MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)
Grade 'A' Accredited by NAAC
Sector-01, Kamothe, Navi Mumbai -410 209
Tel 022-27432471, 022-27432994, Fax 022 -27431094
E-mail: registrar@mgmuhs.com; Website :www.mgmuhs.com

Curriculum for

Second M.B.B.S
Microbiology

Amended upto BOM 57/2019, Dated 26/04/2019

Amended History

1. Approved as per BOM 04/2007, Item No. 4, Dated 14/12/2007.
2. Amended upto BOM 23/2012, resolution No. 4, dated 30/03/2012.
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9. Amended upto BOM 55/2018, Resolution No. 4.5.2.1, Resolution No. 4.5.2.2, Resolution No. 4.5.2.3, Resolution No. 4.13, Dated 27/11/2018.
10. Amended upto BOM 57/2019, Resolution No. 3.1.4.2, dated 26/04/2019.

GENERAL CONSIDERATIONS AND TEACHING APPROACH

(1) Graduate medical curriculum is oriented towards training students to undertake the responsibilities of a physician of first contact who is capable of looking after the preventive, promotive, curative & rehabilitative aspect of medicine.

(2) With wide range of career opportunities available today, a graduate has a wide choice of career opportunities. The training, though broad based and flexible should aim to provide an educational experience of the essentials required for health care in our country.

"Training should be able to meet internationally acceptable standards."

(3) To undertake the responsibilities of service situations which is a changing condition and of various types, it is essential to provide adequate placement training tailored to the needs of such services as to enable the graduates to become effective instruments of implementation of those requirements. To avail of opportunities and be able to conduct professional requirements, the graduate shall endeavour to have acquired basic training in different aspects of medical care.

(4) The importance of the community aspects of health care and of rural health care services is to be recognized. This aspect of education & training of graduates should be adequately recognized in the prescribed curriculum. Its importance has been systematically upgraded over the past years and adequate exposure to such experiences should be available throughout all the three phases of education & training. This has to be further emphasized and intensified by providing exposure to field practice areas and training during the internship period. The aim of the period of rural training during internship is to enable the fresh graduates to function efficiently under such settings.

(5) The educational experience should emphasize health and community orientation instead of only disease and hospital orientation or being concentrated – on - curative - aspects. As such all the basic concepts of modern scientific medical education are to be adequately dealt with.

(6) There must be enough experiences to be provided for self learning. The methods and techniques that would ensure this must become a part of teaching - learning process.

(7) The medical graduate of modern scientific medicine shall endeavour to become capable of functioning independently in both urban and rural environment. He/she shall endeavour to give emphasis on fundamental aspects of the subjects taught and on common problems of health and disease avoiding unnecessary details of specialization.

(8) The importance of social factors in relation to the problem of health and diseases should receive proper emphasis throughout the course and to achieve this purpose, the

educational process should also be community based than only hospital based. The importance of population control and family welfare planning should be emphasized throughout the period of training with the importance of health and development duly emphasized.

(9) Adequate emphasis is to be placed on cultivating logical and scientific habits of thought, clarity of expression and independence of judgment, ability to collect and analyze information and to correlate them.

(10) The educational process should be placed in a historic background as an evolving process and not merely as an acquisition of a large number of disjointed facts without a proper perspective. The history of Medicine with reference to the evolution of medical knowledge both in this country and the rest of the world should form a part of this process.

(11) Lectures alone are generally not adequate as a method of training and are a poor means of transferring/acquiring information and even less effective at skill development and in generating the appropriate attitudes. Every effort should be made to encourage the use of active methods related to demonstration and on firsthand experience. Students will be encouraged to learn in small groups, through peer interactions so as to gain maximal experience through contacts with patients and the communities in which they live. While the curriculum objectives often refer to areas of knowledge or science, they are best taught in a setting of clinical relevance and hands on experience for students who assimilate and make this knowledge a part of their own working skills.

(12) The graduate medical education in clinical subjects should be based primarily on out-patient teaching, emergency departments and within the community including peripheral health care institutions. The out-patient departments should be suitably planned to provide training to graduates in small groups.

(13) Clinics should be organized in small groups of preferably not more than 10 students so that a teacher can give personal attention to each student with a view to improve his skill and competence in handling of the patients.

(14) Proper records of the work should be maintained which will form the basis for the students' internal assessment and should be available to the inspectors at the time of inspection of the college by the Medical Council of India.

(15) Maximal efforts have to be made to encourage integrated teaching between traditional subject areas using a problem based learning approach starting with clinical or community cases and exploring the relevance of various preclinical disciplines in both understanding and resolution of the problem. Every attempt be made to de-emphasize compartmentalization of disciplines so as to achieve both horizontal and vertical integration in different phases.

(16) Every attempt is to be made to encourage students to participate in group discussions and seminars to enable them to develop personality, character, expression and other faculties which are necessary for a medical graduate to function either in solo practice or as a team leader when he begins his independent career. A discussion group should not have more than 20 students.

(17) Faculty member should avail of modern educational technology while teaching the students and to attain this objective, Medical Education Units/ Departments be established in all medical colleges for faculty development and providing learning resource material to teachers.

(18) To derive maximum advantage out of this revised curriculum, the vacation period to students in one calendar year should not exceed one month, during the 4 ½ years Bachelor of Medicine and Bachelor of Surgery (MBBS) Course.

(19) In order to implement the revised curriculum in Toto, State Govts. and Institution Bodies must ensure that adequate financial and technical inputs are provided.

(20) HISTORY OF MEDICINE –The students will be given an outline on "History of Medicine". This will be taught in an integrated manner by subject specialists and will be coordinated by the Medical Education Unit of the College.

(21) All medical institutions should have curriculum committee which would plan curricula and instructional method which will be regularly updated.

(22) Integration of ICT in learning process will be implemented.

OBJECTIVE OF MEDICAL GRADUATE TRAINING PROGRAMME:

(1) **NATIONAL GOALS** : At the end of undergraduate program, the medical student should be able to :

(a) Recognize 'health for all' as a national goal and health right of all citizens and by undergoing training for medical profession fulfill his/her social obligations towards realization of this goal.

(b) Learn every aspect of National policies on health and devote himself / herself to its practical implementation.

(c) Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.

(d) Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living.

(e) Become exemplary citizen by observation of medical ethics and fulfilling social and professional obligations, so as to respond to national aspirations.

(2) **INSTITUTIONAL GOALS**: (1) In consonance with the goals each medical institution should evolve institutional goals to define the manpower (or professionals) they intend to produce. The undergraduate students coming out of a medical institute should:

(a) Be competent in diagnosis and management of common health problems of the individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations.

(b) Be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems.

(c) Appreciate rationale for different therapeutic modalities; be familiar with the administration of the "essential drugs" and their common side effects.

(d) Be able to appreciate the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the patients in discharging one's professional responsibilities.

(e) Possess the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine, action research and documentation skills.

(f) be familiar with the basic factors which are essential for the implementation of the National Health Programmes including practical aspects of the following:-

(i) Family Welfare and Material and Child Health(MCH)

(ii) Sanitation and water supply

(iii) Prevention and control of communicable and non-communicable diseases
(iv) Immunization
(v) Health Education
(vi) IPHS standard of health at various level of service delivery, medical waste disposal.
(vii) Organizational institutional arrangements.

(g) Acquire basic management skills in the area of human resources, materials and resource management related to health care delivery, General and hospital management, principal inventory skills and counseling

(h) Be able to identify community health problems and learn to work to resolve these by designing, instituting corrective steps and evaluating outcome of such measures.

(i) Be able to work as a leading partner in health care teams and acquire proficiency in communication skills.

(j) Be competent to work in a variety of health care settings.

(k) Have personal characteristics and attitudes required for professional life such as personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.

All efforts must be made to equip the medical graduate to acquire the skills as detailed as under:

A comprehensive list of skills recommended as desirable for Bachelor of Medicine and Bachelor of Surgery (MBBS) Graduate:

1. **Clinical Evaluation:**

(a) To be able to take a proper and detailed history.
(b) To perform a complete and thorough physical examination and elicit clinical signs.
(c) To be able to properly use the stethoscope, Blood Pressure, Apparatus Auroscope, Thermometer, Nasal Speculum, Tongue Depressor, Weighing Scales, Vaginal Speculum etc.:
(d) To be able to perform internal examination-Per Rectum (PR), Per Vaginum (PV) etc.
(e) To arrive at a proper provisional clinical diagnosis.

II. **Bed side Diagnostic Tests:**

(a) To do and interpret Haemoglobin (HB), Total Count (TC), Erythrocytic Sedimentation Rate (ESR), Blood smear for parasites, Urine examination /albumin /sugar /ketones /microscopic:
(b) Stool exam for ova and cysts;
(c) Gram, staining and Siehl-Nielsen staining for AFB;
(d) To do skin smear for lepra bacilli
(e) To do and examine a wet film vaginal smear for Trichomonas
(f) To do a skin scraping and Potassium Hydroxide (KOH) stain for fungus infections;
(g) To perform and read Montoux Test.

III. **Ability to Carry Out Procedures:**

(a) To conduct CPR (Cardiopulmonary resuscitation) and First aid in newborns, children and adults.
(b) To give Subcutaneous (SC) /Intramuscular (IM) /Intravenous (IV) injections and start Intravenous (IV) infusions.
(c) To pass a Nasogastric tube and give gastric leavage.
(d) To administer oxygen-by masic/catheter
(e) To administer enema
(f) To pass a ruinary catheter-male and female
(g) To insert flatus tube
(h) To do pleural tap, Ascitic tap & lumbar puncture
(i) Insert intercostal tube to relieve tension pneumothorax
(j) To control external Haemorrhage.

IV Anaesthetic Procedure

(a) Administer local anaesthesia and nerve block

(b) Be able to secure airway potency, administer Oxygen by Ambu bag.

V **Surgical Procedures**

(a) To apply splints, bandages and Plaster of Paris (POP) slabs;
(b) To do incision and drainage of abscesses;
(c) To perform the management and suturing of superficial wounds;
(d) To carry on minor surgical procedures, e.g. excision of small cysts and nodules, circumcision, reduction of paraphimosis, debridement of wounds etc
(e) To perform vasectomy;
(f) To manage anal fissures and give injection for piles.

VI Mechanical Procedures

(a) To perform thorough antenatal examination and identify high risk pregnancies.
(b) To conduct a normal delivery;
(c) To apply low forceps and perform and suture episiotomies;
(d) To insert and remove IUD's and to perform tubectomy

VII **Paediatrics**

(a) To assess new borns and recognize abnormalities and I.U. retardation
(b) To perform Immunization;
(c) To teach infant feeding to mothers;
(d) To monitor growth by the use of 'road to health chart' and to recognize development retardation;
(e) To assess dehydration and prepare and administer Oral Rehydration Therapy (ORT)
(f) To recognize ARI clinically;

VIII **ENT Procedures:**

(a) To be able to remove foreign bodies;
(b) To perform nasal packing for epistaxis;
(c) To perform trachesotomy

IX **Ophthalmic Procedures:**

(a) To invert eye-lids;
(b) To give Subconjunctival injection;
(c) To perform appellation of eye-lashes;
(d) To measure the refractive error and advise correctional glasses;
(e) To perform nasolacrimal duct syringing for potency

X. **Dental Procedures:**

To perform dental extraction

XI **Community Healthy**:

(a) To be able to supervise and motivate, community and para-professionals for corporate efforts for the health care;
(b) To be able to carry on managerial responsibilities, e.g. Management of stores, indenting and stock keeping and accounting
(c) Planning and management of health camps;
(d) Implementation of national health programmes;
(e) To effect proper sanitation measures in the community, e.g. disposal of infected garbage, chlorination of drinking water;
(f) To identify and institute and institute control measures for epidemics including its proper data collecting and reporting.

XII **Forensic Medicine Including Toxicology**

(a) To be able to carry on proper medico legal examination and documentation of injury and age reports.
(b) To be able to conduct examination for sexual offences and intoxication;
(c) To be able to preserve relevant ancillary material for medico legal examination;
(d) To be able to identify important post-mortem findings in common un-natural deaths.

XIII **Management of Emergency**

(a) To manage acute anaphylactic shock;
(b) To manage peripheral vascular failure and shock;
(c) To manage acute pulmonary oedema and LVF;
(d) Emergency management of drowning, poisoning and seizures
(e) Emergency management of bronchial asthma and status asthmaticus;
(f) Emergency management of hyperpyrexia;
(g) Emergency management of comatose patients regarding airways, positioning prevention of aspiration and injuries
(h) Assess and administer emergency management of burns

Syllabus for
MICROBIOLOGY

INDEX

BROAD CURRICULUM AS PER MCI GUIDELINES (MICROBIOLOGY)

i) GOAL

The broad goal of the teaching of undergraduate students Microbiology is to provide an understanding of the natural history of infectious disease in order to deal with the etiology, pathologenesis, laboratory diagnosis, treatment and control of infections in community.

ii) OBJECTIVES

a. KNOWLEDGE

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

1) State the infective micro-organisms of the human body and describe the host parasite relationship.
2) List pathogenic micro-organisms (bacteria, viruses, parasites, fungi) and describe the pathogenesis of the diseases produced by them.
3) State or indicate the modes of transmission of pathogenic and opportunistic organisms and their sources, including insect vectors responsible for transmission of infection.
4) Describe the mechanisms of immunity to infections.
5) Acquire knowledge on suitable antimicrobial agents for treatment of infections and scope of immunotherapy and different vaccines available for prevention of communicable diseases.
6) Apply methods of disinfection and sterilization to control and prevent hospital and community acquired infections.
7) Recommend laboratory investigations regarding bacteriological examination of food, water, milk and air.

b. SKILLS

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

1. Plan and interpret laboratory investigations for the diagnosis of infectious diseases and to correlate the clinical manifestations with the etiological agent.
2. Identify the common infectious agents with the help of laboratory procedures and use antimicrobial sensitivity tests to select suitable antimicrobial agents.

3. Perform commonly employed bed-side tests for detection of infectious agents such as blood film for malaria, filaria, gram staining and AFB staining and stool sample for ova cyst.
4. Use the correct method of collection, storage and transport of clinical material for microbiological investigations.

(b) INTEGRATION

The student should understand infectious diseases of national importance in relation to the clinical, therapeutic and preventive aspects.

