handling and care

SEMESTER II-PAPER III (THEORY)

PAPER CODE-

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PHARMACOLOGY

GENERAL PHARMACOLOGY:

- (1) Introduction to Pharmacology
- (2) Nature and Sources of Drugs & Drug Information
- (3) Dosage forms & Drug Nomenclature
- (4) Routes of drug administration,
- (5) Drug delivery systems
- (6) Pharmacokinetics (Absorption, Distribution, Metabolism and Excretion of drugs)
- (7) Therapeutic drug Monitoring
- (8) Pharmacogenomics and Pharmacogenetics
- (9) Drug receptors and Pharmacogenetics
- (10) Factors Modifying Drug Action
- (11) Drug administered in special situations: Pregnancy, Lactation, Pediatrics & Geriatrics.
- (12) Adverse drug reactions & Pharmacovigilance
- (13) Aspects of Pharmacotherapy & Clinical pharmacology
- (14) Drug Interactions
- (15) Drug development process and Regulations
- (16) Rational Drug concept
- (17) Essential drug concept
- (18) Fixed Drug Combinations

(19) Evidence based Medicine

II Classification and pharmacological actions of drugs acting on various systems: -

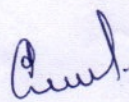
1. Autonomic nervous system
2. Peripheral Nervous System
3. Central nervous system
4. Renal system
5. Cardiovascular System
6. Gastrointestinal system
7. Respiratory system
8. Uterine motility

III. Classification and pharmacological actions of

1. Autacoids and related drugs
2. Chemotherapy of microbial diseases
3. Antineoplastic agents
4. Immunomodulators
5. Drugs affecting blood
6. Hormones and Related drugs
7. Vitamins

RECOMMENDED TEXTBOOKS

- Goodman & Gilman's The Pharmacological Basis of Therapeutics, ed. Laurence Brunton, Bruce A. Chabner, Bjorn Knollman.
- Essentials of Medical Pharmacology, by KD Tripathi
- Basic and Clinical Pharmacology, by Bertram G. Katzung and Anthony J. Trevor


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SEMESTER III-PAPER I (THEORY)

PAPER CODE-MSCM0523S301T

CELL PHYSIOLOGY, MUSCLE NERVE PHYSIOLOGY AND ENVIRONMENTAL PHYSIOLOGY

Fundamental phenomenon of life

- Structure and functions of a cell, intercellular communication and their applications in Clinical care and research
- Principles of homeostasis and feedback mechanism
- Various transport mechanisms across cell membranes
- Fluid compartments of the body, its ionic composition & measurement methods
- Concept of pH & Buffer systems in the body
- Molecular basis of resting membrane potential (RMP) and generation of action potential in a nerve fibre

Muscles and nerves:

- Structure and functions of a neuron and neuroglia ; Discuss nerve growth factors
- Types, functions, properties of nerve fibers including strength duration curve, chronaxie and rheobase
- Classify nerve injury and discuss the mechanism of degeneration and regeneration in peripheral nerves
- Microscopic structure of neuro-muscular junction (NMJ) and mechanism of neuromuscular transmission
- Applied aspects of neuromuscular junction: myasthenia gravis, Lambert Eaton syndrome and neuromuscular blocking agents.
- Types of muscle fibres, their structure and physiological basis of action potential

Environmental physiology-

- Physiological mechanism of temperature regulation
- Adaptation to altered temperature (heat and cold) and mechanism of fever, cold injuries and heat stroke
- Cardio-respiratory and metabolic adjustments during exercise (isometric and isotonic), effects of physical training under different environmental conditions (heat and cold)

SEMESTER III-PAPER II (THEORY)

PAPER CODE- MSCM0523S302T

BLOOD & IT'S COMPONENTS

- Composition and functions of blood and its components
- Origin, forms, variations and functions of plasma proteins and its clinical implications
- Physiological structure, synthesis, functions and breakdown of hemoglobin & its variants and clinical significance.
- Erythropoiesis & discuss its regulation in physiological and pathological situations
- Anaemias, polycythemia& jaundice and discuss its physiological principles of management
- Formation of WBC (leucopoiesis), structure and function of various WBC types and their regulatory mechanisms
- 'Immunity' in terms of its types, development, regulation and physiological significance
- Formation of platelets (thrombopoiesis), structure, functions and variations.
- Hemostasis, coagulation pathways, mechanism of action of anticoagulants and briefly discuss pathophysiological aspects of bleeding & clotting disorders (e.g. Hemophilia, purpura)
- Types of blood groups, clinical importance of blood grouping, blood banking and transfusion

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PAPER CODE-

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BIostatISTICS & RESEARCH METHODOLOGY

i. Biostatistics: - Use of calculators and electronic spread sheets for understanding of: (1) Elements of data collection and presentation of data (2) Measures of central tendency and dispersion (3) Nonparametric tests (4) Parametric tests (including ANOVA) (5) Correlation and regression (6) Sampling techniques, randomization, sample size estimation. (7) Scales of measurement, data display, and measures of central tendency (mean, median, mode). (8) Dispersion of data (variance, standard deviation). (9) Selection of tests (of significance) and their applicability. (10) Correlation and regression analysis. (11) Statistical software.

ii. Research Methodology: -

1. Literature search and bibliography.


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2. Data management and presentation.

Formulation of research topic, study design, blinding procedures and protocol

SEMESTER IV-PAPER I (THEORY)

PAPER CODE-MSCM0523S401T

CARDIOVASCULAR SYSTEM

- Functional anatomy of heart including chambers and coronary circulation
- Properties of cardiac muscle including its morphology, electrical, mechanical and metabolic function
- Generation and conduction of cardiac impulse along with the conduction pathway (including pacemaker potential).
- Physiological events occurring during the cardiac cycle, concurrent pressure volume changes, generation of heart sounds and murmur
- Physiology of electrocardiogram (e.c.g), the cardiac axis and its applications
- Physiological variations in ecg wave forms, abnormal waveforms and intervals , arrhythmias, heart blocks and myocardial infarction
- Haemodynamics of circulatory system
- Local and systemic cardiovascular regulatory mechanisms
- Heart rate, factors affecting heart rate, and its regulation
- Cardiac output, factors affecting cardiac output and its regulation.
- Bloodpressure, factors affecting bloodpressure and its regulation
- Regional circulation including microcirculation, lymphatic circulation, cerebral, capillary, skin, foetal, pulmonary and splanchnic circulation
- Patho-physiology of shock, syncope, heart failure with physiological basis of its management

SEMESTER IV-PAPER II (THEORY)

PAPER CODE- MSCM0523S402T

RESPIRATORY SYSTEM

- Functional anatomy of respiratory tract and non-respiratory functions of lungs
- Mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities (static and dynamic)
- Alveolar surface tension, compliance, airway resistance, ventilation, v/p ratio, diffusion capacity of lungs
- Transport of respiratory gases viz oxygen and carbon dioxide across lungs and whole body

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- Chemoreceptors (peripheral and central) and neural centers of respiration including chemical and neural regulation of respiration
- Pathophysiology of dyspnoea, hypoxia, cyanosis, asphyxia, drowning, periodic breathing and oxygen therapy
- Various lung function tests and their clinical significance in obstructive and restrictive lung diseases
- Physiology of high altitude and acclimatization
- Physiology of deep-sea diving and decompression sickness

SEMESTER IV-PAPER III (THEORY)

PAPER CODE-MSCM0523S403T

DIGESTIVE SYSTEM

- Functional anatomy of digestive system
- Various gastrointestinal hormones (gi) hormones, discuss their functions and regulation
- Composition, mechanism of secretion, functions, and regulation of saliva
- Composition, mechanism of secretion, functions, and regulation of gastric juice. Discuss various gastric function tests
- Composition, mechanism of secretion, functions, and regulation of pancreatic juice including various pancreatic exocrine function tests
- Composition, mechanism of secretion, functions, and regulation of intestinal juices
- Physiology of digestion and absorption of nutrients
- Gut movements, its regulation and physiological significance including defecation reflex and the role of dietary fibres
- Structure, functions and secretion of liver and gall bladder with elaboration of various liver function tests
- Gut-brain axis and its physiological significance
- Applied physiology of gut viz. Peptic ulcer, gastroesophageal reflux disease, vomiting, diarrhoea, constipation, adynamic ileus, hirschsprung's disease

SEMESTER V-PAPER I (THEORY)