IInd MBBS Syllabus for Microbiology, MGMIHS

GENERAL MICROBIOLOGY [n=17]

Sr. No.	Topic	MK	DK	NK	No. of Hrs.
1	**History & Microscopy**	√			1hr
	• Definitions of Medical Microbiology, Pathogen Commensal, Symbiotic infection,	√			
	• Contribution of Louis Pasture Robert Koch Lister	√			
	• Names of scientists who discovered common bacteria	√			
	• Importance of Microbiology	√			
2	**Morphology of bacteria I**	√			1hr
	• Difference between Prokaryotes & Eukaryotes	√			
	• Microscopy – Basic principles and applications of all microscopes	√			
	• Classification of staining techniques	√			
	• Gram's stain and ZN stain in detail(with examples)	√			
	• Negative staining, Impregnation method	√			
	• Albert's stain	√			
3	**Morphology II**	√			1hr
	• Morphology of Bacteria	√			
	• Bacterial cell anatomy in detail	√			
	• Bacterial Spore	√			

4	**Physiology of bacteria**				
	• Bacterial cell division, Generation time, Bacterial growth curve	√			
	• Bacterial growth requirements	√			1hr
	• Bacterial Metabolism		√		
5	**Sterilization**	√			2hrs
&	• Definitions of Sterilization, disinfection, asepsis, antiseptics	√			
6	• Need of Sterilization / Disinfection in various fields – Medical, Food & Pharma Industry	√			
	• Physical methods of Sterilization Sunlight, Heat (dry & moist heat), Filtration, Radiation in details	√			
	Working and efficacy testing of autoclave and hot air oven		√		
	Plasma sterilization central sterile supply department concept only			√	
7	**Disinfection**				1hr
	• Characteristics of ideal chemical disinfectant	√			
	• Factors influencing potency of a disinfectant	√			
	• Disinfectants like Aldehydes , Alcohols, phenols, Halogens, Oxidising agents, Salts, Surface Active Agent, Gases, Dyes (Concentration, Mode of action and uses only)	√			
	• Testing of Disinfectants		√		
8	**Culture Media**				1hr
	• Types of Media and their uses	√			
	• Composition of Media			√	

9	**Culture Methods**				1hr
	• Types of aerobic culture methods and their uses	√			
	• Types of anaerobic culture methods and their uses	√			
	• Mc Intosh Filde's Jar – Functioning and uses	√			
10	• **Identification of bacteria**	√			1hr
	• Morphology of bacteria (Gram stain), Motility	√			
	• Biochemical tests (Principle and examples)	√			
	• **Morphology of Bacterial Colony**		√		
	• Biochemical tests (Procedure)		√		
	• Typing Method		√		
	• Pathogenicity tests		√		
11	• Antimicrobial therapy Mode of action of antimicrobial agents Antibiotic Sensitivity tests : Kirby Bauer disc diffusion Importance of making an antibiotic Policy Strict Adherences to antibiotic Policy	√			1hr
	• Antibiotic Sensitivity tests: Stokes Disc diffusion E-test		√		
	• Dilution test MIC , MBC procedure other than Kirby- Baur AST testing			√	
12 & 13	**Bacterial Genetics** Basic structure of Bacterial DNA Definitions of Gene, Codon, Nonsense codons Extrachromosomal elements – Plasmids, Episomes, Transposons	√			2hr

	• Difference between Phenotypic & Genotypic variation (Mutation)	√			
	• Genetic Variation (Mutation) • Gene transfer (Transformation, Transduction, Lysogenic	√			
	• conversion, Conjugation)	√			
	• Differences between Mutational & Transferable drug resistance	√			
	• mechanism of drug resistance	√			
	• Synthesis of Polypeptide (Transcription and translation)			√	
	• Genetic Engineering		√		
	• DNA Probes		√		
	• PCR			√	
	• Gene therapy			√	
14	**Bio- medical waste disposal**				1hr
	• Definition of Biomedical waste	√			
	• Classification & disposal as per categories	√			
	• Importance of segregation	√			
15	**Universal Safety Precautions & health care associated infections**				1hr
	• Universal safety precautions	√			
	• Hand Hygiene	√			
	• Definition of Hospital acquired infection.	√			
	• Sources , types, prevention and control of health care associated infections	√			

16	**Normal microbial flora of human body**				1hr
	• Introduction – Various sites, types & role	√			
17	**Infection /** **Host parasite relationship**				1hr
	• Definitions of Saprophytes, Parasitic, Commensals, Pathogen, Opportunistic Pathogens, Pathogenicity, Virulence	√			
	• Types of infection, Routes of transmission	√			
	• Sources of Infection	√			
	• Difference between Exotoxins & Endotoxins	√			
	• Types of Infectious diseases Localized, Generalized, Endemic, Epidemic, Pandemic	√			
	• Factors Predisposing to Microbial Pathogenicity		√		

SYSTEMIC BACTERIOLOGY [n=29]

Sr. no.	Topic Must Know Subtopics	MK	DK	NK	No. of Hrs
1	**Staphylococci**	√			1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
	MRSA			√	
2	**Streptococci**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			

3	**Other streptococci and Pneumococci**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
	Group - B streptococci			√	
4	**Neisseria**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			

5	**C. diptheriae**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
	Diptheroides			√	
6	**M. tuberculosis**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
	MDR, XDR			√	

7	• Atypical mycobacteria • Name of the Species • Names of the diseases caused • Brief outline of lab diagnosis	√			1hr
	• Special tests for identification		√		
8	**M. leprae**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
9	**Bacillus** • Name of the Species • Names of the diseases caused • Brief outline of lab diagnosis	√			1hr
	• Special tests for identification		√		
10	• Method of anaerobiasis & Nonsporing anaerobes • Method of anaerobiasis • Nonsporing anaerobes { Name of the Species,Names of the diseases caused Brief outline of lab diagnosis }	√		,	1hr
	• Special tests for identification		√		

11	**Clostridium – I**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
12	**Clostridium – II**				
	A: Classification	√			
	B: Morphology	√			1hr
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
	Cl.botulinum		√		

13	**Enterobacteriacae – I** **(E. coli.)**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
14	**Enterobacteriacae – II** **Proteus & Klebsiella**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens				
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			

15	**Enterobacteriacae – III** **Salmonella**				1hr
	A: Classification			√	
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
	Antigenic variation		√		
16	**Shigella**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			

17	**Vibrio**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
	Halophilic vibrios		√		
18	**Campylobacter & Helicobacter** Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis	√			1hr
19	**Pseudomonas**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			

	I: Special identification tests	√			
	Burkholderia species			√	
20	**Other GNB I** (Yersinia, Pasteurella, Francisella, Bordetella)				1hr
	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis	√			
	Pastaurella & Francisella - infections caused			√	
21	**Other GNB II** (Haemophilus, Brucella)				1hr
	Name of the Species Names of the diseases caused Brief outline of lab diagnosis	√			
	Special tests for identification		√		
22	**Miscellaneous Bacteria** (Newer bacteria's)				1hr
	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis	√			
23	**Spirochaete - I** (Treponema species)				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests		√		

24	**Spirochaete –II (Borrelia, Leptospira)**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			
25	**Actinomycete and Nocardia**				1hr
	A: Classification	√			
	B: Morphology	√			
	C: Culture Characteristics	√			
	D: Biochemical reactions		√		
	E: Antigens	√			
	F: Pathogenesis & diseases caused in detail	√			
	G: Laboratory diagnosis	√			
	H: Prevention & control	√			
	I: Special identification tests	√			

26	**Rickettsia**				1hr
	• Name of the Species • Names of the diseases caused • Special tests for identification • Brief outline of lab diagnosis	√			
27	**Chlamydia**				1hr
	• Name of the Species • Names of the diseases caused • Brief outline of lab diagnosis	√			
28	**Mycoplasma**				1hr
	• Name of the Species • Names of the diseases caused • Brief outline of lab diagnosis	√			
	• Special tests for identification		√		
29	**Bacteriology of water, Air & Milk**	√			1hr
	• Bacteriological Examination of Air Acceptable limit of Air pollution				
	• **Bacterial flora in water** Water Borne Pathogens Bacteriological Examination of water Milk Borne diseases Bacteriological Examination of milk		√		
	• **Procedures for bacteriological examination of milk & water**			√	

MYCOLOGY [n=4]

Sr. No.	Topic	MK	DK	NK	No. of Hrs
1	**Introduction to mycology** • Introduction to Mycology • Difference between fungus & Bacteria • Classification of fungi with examples • Reproduction & Sporulation • Lab diagnosis of mycosis • Classification of Fungal diseases	√			1hr
2	**Agents of superficial mycosis (Dermatophytes)** • **Superficial Mycosis** a. Enumerate agents b. Predisposing factors c. Lab diagnosis (Outline)	√			1hr
	• Colony characteristics of dermatophytes		√		
3	**Subcutaneous mycosis & Candida** • **Subcutaneous Mycosis & Candida in detail** a. Enumerate agents b. Predisposing factors c. Lab diagnosis (Outline)	√			1hr
4	**Systemic mycosis & opportunistic fungal infections & P. Carinii** • **Systemic & Opportunistic Mycosis** a. Enumerate agents b. Predisposing factors c. Candida, Cryptococcus in detail d. Mucor, Aspergillus	√			1hr
	• **Histoplasma**		√		
	• **P. Carinii** • **Mycetism**			√	

VIROLOGY [n=16]

Sr.no.	Topic	MK	DK	NK	No.of hrs
1	**General virology – I**				1hr
	Morphology of Viruses • Replication of viruses	√			
	• Chemical properties of viruses • Susceptibility to physical and chemical agents • Viral Haemagglutinin		√		
2	**General virology – II**				1hr
	• Cultivation of Viruses ,Viral assays • Outline of diagnosis of viral diseases	√			
3	**Virus-host interactions**				1hr
	• Inclusion Bodies • Routes of transmission of viral infections • Interferons • Immunity in viral diseases	√			
	• Host responses to virus infections		√		
4	**Viral vaccines and antiviral agents**				1hr
	• Commonly used viral vaccines a. Types and Schedule • List of antiviral agents.	√			
	Mode of preparation • Chemoprophylaxis		√		
	• Chemotherapy of viral diseases			√	

5	**Pox viruses**				1hrs
	Bacteriophage • Morphology • Names of poxviruses and diseases caused • Bacteriophage[Basic structure and Significance]	√			
	• Cultivation		√		
6	**Herpes simplex & Varicella zoster CMV, EBV**				1hr
	• Morphology • Classification • HSV (Infections caused and Lab diagnosis) • Varicella – Zoster (Infections caused and Lab diagnosis)	√			
	• EBV (Infections caused and Lab diagnosis) • CMV (Infections caused and Lab diagnosis		√		
7	**Other DNA viruses**				1hr
	(Papova, Adeno,) Basic morphology, diseases caused	√			
	Outline of lab diagnosis		√		
8	**Orthomyxoviruses**				1hr
	• Differences between Orthomyxo & paramyxo viruses • Influenza Virus a. Morphology b. Antigenic classification and structure c. Antigenic shift and Antigenic drift d. Pathogenesis and lab diagnosis	√			
	• Influenza Virus		√		
	• Antigenic classification Prophylaxis		√		
	• Bird flu, Swine flu			√	

9	**Paramyxoviruses**				1h
	• Morphology • Measles virus and Mump Virus	√			
	• Parainfluenza virus • RSV		√		
10	**Picornaviruses**				1hr
	• Classification • Polio virus in detail • Differences between killed and live vaccines • Eradication and Prophylaxis of Polio virus	√			
	• Coxsackie viruses		√		
	• Rhino virus			√	
11	**Hepatitis viruses**				1hr
	• HAV (Pathogenesis and Lab diagnosis) • HBV (Morphology, Mode of transmission, Clinical features, Lab diagnosis) • HCV (Morphology, Mode of transmission, Clinical features, Lab diagnosis) • HDV & HEV (Pathogenesis & Lab diagnosis)	√			
12	**Arboviruses**				1hr
	• Classification , Names of Arboviruses and diseases caused • Dengue Virus in detail	√			
	• JE yellow fever KFD		√		
13	**Rhabdoviruses**				1hr

	• Morphology • Pathogenesis and Lab diagnosis • Prophylaxis	√			
14	**Retro Viruses – HIV**				1hr
	• Morphology • Resistance • Modes of Transmission • Pathogenesis • Opportunistic infections and malignancies • Lab diagnosis in detail • Prevention • PEP • Viral genes & antigens	√			
	• ART		√		
	• Strategies for HIV testing			√	
15	**Miscellaneous viruses**				1hr
	• Viruses (Only names) causing gastroenteritis • Viruses causing viral hemorrhagic fevers (only names) • Slow virus diseases (Only names)	√			
16	**Oncogenic viruses**	√			1hr
	Papilloma Virus • Only names of oncogenic viruses and malignancies caused	√			

IMMUNOLOGY [n=12]

Sr. No.	Topic	MK	DK	NK	No. of Hrs
1	**Immunity**				1hr
	• Innate Immunity – Types, Factors influencing innate immunity, Mechanisms • Acquire Immunity - a. Active Immunity b. Passive Immunity • Combined immunization • Adoptive immunity • Local Immunity	√			
	• Herd Immunity		√		
2	**Antigen**				1hr
	• Types of Antigens • Factors determining antigenicity	√			
	• Super antigens		√		
3	**Antibody**				1hr
	• Properties of antibodies • Structure of Immunoglobulin classes • IgG, IgM, IgA, IgD, IgE a) Basic structure, function & distribution	√			
	• IgG, IgM, IgA, IgD, IgE Mol. Wt., Sedimentation Coefficient		√		
	• Abnormal Immunoglobulins			√	

4	**Complement**				1hr
	• Components of complement • Classical Pathway • Alternative Pathway • Biological effects of complement • Deficiencies of complement	√			
	• Regulation of complement activation • Biosynthesis of Complement • Quantitation of complement		√		
5 & 6	**Ag-Ab reactions I** • Types of Ag – Ab reactions, precipitation, Agglutination, CFT, Neutralization, Opsonisation, Immunoflourescence, ELISA Immunochromatography (Principle, Types & uses only)	√			2hrs
7	**Structure & function of Immune system**				1hr
	• Central Lymphoid Organs • Peripheral Lymphoid Organs • Cells of Lymphoreticular System • HLA • Differences between T & B cells	√			
	• Lymphocytic recirculation		√		
8	**Immune response**				1hr
	• Humoral Immune Response Primary and secondary responses Production of Antibodies Factors influencing antibody production • Cell mediated Immune Response Cytokines & Lymphokines – Types & functions only	√			
	• Cell mediated Immune Response Detection of CMI • Immunological tolerance		√		
	• Monoclonal antibodies		√		