PAPER CODE- MSCM0523S501T

REPRODUCTIVE SYSTEM

- Sex determination, sex differentiation and their abnormalities and discuss the effects of removal of gonads on physiological functions
- Puberty: onset, progression, stages; early and delayed puberty.
- Functional anatomy of male reproductive system, functions of testis, spermatogenesis and discuss the functions and regulations of testosterone hormone

- Functional anatomy of female reproductive system: functions of ovary and its hormones (estrogen and progesterone); hormonal regulation by hypothalamic pituitary gonadal (hpg axis)
- Menstrual cycle, uterine and ovarian changes, hormonal regulation and its implications in reproductive physiology
- Male and female contraceptive methods, rationale of its prescription, side effects and its advantages & disadvantages
- Physiology of pregnancy, parturition & lactation.
- Physiological basis of various pregnancy tests
- Hormonal changes and their effects during perimenopause and menopause
- Common causes of infertility in a couple and role of IVF in managing a case of infertility

SEMESTER V-PAPER I I(THEORY)

PAPER CODE- MSCM0523S502T

ENDOCRINE

- Functional anatomy of endocrine glands, mechanism of hormonal action (steroid and peptide) and hypothalamus pituitary axis {HPA}
- Synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pituitary gland
- Synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of thyroid gland including thyroid function tests
- Synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of adrenal gland and its function tests
- Synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of parathyroid gland with emphasis of physiology of bone and calcium metabolism
- Synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pancreatic gland including pancreatic function tests
- Physiology of thymus & pineal gland

SEMESTER V-PAPER III (THEORY)

PAPER CODE- MSCM0523S503T

EXCRETORY SYSTEM

- Functional anatomy of kidney and non-excretory functions of kidney
- Structure and functions of juxtaglomerular apparatus and role of renin-angiotensin system
- Mechanism of urine formation involving processes of filtration (glomerular filtration), tubular reabsorption & secretion.

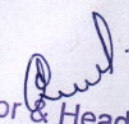
- Mechanism of urine concentration and dilution (counter current multiplier & exchanger)
- Renal regulation of fluid and electrolytes & acid-base balance
- Innervations of urinary bladder, physiology of micturition and its abnormalities
- Cytometry and discuss the normal cystometrogram
- Various renal function tests with its physiological significance and clinical implication of renal clearance
- Role of artificial kidneys, dialysis and indications of renal transplant

SEMESTER VI-PAPER I (THEORY)

PAPER CODE - MSCM0523S601T

CENTRAL NERVOUS SYSTEM

- Functional organization of central nervous system (brain and spinal cord)
- Functional anatomy of peripheral nervous system (including autonomic nervous system)
- Classify the neurotransmitters and discuss the chemical transmission in the nervous system.
- Classification, functions and properties of synapse
- Classification, functions and properties of reflex
- Classification, functions and properties of receptors
- Somatic sensations, ascending tracts, (sensory tracts) and applied aspects of sensory system
- Physiology of pain including pain pathways and its modulation with special emphasis on gate control theory of pain
- Course of descending tracts (pyramidal and extra pyramidal), its clinical implications including difference in Upper motor neuron (UMN) and lower motor neuron (LMN) lesions
- Types and clinical features of spinal cord lesions (complete, incomplete transection and hemi section - Brown Sequard syndrome)
- Functional anatomy of cerebellum, its connections, functions and clinical abnormalities
- Functional anatomy of basal ganglia, its connections, functions and Clinical abnormalities
- The mechanism of maintenance of tone, posture and control of body movements
- Functional anatomy of thalamus, its connections, functions and clinical abnormalities
- Functional anatomy of hypothalamus and limbic system, its connections, functions and clinical abnormalities.
- Functional anatomy of cerebral cortex, its connections, functions and Clinical abnormalities
- Structure and functions of reticular activating system, sleep physiology and EEG waveforms during sleep wake cycle
- Physiological basis of memory, learning and speech and clinical alterations in speech


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SEMESTER VI-PAPER II (THEORY)

PAPER CODE- MSCM0523S602T

SPECIAL SENSES

- Physiology of smell and its applied aspects
- Physiology of taste sensation and applied aspects
- Functional anatomy of ear and auditory pathways, vestibular apparatus and equilibrium
- Physiology of hearing, patho-physiology of deafness and hearing tests
- Functional anatomy of eye, visual pathway, light and pupillary reflex and clinical implication of lesions in visual pathway
- Physiology of image formation, refractive errors and physiological principles of its management
- Physiology of vision including colour vision and colour blindness

SEMESTER VI-PAPER III(THEORY)

PAPER CODE- MSCM0523S603T

RECENT ADVANCES AND OTHERS (SCIENTISTS AND THEIR CONTRIBUTION)

PRACTICAL / ABILITY ENHANCEMENT

Hematology:

- 1) Study of Compound Microscope
- 2) Determination of hemoglobin concentration of blood
- 3) Determination of total red blood cell count
- 4) Determination of total leucocyte count
- 5) Preparation and examination of peripheral blood smear and determination of differential leukocyte count
- 6) Determination of ABO and Rh blood groups
- 7) Determination of bleeding time and clotting time
- 8) Determination of platelet count
- 9) Determination of Reticulocytes count
- 10) Determination of Eosinophil count
- 11) Demonstration of osmotic fragility of erythrocytes and specific gravity of blood
- 12) Demonstration of erythrocyte sedimentation rate
- 13) Demonstration of packed cell volume
- 14) Calculation of the blood indices values

Amphibian Experiments

1 Introduction to animal experiments

2 Study of instruments and circuits

3 Amphibian nerve-muscle experiments

- (a) To study of excitable and contractile properties of a nerve muscle preparation
- (b) To study Simple muscle curve (SMC)
- (c) To study effect of temperature,
- (d) To study the effect of sub threshold, threshold and supra threshold stimuli on isotonic contraction 5. To study the effect of two or more successive stimuli and genesis of tetanus
- (e) To study isometric contraction and length tension relationship
- (f) Estimation of the work performed by skeletal muscle in vitro under after loaded and free loaded conditions
- (g) Study of neuromuscular transmission in an amphibian nerve muscle preparation under
- (h) Determination of strength duration curve in frog's nerve and muscle
- (i) Determination of conduction velocity
- (j) To study the phenomenon of Fatigue,
- (k) To study the genesis of tetanus

4 Amphibian Cardiac experiments

- a) To study the Normal cardiogram,
- b) To study the Effect of temperature,
- c) To Study the properties of cardiac muscle,
- d) To study the Effect of Stannius ligature,
- e) To study the All or none Law and summation,
- f) To Study the staircase phenomenon,
- g) To study the Extra systole and compensatory pause,
- h) To study the Effect of stimulation of Vagus and WCL,
- i) To study the Effect of drugs and ions on normal cardiogram
- j) Study of the factors controlling inotropic and chronotropic functions in isolated perfused frog's heart

Clinical & Human Examination:

- 1. Obtain history and perform general examination in the volunteer/ simulated environment
- 2. Perform Ergograph and calculate the work-done by a skeletal muscle
- 3. Obtain relevant history and conduct correct General and Clinical examination of the abdomen in a normal volunteer or simulated environment
- 4. Record blood pressure & pulse
 - At rest and
 - In different grades of exercise and
 - In different postures in a volunteer or simulated environment
- 5. Record and interpret normal ECG in a volunteer or simulated environment
- 6. Obtain relevant history and conduct General and Clinical examination of the cardiovascular system in a normal volunteer or simulated environment


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7. Obtain relevant history and conduct correct General and Clinical examination of the respiratory system in a normal volunteer or simulated environment
8. Perform Spirometry and interpret the findings (Digital /Manual)
9. Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment
10. Obtain relevant history and conduct correct General and Clinical examination of the nervous system:
 - Higher functions,
 - sensory system,
 - motor system,
 - Reflexes in a normal volunteer or simulated environment
11. Obtain relevant history and conduct correct General and Clinical examination of the cranial nerves in a normal volunteer or simulated environment
12. Visual acuity
13. cardiovascular autonomic function tests

Dissertation

Pedagogy

Identifying several situations same and able to dissertation work, writing a proposal and making a presentation to the Dissertation faculty advisory committee. Reporting to the committee on the progress of research work periodically. Making use of a variety of research methods. Defending the inference before the Examining Committee.

Contents

Every student will do a detailed study on the topic selected for the dissertation, and is expected to prepare a two or three proposals which he intends to take up for the Dissertation. Faculty will examine this and decide on the topic of dissertation.