9	**Hypersensitivity**				1 r
	• Definition & Classification • Type 1 Reaction • Differences between Immediate & delayed hypersensitivity • Type 2, 3 & 4 Reactions	√			
10	**Autoimmunity**				1hr
	• Definition & Mechanisms • Classification with examples	√			
11	**Immunodeficiency diseases**				1hr
	• Definition, classification and examples of diseases	√			
	• Laboratory test for detection.			√	
12	• Transplantation & Tumor immunity • Types of Transplants • Allograft reaction • Histocompatibility Antigens • Histocompatibility Testing • Graft - Versus – Host reaction • Tumor antigens	√			1hr
	• Immunosurveillance		√		
	• Immune response to malignancy • Immunotherapy of cancer			√	

PARASITOLOGY [n=10]

Sr. no.	Topic	MK	DK	NK	No. of Hrs.
1	**Introduction to parasitology**				1hr
	• Classification of Parasites • Type of Parasites • Hosts (Definitive & Intermediate) • Host – Parasitic relationship • Sources of Infection • Lab diagnosis in general	√			
2	**E.Histolytica**				1hr
	• Morphology • Life cycle • Pathogenesis & Complications • Lab diagnosis & treatment • Non Pathogenic amoebae • Free living amoebae	√			
3	**Giardia, Trichomonas**				1hr
	• Giardia lamblia (Morphology, life Cycle, Pathogenesis, Lab diagnosis & treatment) • Trichomonas vaginalis (Morphology Pathogenesis, Lab diagnosis & treatment	√			
4	**Malaria**				1hr
	• Life Cycle, Morphology, Pathogenecity & Lab diagnosis, prevention	√			
5	**Haemoflagellates**				1hr
	• Leishmania (Classification, diseases caused) L. donovani in details Morphology, Lifecycle, Pathogenesis, Lab diagnosis	√			

	Trypanosomes		√			
6	**Miscellaneous protozoa**					1hr
	• Toxoplasma (Morphology life Cycle, Pathogenesis, Lab diagnosis) Cryptosporidium, Isospora	√				
	B.coli			√		
7	**Cestodes**					1hr
	• Taenia & Echinococcus (Morphology life Cycle, Pathogenecity, Lab diagnosis)	√				
	• Brief mention about other cestodes		√			
8	**Trematodes**					1hr
	• Schistosomes Names & diseases caused	√				
	• Morphology, Life Cycle, Pathogenicity & Lab diagnosis • Fasciola hepatica • Parognimus westermani		√			
9	**Nematodes (Intestinal) I**					1hr
	• A. duodenale, A. lumbricoides, E. vermicularis, T. trichura (in details)	√				
	• S. stercoralis		√			
10	**Tissue Nematodes II** **& Stool concentration techniques**					1hr
	W. bancrofti (in details) T. Spiralis • D. medinensis (in details) • stool concentration techniques • Name of parasites in stool • Names of parasites affecting CNS • Names of parasites affecting liver • Names of parasites entering through skin Bile stained eggs& Eggs which float in saturated salt solution & those which do not	√				

APPLIED MICROBIOLOGY (To be taken in the form of UG seminars/Tutorials) (n=8)

Topic No	Topic	No. of Hrs.
	Only Causative agents & Brief Outline of Lab diagnosis in	
1	• Gastrointestinal infections	1hr
2	• URTI	1hr
3	• LRTI	1hr
4	• UTI	1hr
5	• CNS Infections	1hr
6	• Wound & Pyogenic infections	1hr
7	• PUO & infections	1hr
8	• STDs	1hr

Theory: (n=96)

Section	No of lectures
General Microbiology	17
Systemic bacteriology	29
Mycology	04
Virology	16
Immunology	12
Parasitology	10
Seminars/Tutorials on Applied Microbiology	08
Total	**96**

Practicals: Including Extra coaching, Revisions & classroom assessment (CRA) (n=132)

No	Experiments	No.of Hrs
1.	Microscopy	4hrs
2.	Morphology of bacteria	4hrs
3.	Sterilisation and Disinfection	4hrs
4.	Principles in diagnostic Microbiology 1	4hrs
5.	Principles in diagnostic Microbiology 2	4hrs
6.	Immunology and Serologigal methods	4hrs
7.	Staphylococci	4hrs
8.	Streptococci and Pneumococci	4hrs
9.	Neisseria	4hrs
10.	Corynebacteria	4hrs
11.	Bacillus	4hrs
12.	M.tuberculosis and Atypical Mycobacteria	4hrs
13.	M.leprae	4hrs
14.	E.coli,Klebsiella and Proteus	4hrs
15.	Salmonella	4hrs
16.	Shigella and Vibrio	4hrs
17.	Pseudomonas and Hospital infections	4hrs
18.	Yersinia and Brucella	4hrs
19.	Haemophillus and Bordetella	4hrs
20.	Clostridia	4hrs
21.	Non-sporing anaerobes	4hrs
22.	Spirochaetes	4hrs
23.	Actinomycetes and Nocardia	4hrs
24.	Virology	4hrs
25.	Intestinal protozoa	4hrs
26.	Blood and tissue protozoa	4hrs

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27.	Blood and tissue flagellates	4hrs
28.	Cestodes	4hrs
29.	Trematodes	4hrs
30.	Intestinal nematodes	4hrs
31.	Tissue nematodes	4hrs
32.	Medical Entamology	4hrs
33.	Mycology	4hrs
	TOTAL	**132Hrs**

Total Teaching Hours: 250 hours (As per MCI)

Lectures + Seminars/Tutorials	96Hrs
Practicals Including Extra coaching & Revisions	132Hrs
Assessments	22Hrs
Total	**250Hrs**

Books Recommended :

Sr. No.	Name of the Book	Author
1	Textbook of Microbiology	R. Ananthanarayan C K Jayaram Panikar
2	A Textbook of Microbiology	P. Chakraborty
3	Textbook of Medical Microbiology	Rajesh Bhatia & Itchpujani
4	Textbook of Medical Microbiology	Prof C.P. Baveja
5	Textbook of Medical Parasitology	C K Jayaram Panikar
6	Medical Parasitology	C.P.Baveja V.Baveja
7	Textbook of Medical Parasitology	S C Parija
8	Textbook of Parasitology	Damle and Karyakarte
8	A Textbook of Parasitology	Dr.K.D. Chatterjee.
9	Practical Microbiology	Dr. Anuradha De

Reference Books :

Sr. No.	Name of the Book	Author
1	Mackie McCartney practical Medical Microbiology	Colle JG, Fraser AG
2	Principles of Bacteriology, Virology & Immunology Vol. 1, 2, 3, 4, 5	Topley Wilsons
3	Medical Mycology (Emmons)	Kwon – Chung
4	Review of Medical Microbiology (Lange)	Jawetz
5	Immunology	Weir DM
6	Medical Microbiology	David Greenwood, Richard Stack, John Pentherer
7	Medical Virology	Timbury MC
8	Mackie McCartney Medical Microbiology Vol.1	Duguid JP
9.	Textbook of Microbiology	Monica Cheesebrough

Evaluation

a. **Methods**

Theory, Practical & Viva

No.		Particulars	Total Marks
1	Theory (Total out of 95 Marks)	Theory (2 Papers – 40 Marks each)	80 Marks
		Oral (Viva)	15 Marks
2	Practical (Total out of 25 Marks)	Practical	25 Marks
3	Internal Assessment (Total out of 30 Marks)	Internal Assessment (Theory – 15 Practical – 15)	30 Marks
		TOTAL	**150 Marks**

Passing: A candidate has to obtain minimum of 47 Marks out of 95 in Theory, 13 marks out of 25 in Practical, 11 marks out of 30 in Internal Assessment and 75marks out of 150 Total to be declared as passed.

Nature of Question Paper :- Theory (Total 80 Marks)

Paper - I	General Microbiology , Systemic Bacteriology & Related Applied Microbiology	40 Marks
Paper – II	Immunology, Virology, Parasitology ,Mycology & Related Applied Microbiology	40 Marks

Section	**Question Description**	**Division of Marks**	**Total Marks**
A	MCQs (16)	16 x 0.5 Marks	08 Marks
B	Brief Answer Questions (4/5)	4 x 4 Marks	16 Marks
C	Long Answer Questions (2/3)	2 x 8 Marks	16 Marks
TOTAL			**40 Marks**

Practical Examination Marks distribution : -

No.	Particulars	Marks
1	Grams Staining	5 Marks
2	ZN Staining	5 Marks
3	Stool Examination	5 Marks
4	Spots (10)	10 Marks
TOTAL		**25 Marks**

Viva (Two Tables)

A	General Microbiology, Systemic Bacteriology and Applied Microbiology	8 Marks
B	Parasitology, Virology , Mycology, Immunology	7 Marks
	Total	**15 Marks**

Distribution of MCQs:

PAPER 1: 16 MCQs , Marks 0.5 each= 8Marks

General Microbiology	06 MCQs
Systemic Bacteriology	10MCQs
Total	**16 MCQs**

PAPER 2: 16 MCQs , Marks 0.5 each= 8Marks

Parasitology	05MCQs
Mycology	03MCQs
Virology	04MCQs
Immunology	04MCQs
Total	**16 MCQs**

DIRECTION:-

For paper setting out of total marks ,70%, 20% and 10 % marks must be from must know , desirable to know, and nice to know portion, respectively

However all LAQs and MCQs are to be from must know area.

Internal Assessment shall be computed on the basis of three term ending examinations (Two Terminals & One Preliminary examination).

Examination	No. of Papers	Pattern	Duration of each paper	Total Marks
I st Terminal	1 (40 Marks)	MCQs = 16 (8 Marks) BAQs = 4/5 (16 Marks) LAQs = 2/3 (16 Marks)	2 Hours	40 Marks
II nd Terminal	1 (40 Marks)	MCQs = 16 (8 Marks) BAQs = 4/5 (16 Marks) LAQs = 2/3 (16 Marks)	2 Hours	40 Marks
Prelim	2 (40 Marks each)	MCQs = 16 (8 Marks) BAQs = 4/5 (16 Marks) LAQs = 2/3 (16 Marks)	2 Hours each paper	80 Marks

Approved in BOM 23/2012, Dated 30/03/2012

Resolution No. - 4

Resolved to approve the following recommendations [Sr. Nos. 1 to 39] of the Academic Council [AC-12/2012] dated 24.03.2012

5. In Microbiology theory syllabus for MBBS-II, the topic of Mycology be shifted from ~~Paper~~ IV Paper – II to Paper – I. **[Annexure - IV].**

Proposed M.D Micro Exam Scheme for 2 days

DAY 1

1. Short case
2. Long case – Plating from broth and work up with discussion and further tests for identification from solid media.
3. Serology – A) WIDAL test or VDRL test
4. Mycology
   - Slant LPCB with slide culture
   - Yeast identification
5. HIV (ELISA) - Procedure, result & discussion
6. Pedagogy

DAY 2

1. Short case final identification.
2. Long case final identification.
3. Serology WIDAL test Reading
4. Fungal final identification.
5. Parasitology
   - Stool examination – R & M
   - Stool Cryptosporidium – Modified ZN staining / Malarial parasite – Leishman staining
6. 10 slides
7. Grand viva

-40/2015-
15/7/15

ANNEXURE-4

(Microbiology)

MGM INSTITUTE OF HEALTH SCIENCES
(Deemed University u/s 3 of UGC Act, 1956)
Grade 'A' Accredited by NAAC
Sector-1, Kamothe, Navi Mumbai - 410209
Tel. No. 022-27432471, 022-27432994, Fax No. 022 - 27431094
E-mail : registrar@mgmuhs.com ; Website : www.mgmuhs.com

SECOND YEAR MBBS

PARA-CLINICAL

SYLLABUS FOR THE SUBJECT OF SECOND YEAR MBBS COURSE AT CONSTITUENT COLLEGES OF MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI / AURANGABAD

((Approved in BOM 40/2015, dated 13.03.2015, Resolution No.- 3.2 (F))

Annexure - 4

EXAMINATION PATTERN FOR PATHOLOGY, MICROBIOLOGY & PHARMACOLOGY

GENERAL SECTION

A. PASSING:-

i. A candidate must obtain 50% in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in practical and 35% in internal assessment combined theory and practical.

ii. Prelims examination on the basis of University pattern (Theory, Practical and viva): Minimum 3-4 weeks gap between Prelims and University examination.

iii. The total time will be 2 hours each for theory papers of 40 marks.

iv. Practical (total time 3 hours). The details of Practical examination exercises will be notified by Head of the department / Head of Institution.

v. Prelim pattern will be as per the University exam with 2 papers in theory each of 2 hours duration.

B. CALCULATION OF INTERNAL ASSESSMENT MARKS:

- Calculation of Theory and Practical Internal Assessment marks for **Pathology, Microbiology & Pharmacology** shall be as per following rule

1. Distribution of 15 marks in theory shall be as follows:

1.1 5 marks for attendance as per the following guidelines:
Below 75% -0
Upto75% -2.5
Above 75% proportionately higher marks at pro-rate basis (multiplication factor is 0.1)

1.2 10 marks for academic performance in theory in 2 term and prelim exam- (average of all the 3 internal examination shall be taken)

1.3 Marks in decimal computed in 1.1, 1.2 & 1.3 should be converted into whole number at the end.

2. Distribution of 15 marks in practical shall be as follow:

2.1 5 marks for attendance as per the following guidelines:

Below 75%- 0

Upto 75% -2.5

Above 75% proportionately higher marks at pro -rate basis (multiplication factor is 0.1)

2.2 10 marks for academic performance in Practicals in 2 term and prelim exam- (average of all the internal examination shall be taken).