The Process involves:

1. Formulation of objectives and hypothesis
2. Review of literature
3. Designing the tool for data collection
4. Data collection
5. Coding, classifying and analysis of data
6. Inferences, conclusions and recommendations
7. Preparing a bibliography
8. Writing the dissertation and submission


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Paper Code

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MODEL PAPER

M. Sc. (Medical)

**Physiology/Pharmacology/Microbiology/
Biochemistry/Anatomy**

Semester I

Examination (Month/ year)

Paper - I

Anatomy

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15 = 30

Q1. Describe Synovial joints under following headings:

(2.5+10+2.5)

(i) Components and Structure of joint (ii) Classification of synovial joint (iii) Factors providing stability to joint.

Q2. Describe central nervous system under the following headings:

(10+2.5+2.5)

(i) Parts and their functions (ii) Cells present in CNS (iii) Functions of cerebellum

Q3. Classify bones with examples and describe blood supply of long bone (10+5)

2. Short Essa (Attempt any two)

2x15=30

A. Describe Compact and cancellous bones with examples

B. Components of respiratory system with functions.

C. Parts of female reproductive system with functions.

3. Write short notes on: (Any Four)

20 (5x4)

(A) Types of cartilages

(B) Compare functions of sympathetic and Parasympathetic nervous system

(C) Contribution of A. Vesalius in study of anatomy

(D) Types of anastomosis between blood vessels

(E) Types of muscles with examples.

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MODEL PAPER**M. Sc. (Medical)****Physiology/Pharmacology/Microbiology/****Biochemistry/Anatomy****Semester I****Examination (Month/ year)****Paper - II****Physiology****Time: Three Hours****Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)**2X15=30**

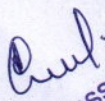
1. Describe Classification of Reflexes & Describe in detail Stretch Reflex
2. Define erythropoiesis. List the different stages of erythropoiesis. Describe factors necessary for erythropoiesis
3. Define cardiac output, how is it regulated? Give one method of measurement of cardiac output.

2. Short Answer Questions (Attempt any two):**10X2=20**

1. Homeostasis
2. Functions of Cerebellum
3. Oxygen hemoglobin dissociation curve.

3. Short Notes (Any four)**5X4=20**

1. Reninangiotensin system.
2. Blood Brain Barrier
3. Actions of parathormone.
4. Accommodation reflex
5. Spermatogenesis


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MODEL PAPER**M. Sc. (Medical)****Physiology/Pharmacology/Microbiology/
Biochemistry/Anatomy****Semester I****M. Sc. (Medical) Physiology****Examination (Month/ year)****Paper - III****Biochemistry****Time: Three Hours****Maximum Marks: 70**

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)**2X15=30**

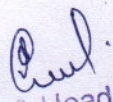
- A. With the help of flow chart describe in detail about Glycolysis. Write its energetics
- B. Explain all the reactions of Urea Cycle. Add a note on Ammonia toxicity
- C. Enumerate Beta-oxidation with the help of flow chart. Also write the energetics of Palmitic acid.

2. Short Essay (Attempt any 2)**2x10=20**

- A. Classification of Carbohydrate
- B. Write the biochemical function, RDA and deficiency disorders of Vitamin A
- C. Factors affecting enzyme activity

3. Short notes (Attempt any 4)**4x5=20**

- A. Calcium Homeostasis
- B. Chromatography
- C. Functions of Mitochondria
- D. Structure of DNA
- E. Thyroid Function Test


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MODEL PAPER

M. Sc. (Medical)

Physiology

Semester II

Examination (Month/ year)

Paper - I

Pathology

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Describe anemia with its classification. Discuss in detail about Sickle cell Anemia.
- B. Describe and Define cell injury along with its Causes. Write in detail about Reversible and irreversible injury.
- C. Define neoplasia along with its nomenclature. Write in brief about carcinogenesis and metastasis.

2. Short Essay (Attempt any two)

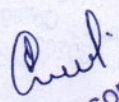
2x10=20

- A. Factors affecting wound healing
- B. Difference between Acute and Chronic inflammation
- C. Difference between benign and malignant neoplasm

3. Short notes (Attempt Any four)

4x5=20

- A. Renal Function Test
- B. Liver Function Test
- C. Pancreatic Function Test
- D. Lab investigation of haemorrhagic disorders
- E. Discuss Diabetes Mellitus


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MODEL PAPER

M. Sc. (Medical)
**Physiology/Pharmacology/Microbiology/
Biochemistry/Anatomy**
Semester II
Examination (Month/ year)

Paper - II

Microbiology

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Define Sterilization. How does it differ from disinfection? Classify the various agents used in sterilization. Add a note on the principle and functioning of autoclave.
- B. Explain the structural components of bacterial cell with well labelled diagram. Write a note on bacterial growth curve.
- C. Describe the method of collection and processing of blood specimen for bacterial culture and sensitivity.

2. Short Essay (Attempt any two)

2x10=20

- A. Kirby-Bauer Disc Diffusion method
- B. Anaerobic culture methods
- C. Biological safety cabinet

3. Short notes (Attempt any four)

4x5=20

- A. Polymerase chain reaction
- B. Dark ground microscope
- C. Structure of Transposon
- D. Methods of Cultivation
- E. Recombinant DNA Technology


Professor & Head
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Jaipur-302022

Paper Code

MSCM0123S203T

MSCM0223S203T

MSCM0323S203T

MSCM0423S203T

MSCM0523S203T

MODEL PAPER

M. Sc. (Medical)

Physiology/Pharmacology/Microbiology/

Biochemistry/Anatomy

Semester II

Examination (Month/ year)

Paper - III

Pharmacology

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. What are the possible targets of drug action? Describe the G proteins as targets of action for different drugs.
- B Define Adverse drug reactions and classify them. Describe the roles and responsibilities of Pharmacovigilance program of India.
- C Classify diuretics. Explain the pharmacological action of loop diuretics.

2. Short Essay (Attempt any Two)

2X10 = 20

- A. Explain Essential drug concept.
- B Describe Factors Modifying Drug Action.
- C Explain pharmacological actions of Adrenaline.

3. Short notes (Attempt Any four)

4X5 = 20

- A. Newer drug delivery systems
- B. Therapeutic drug monitoring
- C. Clinical significance of Pharmacogenomics.
- D. Parenteral routes of drug administration
- E. Pharmacological actions of antidepressants

Prof.
Professor & Head
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Jaipur-302022

MSCM0523S301T

MODEL PAPER

**M. Sc. (Medical)
Physiology
Semester III
Examination (Month/ year)**

Paper - I

Cell Physiology & Muscle Nerve Physiology

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

1. Define Homeostasis. Describe various homeostatic control mechanisms.
2. Describe various methods of transport across cell membranewith the help of diagram.
3. Describe Molecular Basis of Skeletal Muscle Contraction with the help of diagram.

2. Short Answer Questions: (Attempt Any Two)

10×2 =20

1. What is Resting Membrane Potential. Explain its ionic basis.
2. Explain the properties of Nerve Fibers
3. Explain the distribution of fluids in various compartments of the body.

3. Short Notes (Attempt Any Four):

5X4 =20

1. Saltatory Conduction
2. Lambert Eaton Syndrome
3. Myasthenia Gravis
4. Gibbs Donnan Equilibrium
5. Apoptosis


Professor & Head
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MSCM0523S302T

MODEL PAPER

**M. Sc. (Medical)
Physiology
Semester III
Examination (Month/ year)**

Paper - II

Blood & its components

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Define erythropoiesis. List the different stages of erythropoiesis. Describe factors necessary for erythropoiesis.
- B. Describe the Immunity with development of cell-mediated Immunity.
- C. Describe Classification of Plasma proteins with its Properties & Functions.

2. Short Answer Questions: (Attempt Any Two)

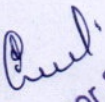
10X2=20

- A. Enlist various clotting factors. Add a note on Bleeding disorders.
- B. Describe ABO blood groups. Add a note on Transfusion reactions.
- C. Describe Reticuloendothelial system in detail.

3. Short Notes : (Attempt Any Four)

5X4=20

- A. Phagocytosis
- B. Arneeth count
- C. Role of calcium in blood coagulation.
- D. Thrombolytic mechanism.
- E. Autologous blood transfusion


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Jaipur-302022

Paper Code

MSCM0123S303T

MSCM0223S303T

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MSCM0423S303T

MSCM0523S303T

MODEL PAPER

M. Sc. (Medical)

Physiology

Semester III

Examination (Month/ year)

Paper - III

Biostatistics & Research Methodology

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

Q. 1. Long Answer (Attempt any two)

2X15=30

- A. Introduction to research methodology.
- B. Discuss about the biostatistics
- C. Describe Types of variables & scales of measurements.