2.3 Marks in decimal computed in 1.1, 1.2 & 1.3 should be converted into whole number at the end.

Minimum marks required by a candidate to be declared as pass will be as follows:

Subject	Theory and Oral		Practical		Internal assessment		Total	
	Max	Min Passing	Max	Min Passing	Max	Min Passing	Max	Min Passing
Pathology	95	47	25	13	30	11	150	75
Microbiology	95	47	25	13	30	11	150	75
Pharmacology	95	47	25	13	30	11	150	75
FMT	50	25	30	15	20	7	100	50

MICROBIOLOGY

1. **THEORY**

The computation of internal assessment marks shall be as per rule No 2 and 3 mentioned in this rule and regulation

University Examination

2. Pattern of Theory Examination including Distribution of Marks, Questions and Time.

a. **Distribution of Marks**

Sr.No		Total marks
1	Theory (2 papers - 40 marks each)	80
2	Oral (Viva)	15
3	Practical	25
4	Internal assessment (Theory -15, Practicals -15)	30
	TOTAL	150

b. **Total duration - 4 hrs (each paper of 2 hrs or 120 minutes)**

c. **Each paper will have 3 sections.**

d. **Pattern and marking for each paper of 40 marks as provided in the table**

e. **One compulsory question of 7 marks on applied Microbiology in each paper**

Sections	Nature of Question- Two Theory Papers	Total No. of Questions	Mark (s) per Question	Total Marks
A)	Multiple Choice Questions (MCQs)	16	1/2	08
B)	Brief Answer Questions (BAQs)	4 out of 5	4	16
C)	Long Answer Question (LAQ)	2 out of 3	8	16
Total				40

3. **Topic Distribution**

A) MICROBIOLOGY PAPER I:- General Microbiology, Systematic bacteriology including Rickettsia, Chlamydia and Mycoplasma , Related applied microbiology .

B) MICROBIOLOGY PAPER II:- Parasitology, Virology, Mycology, Related applied Microbiology, and Immunology .

1. **University examination Nature of practicals and duration**

a. **Practical examination in MICROBIOLOGY will be of 25 Marks and oral (viva) of 15 Marks of THREE hours duration.**

Q.1: Gram staining	5 Marks
Q.2: Zeihl-Neelson's staining	5 Marks
Q.3: Stool examination for Ova/cyst	5 Marks
Q.4: Spots identification (Ten Spots)	10 Marks
	Total-25 Marks

b. Viva (Two tables) 15 Marks

VIVA 1	General Microbiology, Systemic Bacteriology and Applied microbiology	8 Marks
VIVA 2	Parasitology, Virology, Mycology, Immunology.	7 Marks

(*Spots-Bacteriology slide, Culture media, Biochemical, Sterilization and Disinfection, Mycology, Virology, Parasitology, Serological test, Vaccine, Experimental Animal/Vector)

Dr. A.D. Urhekar, M.D.
Prof. & HOD Microbiology
MGM Medical College & Hospital
Kamothe, Navi Mumbai-410209.

MBS, M.D. Regn. No. 2006
Professor, Dept. of Microbiology
MGM Medical College & Hospital,
Navi Mumbai, Kamothe

Sent to University on 15/7/15

Final Revised MBBS Syllabus for Microbiology, MGMIHS

(Proposed in BOS, March 2015)

GENERAL MICROBIOLOGY [n=17]

Topic	Must Know	Desirable to Know	No. of Hrs.
History & Microscopy	• Definitions of Medical Microbiology, Pathogen Commensal, Symbiotic. • Contribution of Louis Pasture Robert Koch Lister • Names of scientists who discovered common bacteria • Importance of Microbiology		1hr
Morphology of bacteria I	• Difference between Prokaryotes & Eukaryotes • Microscopy – Basic principle and applications of all microscopes • Classification of staining techniques • Gram's stain and ZN stain in detail(with examples) • Negative staining, Impregnation method • Albert's stain •		2hr
Morphology II	• Morphology of Bacteria • Bacterial cell anatomy in detail • Bacterial Spore		
Physiology of bacteria	• Bacterial cell division, Generation time, Bacterial growth curve • Bacterial growth requirements	Bacterial Metabolism	1hr

Sterilization	• Definitions of Sterilization, disinfection, asepsis, antiseptics • Need of Sterilization / Disinfection in various fields – Medical, Food & Pharma Industry • Physical methods of Sterilization Sunlight, Heat (dry & moist heat), Filtration, Radiation in details		2hrs
Disinfection	• Characteristics of ideal chemical disinfectant • Factors influencing potency of a disinfectant • Disinfectants like Aldehydes , Alcohols, Halogens, Oxidising agents, Salts, SAA, Gases, Dyes (Concentration, Mode of action and uses only)	Testing of Disinfectants	1hr
Culture Media	• Types of Media and their uses	Composition of Media	1hr
Culture Methods	• Types of aerobic culture methods and their uses • Types of anaerobic culture methods and their uses • Mc Intosh Filde's Jar – Functioning and uses		1hr
Identification of bacteria	Morphology of bacteria (Gram stain), Motility Biochemical tests (Principle and examples)	Morphology of Bacterial Colony Biochemical tests (Procedure) Typing Method Pathogenicity tests	1hr
Antimicrobial therapy	Mode of action of antimicrobial agents Antibiotic Sensitivity tests : Kirby Bauer disc diffusion Importance of making an antibiotic Policy Strict Adherences to antibiotic Policy	Antibiotic Sensitivity tests: Stokes Disc diffusion E-test Dilution test	1hr
Bacterial Genetics	Basic structure of Bacterial DNA	• Synthesis of Polypeptide (Transcription and	2hrs

	Definitions of Gene, Codon, Nonsense codons Extrachromosomal elements – Plasmids, Episomes, Transposons • Difference between Phenotypic & Genotypic variation (Mutation) • Genetic Variation (Mutation) • Gene transfer (Transformation, Transduction, Lysogenic conversion, Conjugation) • Differences between Mutational & Transferable drug resistance • mechanism of drug resistance	translation) • Genetic Engineering • DNA Probes • PCR • Gene therapy	
Bio- medical waste disposal	• Definition of Biomedical waste • Classification & disposal as per categories • Importance of segregation		1hr
Universal Safety Precautions & health care associated infections	• Universal safety precautions • Hand Hygiene • Definition of Hospital acquired infection. • Sources , types,prevention and control of health care associated infections		1hr
Normal microbial flora of human body	Introduction – Various sites, types & role		1hr
Infection Host parasite relationship	• Definitions of Saprophytes, Parasitic, Commensals, Pathogen, Opportunistic Pathogens, Pathogenicity, Virulence • Types of infection,Routes of transmission • Sources of Infection • Difference between Exotoxins & Endotoxins • Types of Infectious diseases Localised, Generalised, Endemic, Epidemic, Pandemic	Factors Predisposing to Microbial Pathogenicity	1hr

SYSTEMIC BACTERIOLOGY [n=29]

Format of study -

A :Classification

B: Morphology

C:Culture Characteristics

D: Biochemical reactions

E:Antigens

F:Pathogenesis & diseases caused in detail

G:Laboratory diagnosis

H:Prevention & control

I: Special identification tests

Topic	Must Know Subtopics	Desirable to Know	No. of Hrs
Staphylococci	A,B,C,,E,F,G,H,I	D	1hr
Streptococci	A,B,C,,E,F,G,H,I	D	1hr
Other streptococci and Pneumococci	A,B,C,,E,F,G,H,I	D	1hr

Neisseria	A,B,C,,E,F,G,H,I	D	1hr
C. diptheriae	A,B,C,,E,F,G,H,I	D	1hr
M. tuberculosis	A,B,C,,E,F,G,H,I	D	1hr
Atypical mycobacteria	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis		1hr
M. leprae	A,B,C,,E,F,G,H,I	D	1hr
Bacillus	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis		1hr
Method of anaerobiasis & Nonsporing anaerobes	Method of anaerobiasis Nonsporing anaerobes { Name of the Species,Names of the diseases caused Special tests for identification,Brief outline of lab diagnosis }		1hr
Clostridium – I	A,B,C,,E,F,G,H,I	D	1hr
Clostridium – II	A,B,C,,E,F,G,H,I	D	1hr
Enterobacteriacae – I (E.coli.)	A,B,C,,E,F,G,H,I	D	1hr
Enterobacteriacae – II Proteus & Klebsiella	A,B,C,,E,F,G,H,I	D	1hr

Enterobacteriacae – III Salmonella	A,B,C,,E,F,G,H,I	D	1hr
Shigella	A,B,C,,E,F,G,H,I	D	1hr
Vibrio	A,B,C,,E,F,G,H,I	D	1hr
Campylobacter & Helicobacter	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis		1hr
Pseudomonas	A,B,C,,E,F,G,H,I	D	1hr
Other GNB I (Yersinia, Pasteurella, Francisella, Bordetella)	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis		1hr
Other GNB II (Haemophilus, Brucella)	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis		1hr
Miscellaneous Bacteria (Newer bacterias)	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis		1hr
Spirochaete - I	A,B,C,,E,F,G,H,I	D	1hr
Spirochaete –II	A,B,C,,E,F,G,H,I	D	1hr

MYCOLOGY [n=4]

Topic	Must Know Subtopics	Desirable to Know	No. of Hrs
Introduction to mycology	• Introduction to Mycology • Difference between fungus & Bacteria • Classification of fungi with examples • Reproduction & Sporulation • Lab diagnosis of mycosis • Classification of Fungal diseases		1hr
Agents of superficial mycosis (Dermatophytes)	• Superficial Mycosis a. Enumerate agents b. Predisposing factors c. Lab diagnosis (Outline)	Colony characteristics of dermatophytes	1hr
Subcutaneous mycosis & Candida	• Subcutaneous Mycosis & Candida in detail a. Enumerate agents b. Predisposing factors c. Lab diagnosis (Outline)		1hr
Systemic mycosis & opportunistic fungal infections & P. Carinii	• Systemic & Opportunistic Mycosis a. Enumerate agents b. Predisposing factors c. Candida, Cryptococcus in detail d. Mucor, Aspergillus	Histoplasma, P. Carinii	1hr

Actinomycete and Nocardia	A,B,C,,E,F,G,H,I	D	1hr
Rickettsia	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis		1hr
Chlamydia	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis		1hr
Mycoplasma	Name of the Species Names of the diseases caused Special tests for identification Brief outline of lab diagnosis		1hr
Bacteriology of water, Air & Milk	Bacteriology of Air Bacteriological Examination of Air Acceptable limit of Air pollution	Bacterial flora in water Water Borne Pathogens Bacteriological Examination of water Milk Borne diseases Bacteriological Examination of milk	1hr

		diagnosis)		
07	Other DNA viruses (Papova, Adeno,)	Basic morphology, diseases caused		1hr
08	Orthomyxoviruses	• Differences between Orthomyxo and paramyxo virus • Influenza Virus a. Morphology b. Antigenic classification and structure c. Antigenic shift and Antigenic drift d. Pathogenesis and lab diagnosis	Influenza Virus Antigenic classification and structure Prophylaxis Bird flu	1hr
09	Paramyxoviruses	• Morphology • Measles virus and Mump Virus	• Parainfluenza virus • RSV	1hr
10	Picornaviruses	• Classification • Polio virus in detail • Differences between killed and live vaccines • Eradication and Prophylaxis of Polio virus	• Coxsackie viruses • Rhino virus	1hr
11	Hepatitis viruses	• HAV (Pathogenesis and Lab diagnosis) • HBV (Morphology, Mode of transmission, Clinical features, Lab diagnosis) • HCV (Morphology, Mode of transmission, Clinical features, Lab diagnosis) • HDV & HEV (Pathogenesis & Lab diagnosis)		1hr
12	Arboviruses	• Classification , Names of Arboviruses and diseases caused • Dengue Virus in detail	JE yellow fever KED	1hr

VIROLOGY [n=16]

Topic No	Topic	Must Know Subtopics	Desirable to Know	No.of hrs
01	General virology – I	• Morphology of Viruses • Replication of viruses	• Chemical properties of viruses • Susceptibility to physical and chemical agents • Viral Haemagglutinin	1hr
02	General virology – II	• Cultivation of Viruses ,Viral assays • Outline of diagnosis of viral diseases		1hr
03	Virus-host interactions	• Inclusion Bodies • Routes of transmission of viral infections • Interferons • Immunity in viral diseases	• Host responses to virus infections	1hr
04	Viral vaccines and antiviral agents	• Commonly used viral vaccines a. Types and Schedule • List of antiviral agents.	Mode of preparation Chemoprophylaxis & Chemotherapy of viral diseases	1hr
05	Pox viruses Bacteriophage	• Morphology • Names of poxviruses and diseases caused • Bacteriophage[Basic structure and Significance]	Cultivation	1hr
06	Herpes simplex & Varicella zoster CMV, EBV	• Morphology • Classification • HSV (Infections caused and Lab diagnosis) • Varicella – Zoster (Infections caused and Lab	• EBV (Infections caused and Lab diagnosis) • CMV (Infections caused and Lab diagnosis)	1hr

13	Rhabdoviruses	• Morphology • Pathogenesis and Lab diagnosis • Prophylaxis		1hr
14	Retro Viruses – HIV	• Morphology • Resistance • Modes of Transmission • Pathogenesis • Opportunistic infections and malignancies • Lab diagnosis in detail • Prevention • PEP	• Viral genes & antigens • ART	1hr
15	Miscellaneous viruses	• Viruses (Only names) causing gastroenteritis • Viruses causing viral hemorrhagic fevers (only names) • Slow virus diseases (Only names)		1hr
16	Oncogenic viruses	Papilloma Virus Only names of oncogenic viruses and malignancies caused		1hr

IMMUNOLOGY [n=11]

Topic	Must Know Subtopics	Desirable to Know	No. of Hrs
Immunity	• Innate Immunity – Types, Factors influencing innate immunity, Mechanisms • Acquire Immunity - a. Active Immunity b. Passive Immunity • Combined immunization • Adoptive immunity • Local Immunity • Herd Immunity		1hr
Antigen	• Types of Antigens • Factors affecting antigenicity	• Super antigens	1hr
Antibody	• Properties of antibodies • Structure of Immunoglobulin classes • IgG, IgM, IgA, IgD, IgE a) Basic structure, function & distribution	• IgG, IgM, IgA, IgD, IgE Mol. Wt., Sed. Coefficient, • Abnormal Immunoglobulins	1hr
Complement	• Components of complement • Classical Pathway • Alternative Pathway	• Regulation of complement activation	1hr

	• Biological effects of complement • Deficiencies of complement	• Biosynthesis of Complement • Quantitation of complement	
Ag-Ab reactions I	• Types of Ag – Ab reactions, precipitation, Agglutination, CFT, Neutralization, Opsonisation, Immunoflourescence, ELISA Immunochromatography (Principle, Types & uses only)		2hrs
Structure & function of Immune system	• Central Lymphoid Organs • Peripheral Lymphoid Organs • Cells of Lymphoreticular System • HLA • Differences between T & B cells	• Lymphocytic recirculation	1hr
Immune response	• Humoral Immune Response a) Primary and secondary responses b) Production of Antibodies c) Monoclonal antibodies d) Factors influencing antibody production • Cell mediated Immune Response a) Cytokines & Lymphokines – Types & functions only	• Cell mediated Immune Response a) Detection of CMI • Immunological tolerance	1hr
Hypersensitivity	• Definition & Classification • Type 1 Reaction • Differences between Immediate & delayed hypersensitivity • Type 2, 3 & 4 Reactions	•	1hr