Q. 2 Short Essay (Attempt any Two)

2X10 = 20

- A. Concept of probability distribution
- B. Basics of Testing of Hypothesis
- C. Describe Correlation & Regression

Q. 3 Short notes (Attempt Any four)

4X5 = 20

- A. Cluster randomization.
- B. Sampling & Non sampling errors
- C. Incidence & Prevalence
- D. Random & non- random sampling
- E. Methods of minimizing errors.

Professor *R. K. Mehta*
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MSCM0523S401T

MODEL PAPER

M. Sc. (Medical)

Physiology

Semester IV

Examination (Month/ year)

Paper - I

Cardiovascular System

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Define cardiac output; give its normal value how is it regulated? Give one method of measurement of cardiac output.
- B. Define cardiac cycle. Explain with the help of a diagram the mechanical and pressure changes during cardiac cycle.
- C. Describe in detail about regulation of blood pressure.

2. Short Answer Questions: (Attempt Any Two)

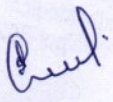
10X2=20

- A. Describe conducting system of heart.
- B. Define blood pressure. Draw a well labeled diagram showing innervations of heart.
- C. Define shock, classify its type. Add a note on hypovolemic shock.

3. Very Short Answer Questions (Attempt Any Four)

5X4=20

- A. Properties of cardiac muscle.
- B. Bainbridge reflex
- C. Triple response.
- D. Auscultatory gap
- E. Coronary circulation


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MSCM0523S402T

MODEL PAPER

**M. Sc. (Medical)
Physiology
Semester IV
Examination (Month/ year)**

Paper - II

Respiratory System

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Explain mechanism of breathing. Describe the nervous regulation of respiration.
- B. What is hypoxia? Describe the types, causes and effects of hypoxia. Add a note on Hyperbaric oxygen therapy.
- C. Describe the changes in the body at high altitude and explain the acclimatization.

2 Short Answer Questions: (Attempt Any Two)

10X2=20

- A. Describe Non-respiratory functions of respiratory system.
- B. Explain Oxygen hemoglobin dissociation curve.
- C. Write in detail about the methods of Artificial respiration.

3 Short Notes (Any Four)

5X4=20

- A. J receptors
- B. sleep apnea syndrome
- C. Cough reflex
- D. Surfactant
- E. CO₂ dissociation curve


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MSCM0523S403T

MODEL PAPER

M. Sc. (Medical)

Physiology

Semester IV

Examination (Month/ year)

Paper - III

Digestive System

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Describe composition and functions of pancreatic juice.
- B. Give the composition of gastric juice? Describe the mechanism of HCl secretion. Give a detailed account on the regulation of gastric secretion.
- C. Explain movements of small intestine.

2 Short Answer Questions: (Attempt Any Two)

10X2=20

- A. Explain enteric nervous system.
- B. Describe in detail functions of liver.
- C. Describe in detail all gastro intestinal hormones.

3 Short Notes (Attempt Any Four)

5X4=20

- A. Gastric emptying
- B. Defecation reflex
- C. Functions of saliva.
- D. Dietary fibers
- E. Absorption of fats


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MSCM0523S501T

MODEL PAPER

M. Sc. (Medical)

Physiology

Semester V

Examination (Month/ year)

Paper - I

Reproductive System

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Explain stages of Spermatogenesis. Add a note on the factors affecting it.
- B. Describe hormonal and uterine changes during different phases of Menstrual Cycle.
- C. Describe ovarian and vaginal changes during different phases of Menstrual Cycle.

2. Short Answer Questions:(Attempt Any Two)

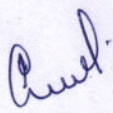
10X2=20

- A. Describe briefly feto placental unit
- B. Explain mechanism of action of oral contraceptive pill
- C. List the secondary sexual characters in males and females.

3. Short notes (Attempt Any four)

5X4=20

- A. Sucking reflex
- B. Cryptorchidism
- C. Hormonal control of Lactation.
- D. Indication of ovulation
- E. Contraceptive methods in males


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MSCM0523S502T

MODEL PAPER

**M. Sc. (Medical)
Physiology
Semester V
Examination (Month/ year)**

Paper - II

Endocrinal Physiology

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Describe in detail the synthesis and functions of thyroid hormones. Add a note on Hypothyroidism.
- B. Describe mechanism of insulin secretion and its regulation and add functions of insulin
- C. Mention normal blood calcium level. Explain how blood calcium levels are regulated.