Autoimmunity	• Definition & Mechanisms • Classification with examples		1hr
Immunodeficiency diseases		• Primary Immunodeficiency Syndromes & • Secondary Immunodeficiency (Only classification)	
• Transplantation & Tumor immunity	• Types of Transplants • Allograft reaction • Histocompatibility Antigens • Histocompatibility Testing • Graft - Versus – Host reaction • Tumor antigens	• Immunosurveillance • Immune response to malignancy • Immunotherapy of cancer	1hr

- PARASITOLOGY [n=10]

Topic No	Topic	Must Know Subtopics	Desirable to Know	No. of Hrs.
01	Introduction to parasitology	• Classification of Parasites • Type of Parasites • Hosts (Definitive & Intermediate) • Host – Parasitic relationship • Sources of Infection • Lab diagnosis in general		1hr
02	E.Histolytica	• Morphology • Life cycle • Pathogenesis & Complications • Lab diagnosis & treatment • Non Pathogenic amoebae • Free living amoebae		1hr
3	Giardia, Trichomonas	• Giardia lamblia (Morphology, life Cycle, Pathogenesis, Lab diagnosis & treatment) • Trichomonas vaginalis (Morphology Pathogenesis, Lab diagnosis & treatment		1hr
4	Malaria	Life Cycle, Morphology, Pathogenecity & Lab diagnosis, prevention		1hr
5	Haemoflagellates	• Leishmania (Classification, diseases caused) L. donovani in details Morpho, Lifecycle, Pathogenesis, Lab diagnosis	Trypanosoma brucci & Trypanosoma Cruzi in details	1hr

6	Miscellaneous protozoa	• Toxoplasma (Morphology life Cycle, Pathogenesis, Lab diagnosis)	Cryptosporidium, Isospora B.coli	1hr
7	Cestodes	Taenia & Echinococcus (Morphology life Cycle, Pathogenesity, Lab diagnosis)	Brief mention about othercestodes	1hr
8	Trematodes	• Schistosomes a. Names & diseases caused	Morphology, Life Cycle, Pathogenicity & Lab diagnosis Fasciola hepatica Parognimus westermani	1hr
9	Nematodes (Intestinal)	• A. duodenale, A. lumbricoides, E. vermicularis, T. trichura (in details)	S. stercoralis	1hr
10	Tissue Nematodes I	W. bancrofti (in details) T. Spiralis		1hr
11	Tissue Nematodes II & Stool concentration techniques	• D. medinensis (in details) • stool concentration techniques • Name of parasites in stool • Names of parasites affecting CNS • Names of parasites affecting liver • Names of parasites entering through skin • Bile stained eggs& Eggs which float in saturated salt solution & those which do not		1hr

APPLIED MICROBIOLOGY (To be taken in the form of UG seminars/Tutorials)

(n=8)

Topic No	Topic	No. of Hrs.
	Only Causative agents & Brief Outline of Lab diagnosis in	
1	• Gastrointestinal infections	1hr
2	• URTI	1hr
3	• LRTI	1hr
4	• UTI	1hr
5	• CNS Infections	1hr
6	• Wound & Pyogenic infections	1hr
7	• PUO & infections	1hr
8	• STDs	1hr

Theory: (n=96)

Section	No of lectures
General Microbiology	17
Systemic bacteriology	29
Mycology	04
Virology	16
Immunology	11
Parasitology	11
Seminars/Tutorials on Applied Microbiology	08
Total	96

Practicals: (n=132)

No	Experiments	No.of Hrs
1.	Microscopy	4hrs
2.	Morphology of bacteria	4hrs
3.	Sterilisation and Disinfection	4hrs
4.	Principles in diagnostic Microbiology 1	4hrs
5.	Principles in diagnostic Microbiology 2	4hrs
6.	Immunology and Serologigal methods	4hrs
7.	Staphylococci	4hrs
8.	Streptococci and Pneumococci	4hrs
9.	Neisseria	4hrs
10.	Corynebacteria	4hrs
11.	Bacillus	4hrs
12.	M.tuberculosis and Atypical Mycobacteria	4hrs
13.	M.leprae	4hrs
14.	E.coli,Klebsiella and Proteus	4hrs
15.	Salmonella	4hrs
16.	Shigella and Vibrio	4hrs
17.	Pseudomonas and Hospital infections	4hrs
18.	Yersinia and Brucella	4hrs
19.	Haemophillus and Bordetella	4hrs
20.	Clostridia	4hrs

21.	Non-sporing anaerobes	4hrs
22.	Spirochaetes	4hrs
23.	Actinomycetes and Nocardia	4hrs
24.	Virology	4hrs
25.	Intestinal protozoa	4hrs
26.	Blood and tissue protozoa	4hrs
27.	Blood and tissue flagellates	4hrs
28.	Cestodes	4hrs
29.	Trematodes	4hrs
30.	Intestinal nematodes	4hrs
31.	Tissue nematodes	4hrs
32.	Medical Entamology	4hrs
33.	Mycology	132Hrs
	TOTAL	

Total Teaching Hours: 250 hours (As per MCI)

Lectures + Seminars/Tutorials	96Hrs
Practicals	132Hrs
Assessments	22Hrs
Total	250Hrs

Books Recommended :

Sr. No.	Name of the Book	Author
1	Textbook of Microbiology	R. Ananthanarayan C K Jayaram Panikar
2	A Textbook of Microbiology	P. Chakraborty
3	Textbook of Medical Microbiology	Rajesh Bhatia & Itchpujani
4	Textbook of Medical Microbiology	Prof C.P. Baveja
5	Textbook of Medical Parasitology	C K Jayaram Panikar
6	Medical Parasitology	C.P.Baveja V.Baveja
7	Textbook of Medical Parasitology	S C Parija
8	Textbook of Parasitology	Damle and Karyakarte
8	A Textbook of Parasitology	Dr.K.D. Chatterjee.
9	Practical Microbiology	Dr. Anuradha De

Reference Books :

Sr. No.	Name of the Book	Author
1	Mackie McCartney practical Medical Microbiology	Colle JG, Fraser AG
2	Principles of Bacteriology, Virology & Immunology Vol. 1, 2, 3, 4, 5	Topley Wilsons
3	Medical Mycology (Emmons)	Kwon – Chung
4	Review of Medical Microbiology (Lange)	Jawetz
5	Immunology	Weir DM
6	Medical Microbiology	David Greenwood, Richard Stack, John Pentherer
7	Medical Virology	Timbury MC
8	Mackie McCartney Medical Microbiology Vol.1	Duguid JP
9.	Textbook of Microbiology	Monica Cheesebrough

Evaluation

a. Methods

Theory, Practical & Viva

No.		Particulars	Total Marks
1	Theory (Total out of 95 Marks)	Theory (2 Papers – 40 Marks each)	80 Marks
		Oral (Viva)	15 Marks
2	Practical (Total out of 25 Marks)	Practical	25 Marks
3	Internal Assessment (Total out of 30 Marks)	Internal Assessment (Theory – 15 Practical – 15)	30 Marks
		TOTAL	150 Marks

Passing: A candidate has to obtain minimum of 47 Marks out of 95 in Theory, 13 marks out of 25 in Practical, 11 marks out of 30 in Internal Assessment and 75marks out of 150 Total to be declared as passed.

Nature of Question Paper :- Theory (Total 80 Marks)

Paper - I	General Microbiology , Systemic Bacteriology & Related Applied Microbiology	40 Marks
Paper – II	Immunology, Virology, Parasitology ,Mycology & Related Applied Microbiology	40 Marks

Section	Question Description	Division of Marks	Total Marks
A	MCQs (16)	16 x 0.5 Marks	08 Marks
B	Brief Answer Questions (4/5)	4 x 4 Marks	16 Marks
C	Long Answer Questions (2/3)	2 x 8 Marks	16 Marks
TOTAL			40 Marks

Practical Examination Marks distribution : -

No.	Particulars	Marks
1	Grams Staining	5 Marks
2	ZN Staining	5 Marks
3	Stool Examination	5 Marks
4	Spots (10)	10 Marks
TOTAL		25 Marks

Viva (Two Tables)

A	General Microbiology, Systemic Bacteriology and Applied Microbiology	8 Marks
B	Parasitology, Virology , Mycology, Immunology	7 Marks
	Total	15 Marks

Distribution of MCQs:

PAPER 1: 16 MCQs , Marks 0.5 each= 8Marks

General Microbiology	06 MCQs
Systemic Bacteriology	10MCQs
Total	16 MCQs

PAPER 2: 16 MCQs , Marks 0.5 each= 8Marks

Parasitology	05MCQs
Mycology	03MCQs
Virology	04MCQs
Immunology	04MCQs
Total	16 MCQs

Internal Assessment shall be computed on the basis of three term ending examinations (Two Terminals & One Preliminary examination).

Examination	No. of Papers	Pattern	Duration of each paper	Total Marks
I st Terminal	1 (40 Marks)	MCQs = 16 (8 Marks)	2 Hours	40 Marks
		BAQs = 4/5 (16 Marks)		
		LAQs = 2/3 (16 Marks)		
II nd Terminal	1 (40 Marks)	MCQs = 16 (8 Marks)	2 Hours	40 Marks
		BAQs = 4/5 (16 Marks)		
		LAQs = 2/3 (16 Marks)		
Prelim	2 (40 Marks each)	MCQs = 16 (8 Marks)	2 Hours each paper	80 Marks
		BAQs = 4/5 (16 Marks)		
		LAQs = 2/3 (16 Marks)		

Dr. A.S. Urhekar, M.D.
Prof. & HOD Microbiology
MGM Medical College & Hospital
Kamothe, Navi Mumbai-410209.

Dr. Anshita V. Bhesania Hodiwala
MBBS, M.D Regn. No. 2000/03/1793
Professor, Dept. of Microbiology,
MGM Medical College & Hospital,
Navi Mumbai, Kamothe

MICROBIOLOGY

2	ZN Staining	5 Marks
3	Stool Examination	5 Marks
4	Spots (10)	10 Marks
	TOTAL	25 Marks

Viva (Two Tables)

A	General & Systemic Microbiology	8 Marks
B	Mycology, Parasitology, Virology, Immunology	7 Marks
	Total	15 Marks

Internal Assessment shall be computed on the basis of three term ending examinations (Two Terminals & One Preliminary examination).

Examination	No. of Papers	Pattern	Duration of each paper	Total Marks
I - Terminal	1 (40 Marks)	MCQs = 16 (8 Marks) BAQs = 4/5 (16 Marks) LAQs = 2/3 (16 Marks)	2 Hours	40 Marks
II - Terminal	1 (40 Marks)	MCQs = 16 (8 Marks) BAQs = 4/5 (16 Marks) LAQs = 2/3 (16 Marks)	2 Hours	40 Marks
				25

Approved in BOM 40/215, dated 13/03/2015, Resolution No. 3.2 (c)

MICROBIOLOGY

Passing: A Candidate must obtain 50% in aggregate with minimum of 50% in Theory (including viva and minimum of 50% in Internal assessment (Combined Oral and practicals) and Practicals

Nature of Question Paper:- Theory (Total 80 Marks)

Paper – I	General Microbiology & Systemic Bacteriology & Applied Microbiology	40 Marks
Paper – II	Immunology, Virology, Parasitology, Mycology	40 Marks

Section	Question Description	Division of Marks	Total Marks
A	MCQs (16)	16×0.5 Marks	08 Marks
B	Brief Answer Questions (4/5)	4×4 Marks	16 Marks
C	Long Answer Questions (2/3)	2×8 Marks	16 Marks
TOTAL			40 Marks

Practical Examination Marks distribution :-

No.	Particulars	Marks
1.	Grams Staining	5 Marks
		24

Approved in BOS 40/2015, Dated 13/03/2015
Resolution No. 3.2 (d)

Resolution No. 3.2(d): Resolved to accept the following distribution of MCQ for UG examination so as to cover the syllabus properly :

MCQ Paper I 16 MCQ -

General Microbiology 06 MCQ
Marks 0.5 each = 08 -
Systemic Bacteriology 10 MCQ

Paper II 16 MCQ

Parasitology - 5 MCQ
Mycology - 3 MCQ
Virology - 4 MCQ
Immunology - 4 MCQ

Approved in BOM 43/2015, Dated 06/11/2015
Resolution No. - 3.2 (a)

~~ANNEXURE - II~~

ANNEXURE - IV

Photo 1: Life Cycle of E.histolytica

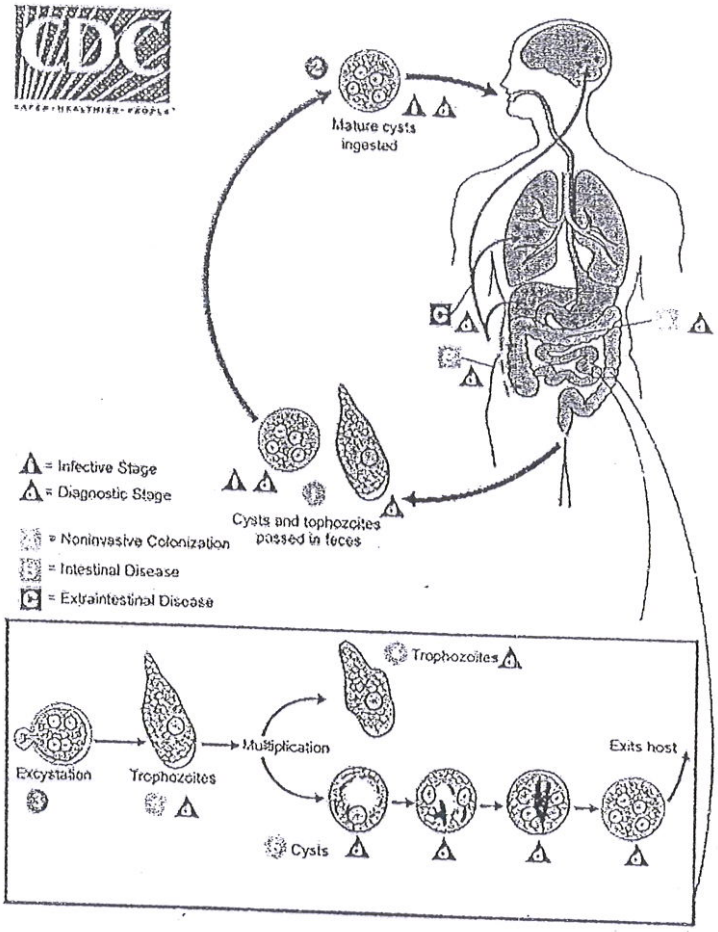


Photo 2: Life Cycle of Giardia lamblia

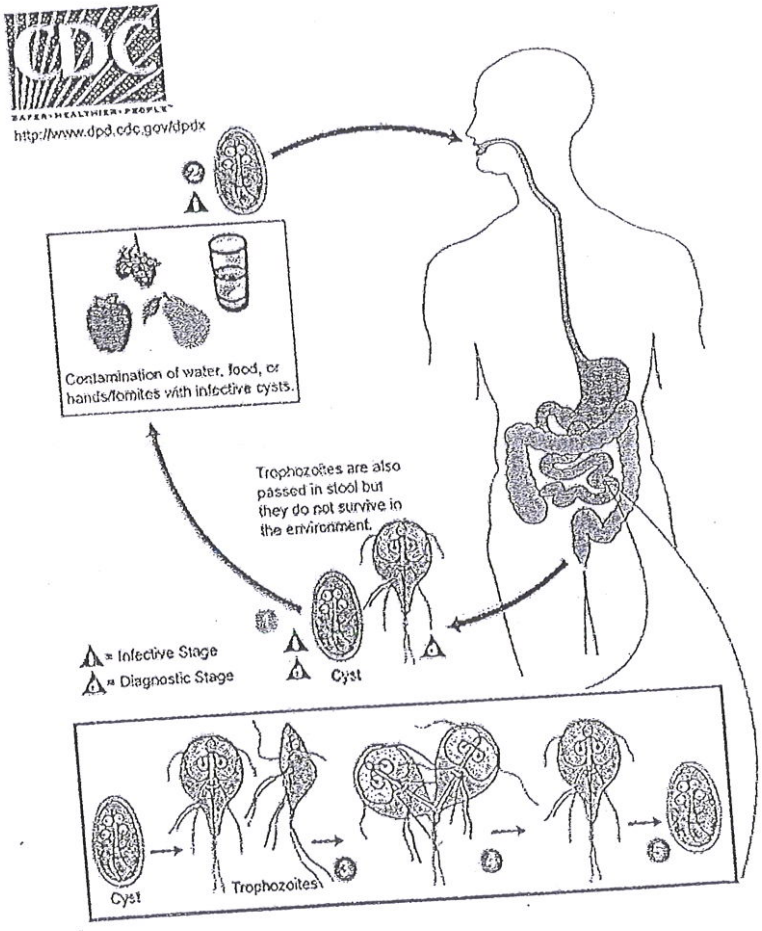


Photo 3: Life Cycle of Plasmodium

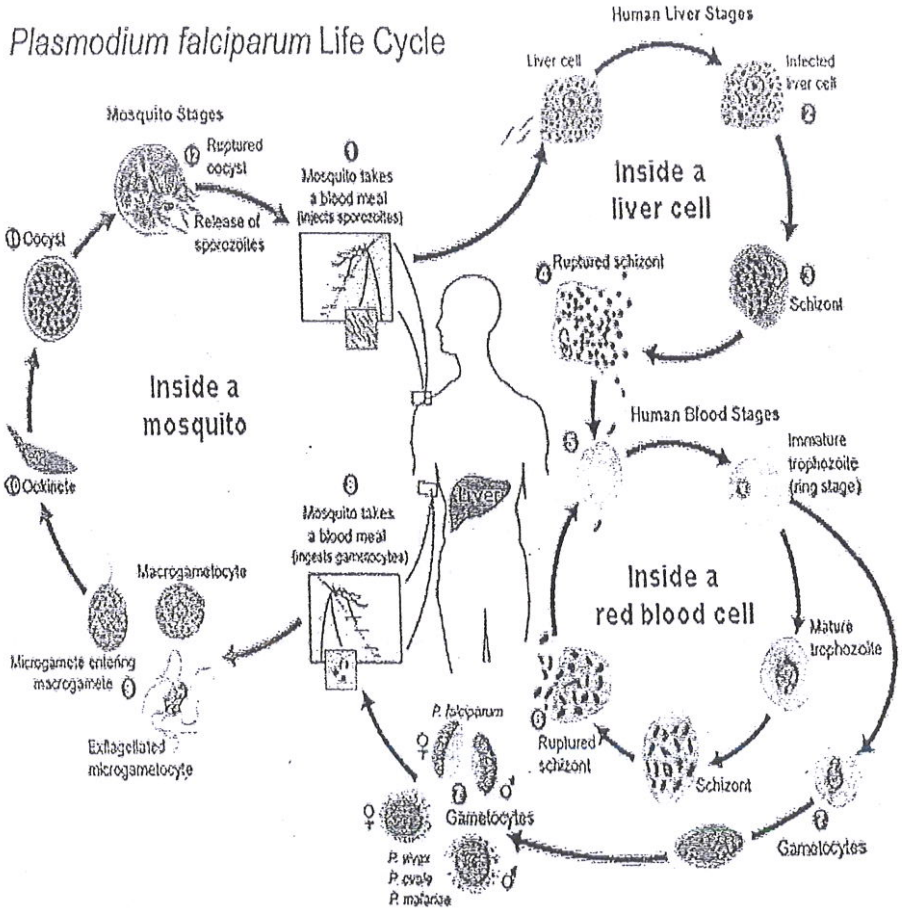


Photo 4: Life Cycle of Leishmania donovani

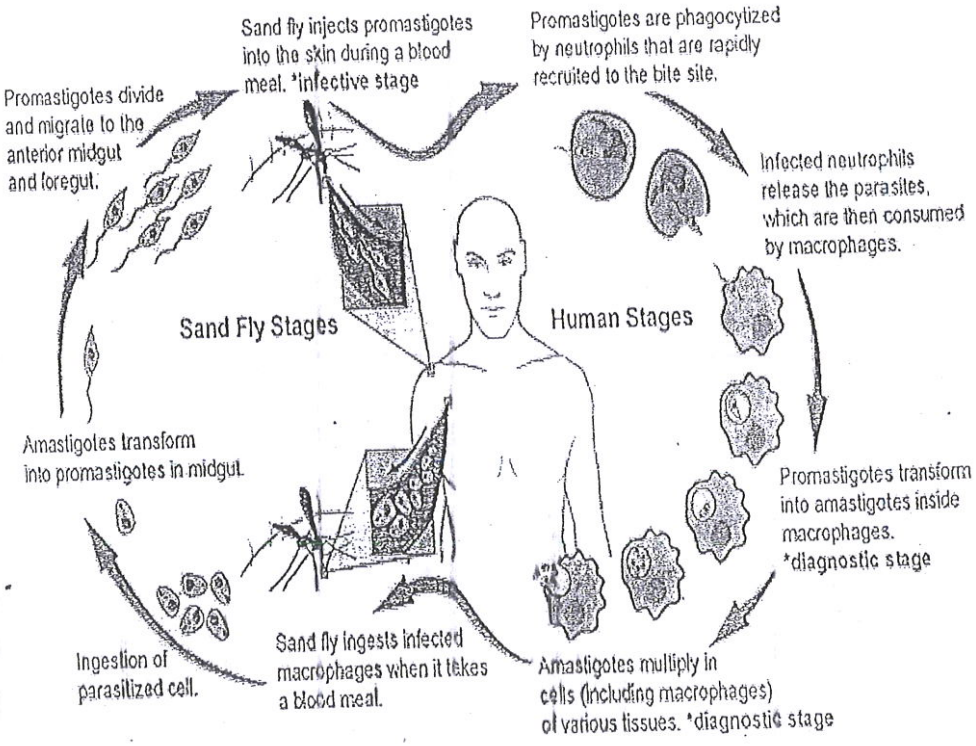


Photo 5: Life Cycle of Taenia

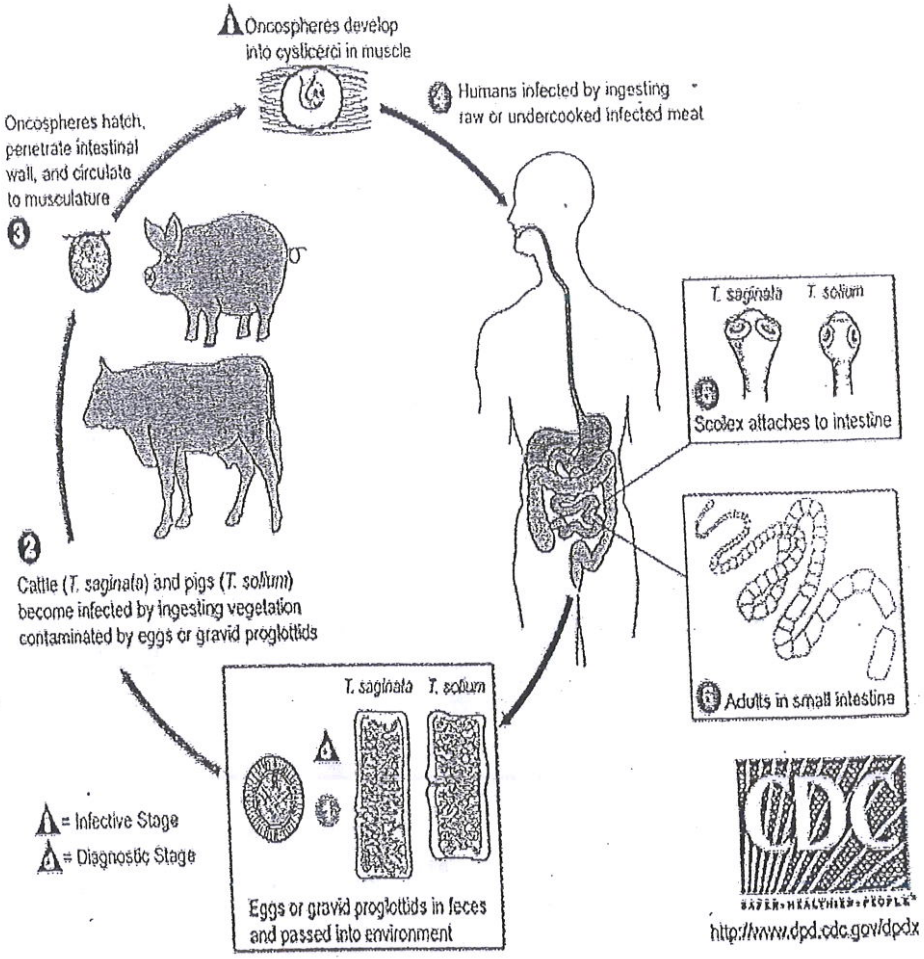


Photo 6: Life Cycle of E.granulosus

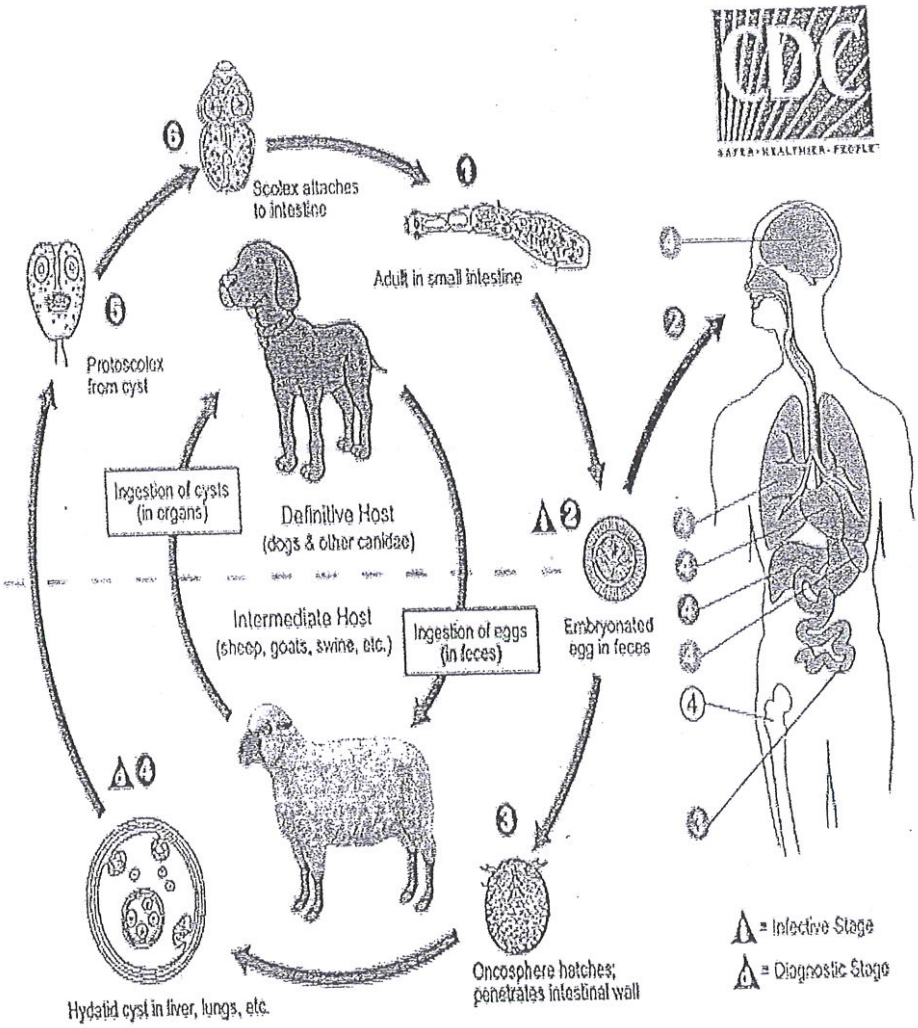


Photo 7: Life Cycle of Schistosomes

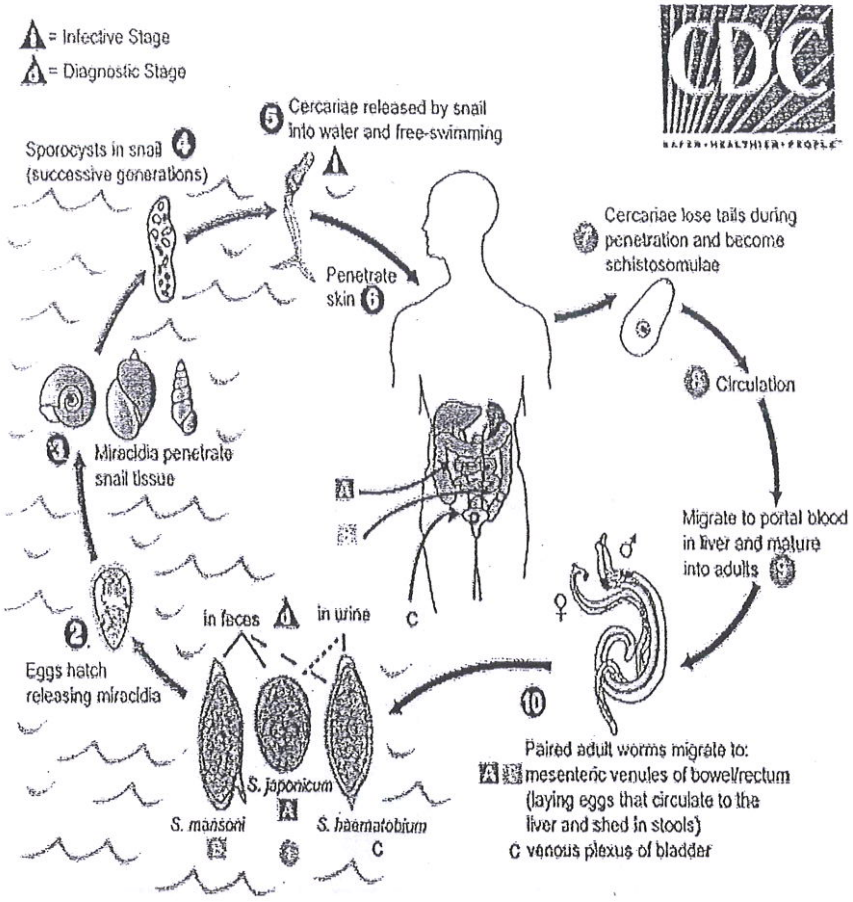


Photo 8: Life Cycle of Ascaris lumbricoides

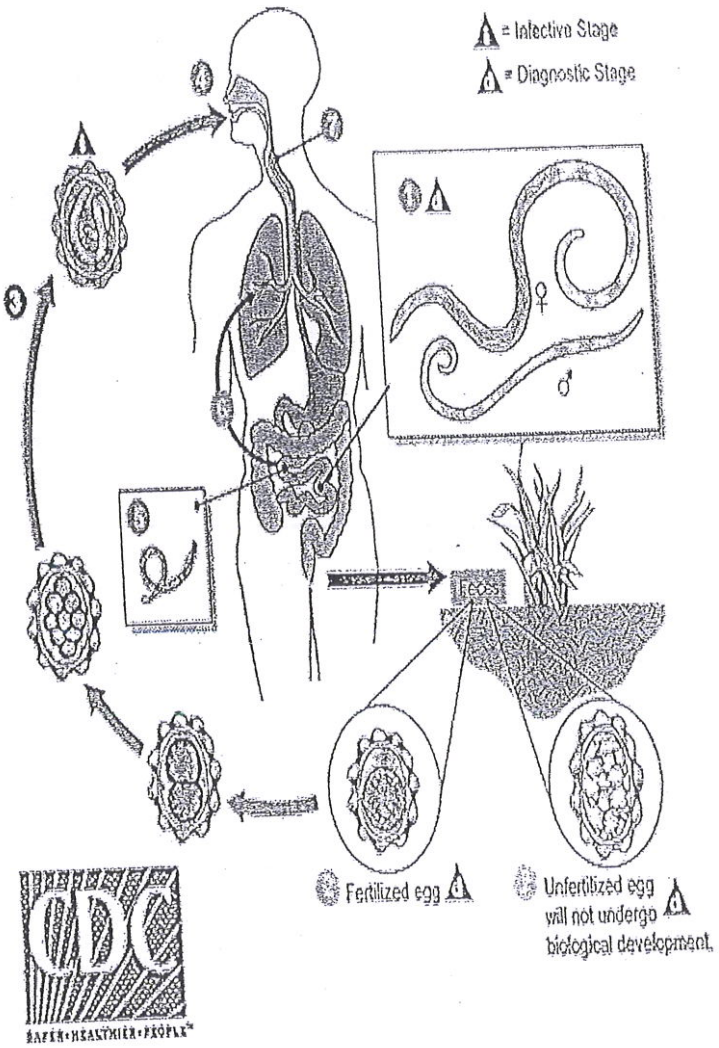


Photo 9: Life Cycle of Ancylostoma duodenale