2. Short Answer Questions: (Attempt Any Two)

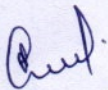
10X2=20

- A. Describe the metabolic actions of cortisol
- B. Enumerate the hormones secreted by anterior pituitary gland. Describe the actions of growth hormone.
- C. Explain the actions of Glucocorticoids

3. Short Notes (Attempt Any Four)

5X4=20

- A. Cushing's syndrome.
- B. Grave's disease
- C. Atrial natriuretic peptide (ANP)
- D. Neuro-endocrine reflex
- E. Function of any one hormone of posterior pituitary


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MSCM0523S503T

MODEL PAPER

**M. Sc. (Medical)
Physiology
Semester V
Examination (Month/ year)**

Paper - III

Renal System

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Describe the mechanism of urine formation.
- B. What is countercurrent mechanism? Describe the anatomical and physiological basis of countercurrent mechanism in kidney.
- C. Draw a labeled diagram showing nerve supply to the urinary bladder. Explain mechanism of micturition.

2. Short Answer Questions: (Any Two)

(10X2)=20

- A. Describe theories of auto regulation
- B. Role of kidney in maintaining acid base balance.
- C. Write in Detail about non excretory function of kidney.

3. Short Notes: (Any Four)

(5X4)=20

- A. Dialysis
- B. Juxtaglomerular apparatus
- C. Factors affecting GFR
- D. Metabolic acidosis
- E. Nephrotic syndrome


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MSCM0523S601T

MODEL PAPER

**M. Sc. (Medical)
Physiology
Semester VI
Examination (Month/ year)**

Paper - I

Central Nervous System

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Classify sensory receptors. Explain Properties of Sensory Receptors.
- B. Describe Physiology of Pain, Pain Pathway, Gate Control Theory & Analgesic System.
- C. Functions of Basal Ganglia (Basal Nuclei) and describe Connections & Neuronal Circuits of Basal Ganglia.

2 Short Answer Questions: (Any Two)

(10X2)=20

- A. Explain the structure of a synapse, what are its types.
- B. Explain the sensory & motor changes in a hemisection of the spinal cord.
- C. Explain Physiology of Sleep Wake Cycle

3 Short Notes (Any Four)

(5X4)=20

- A. Stretch Reflex
- B. Clasp Knife Rigidity
- C. Implicit & Explicit Memory
- D. Thalamic Syndrome
- E. Blood Brain Barrier


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MSCM0523S602T

MODEL PAPER

**M. Sc. (Medical)
Physiology
Semester VI
Examination (Month/ year)**

Paper - II

Special Senses

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

(2X15)=30

- A. Trace the visual pathway and the effects of lesion at various points in the pathway.
- B. Name the primary colors. Explain how the color is perceived by human eye. Add a note on color blindness & diagnostic tests for color vision.
- C. Describe, auditory pathway and process of transduction of sound waves in inner ear. Add a note on conduction deafness or hearing loss.

2 Short Answer Questions: (Any Two)

(10X2)=20

- A. Errors of refraction
- B. Organ of corti
- C. Physiology of olfaction

3 short Notes (Any Four)

(5X4)=20

- A. Schematic eye
- B. Functions of Aqueous humor
- C. Structure of taste bud
- D. Glaucoma
- E. Argyll Robertson's pupil

Yoni

Amel
Professor & Head
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MODEL PAPER

MSCM0523S603T

M. Sc. (Medical)
Physiology
Semester VI
Examination (Month/ year)
Paper - III
Recent Advances and Others
(Scientists and their contribution)
Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)

2X15=30

- A. Describe the physiology of growth and its disorders.
- B. Describe various types of neuro-endocrine regulations.
- C. Write a note on mechanism of action of hormones on their target cells.

2. Short Answer Questions (Attempt any two):

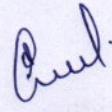
10X2=20

- A. Addison's Disease
- B. Insulin receptors
- C. Pavlov's Study

3. Short Notes (Any four)

5X4=20

- A. Claude Bernard
- B. BK Anand
- C. EEG
- D. Mirror neurons
- E. Deep sea diving


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