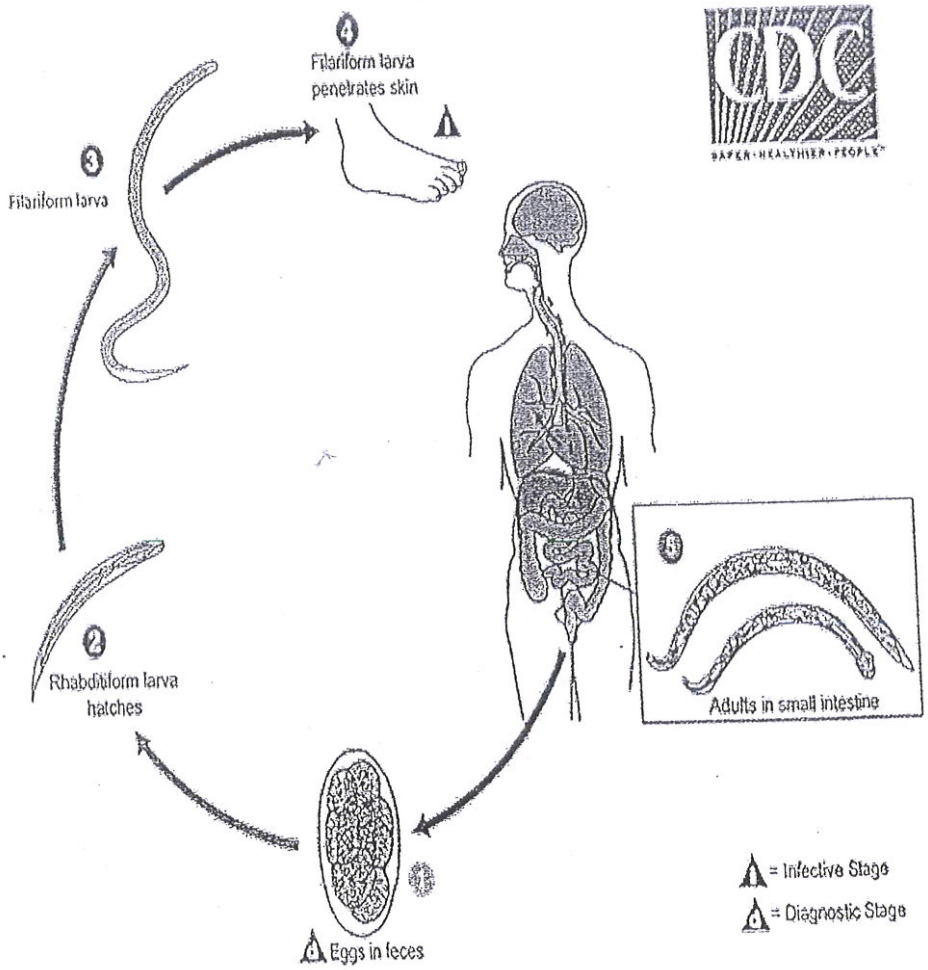


Photo 10: Life Cycle of Trichuris trichura

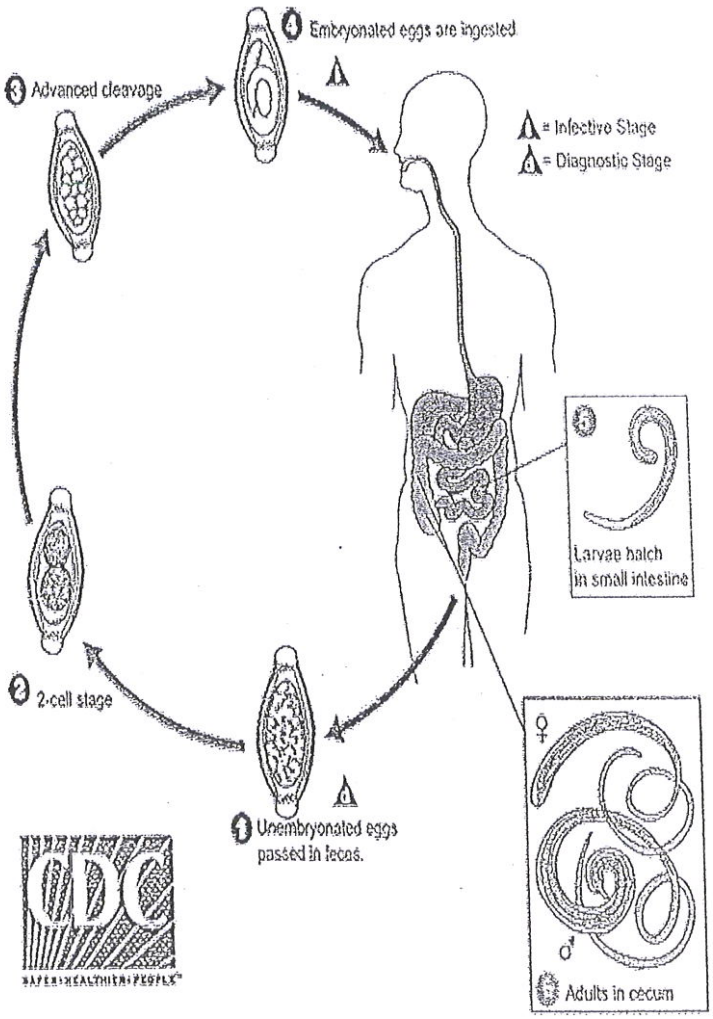


Photo 11: Life Cycle of E.vermicularis

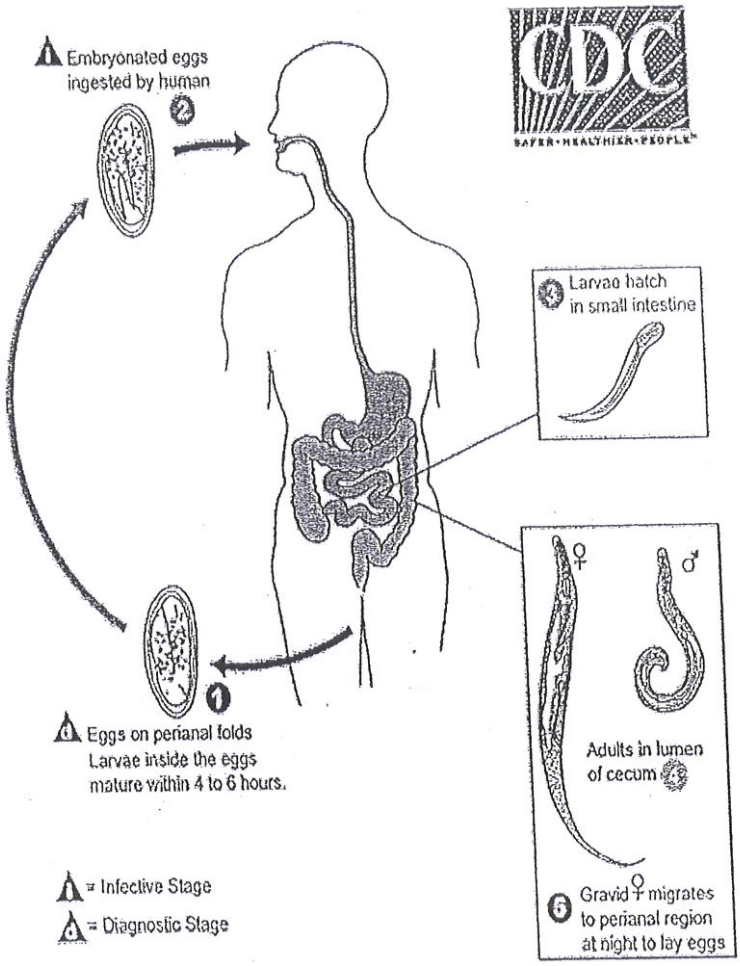


Photo 12: Life Cycle of Strongyloides stercoralis

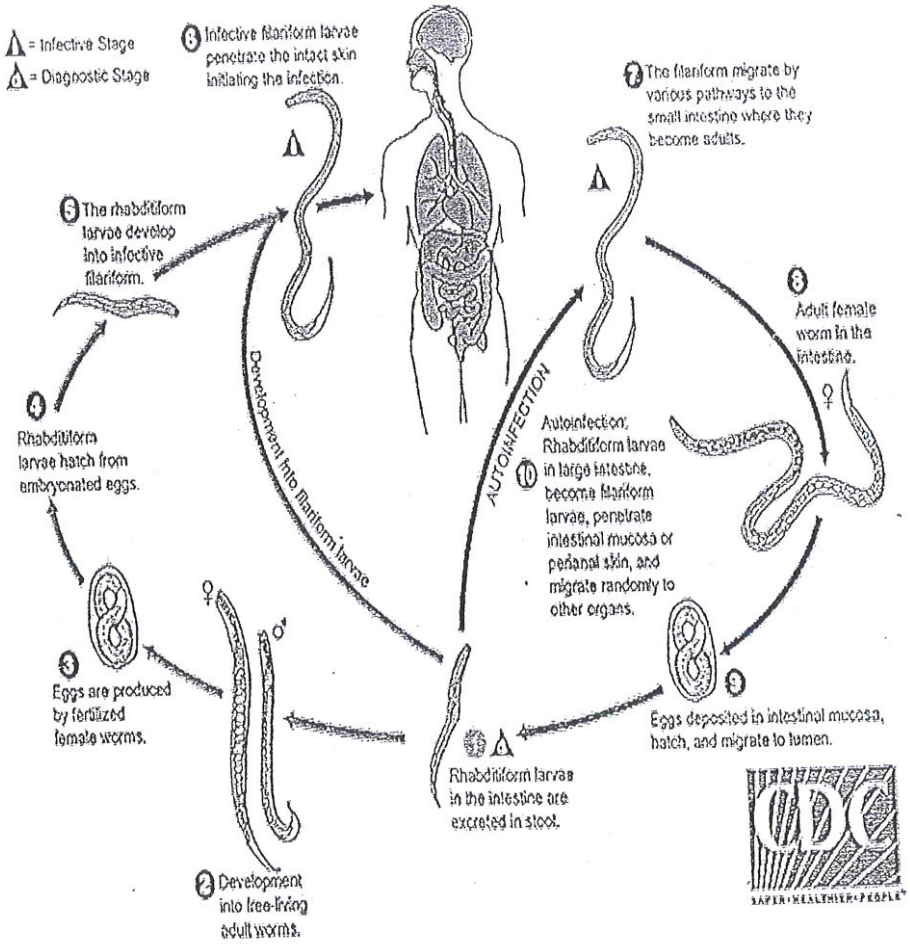


Photo 13: Life Cycle of Wuchereria bancrofti

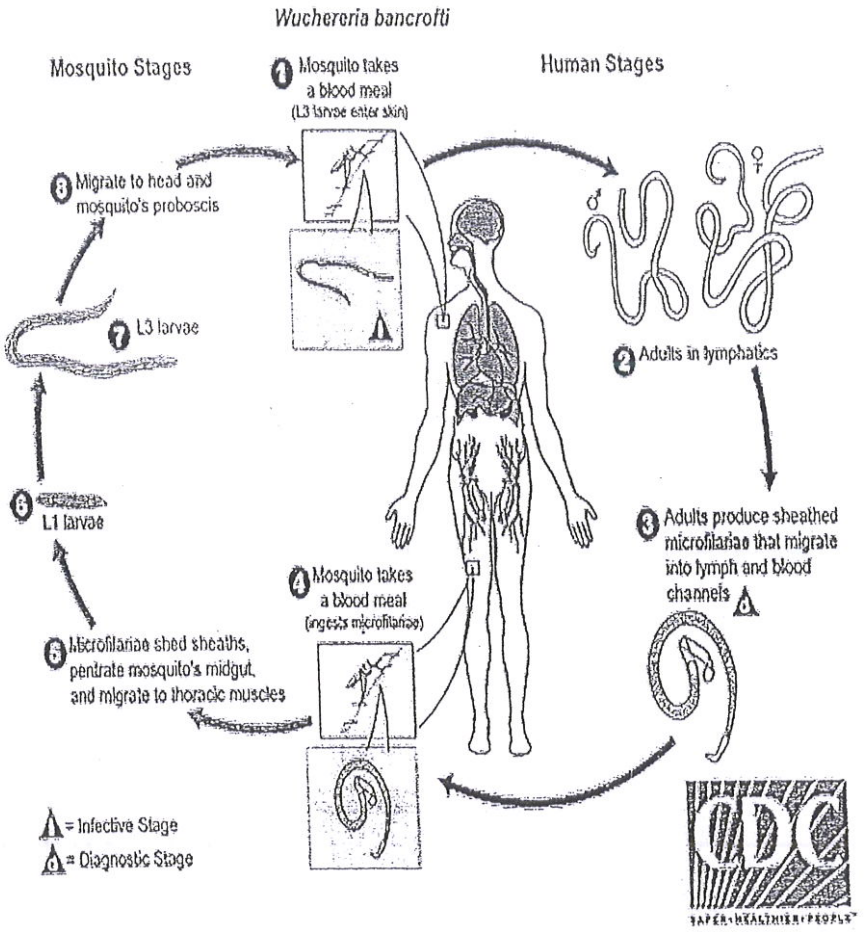
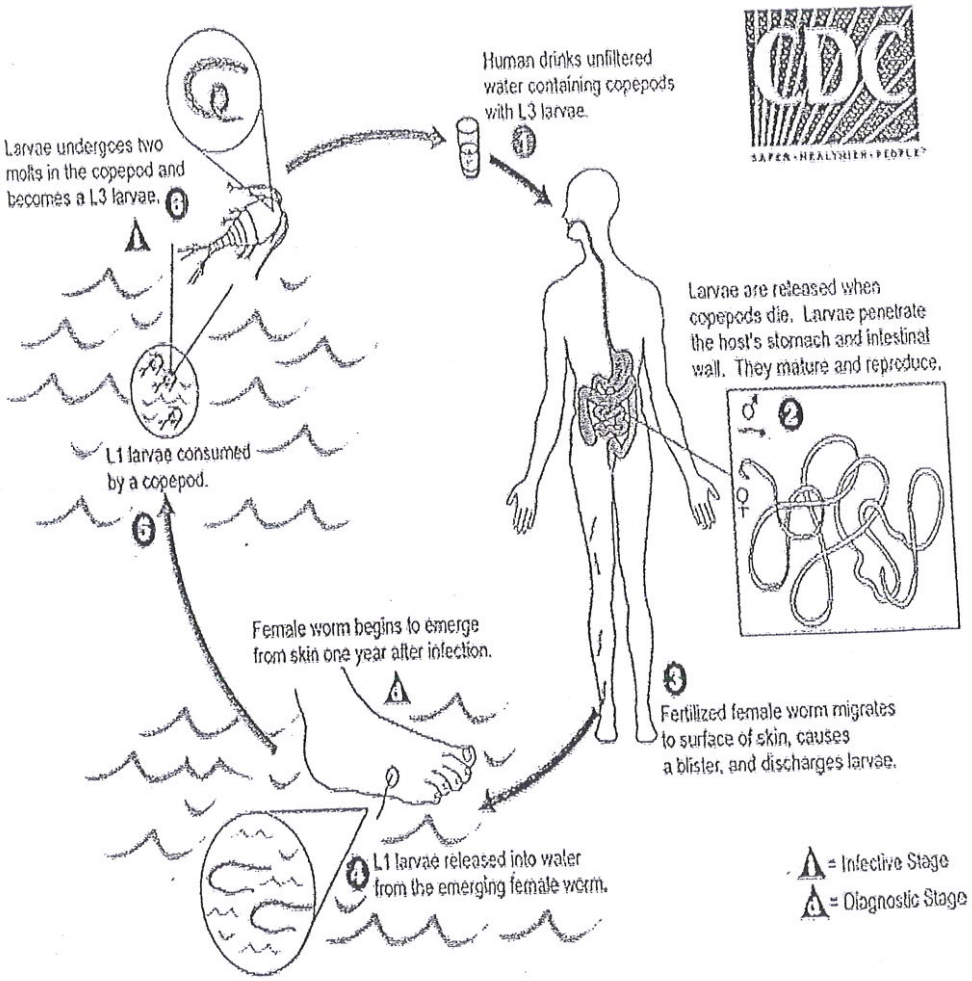
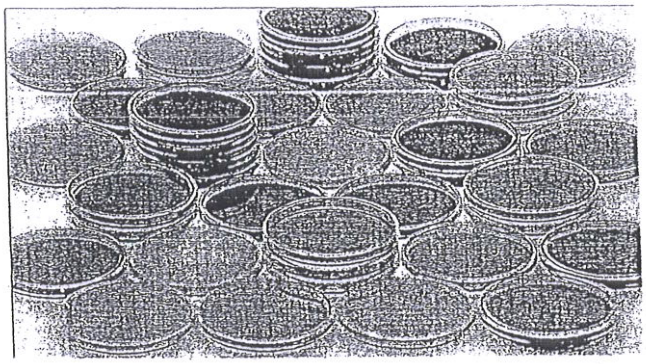
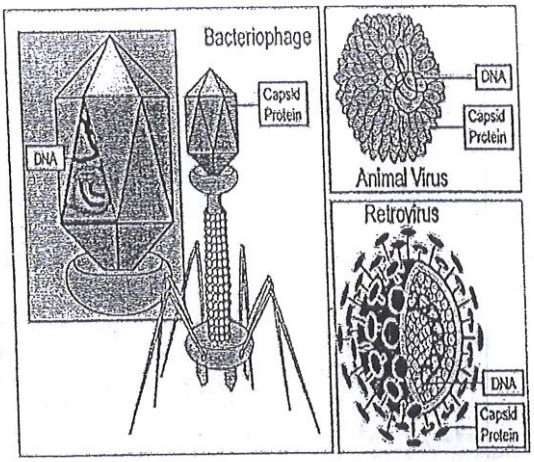
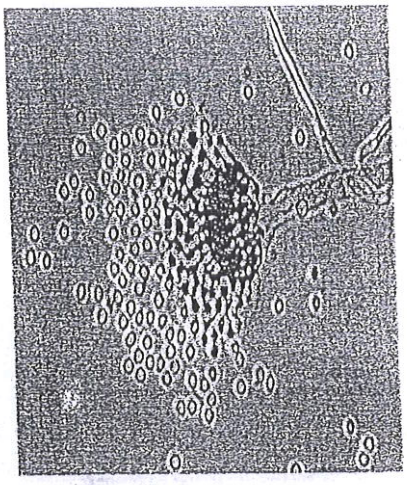


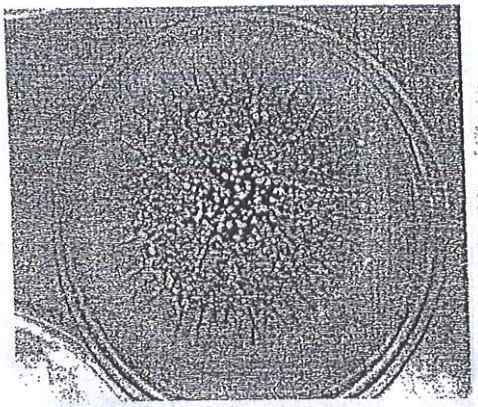
Photo 14: Life Cycle of Dracunculus medinensis

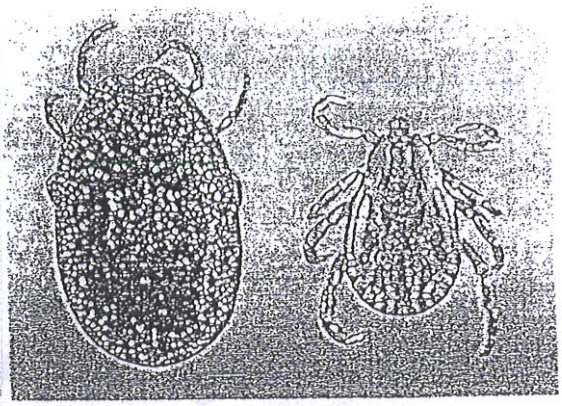


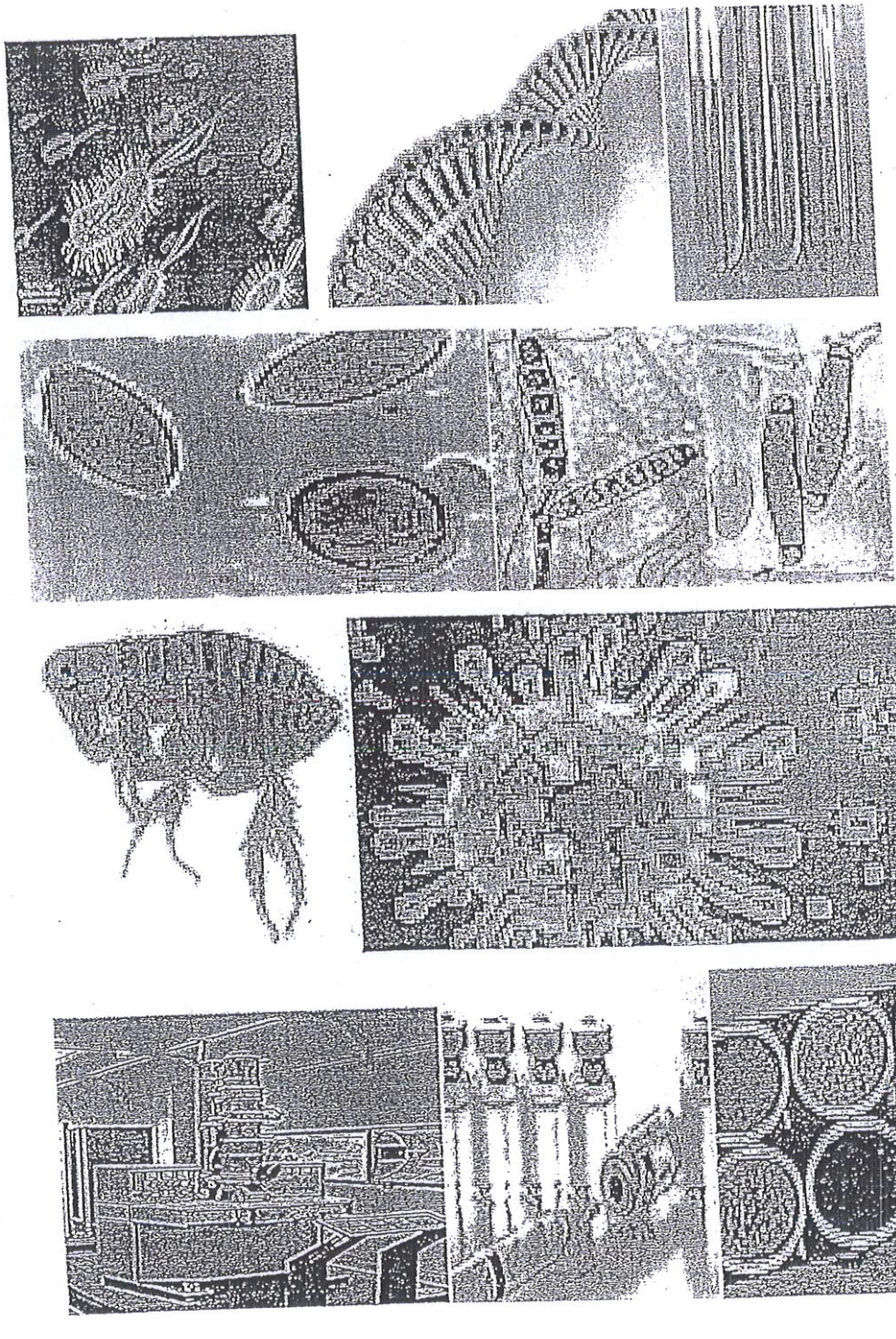



Bacteriophage
DNA
Capsid Protein
DNA
Capsid Protein
Animal Virus
Retrovirus
DNA
Capsid Protein









CONTENTS

Page 15 and 16 which is showing coloured pictures related to Microbiology are to be printed as backside of cover page and frontside of last page respectively (in colour).

Ref: MGM/Micro/2016/O-

Date: 15.01.2016

To,
The Registrar
MGM Institute of Health Sciences
KAmothe, Navi Mumbai.

Subject : Regarding correction in the II-MBBS syllabus

Respected Sir,

Herewith forwarding the text of some changes to be done in making system in University Examination, as suggested by Dr. Shroff, Dr. Deshmukh & Dr. Bhalchandra for needful.

Thanking you,

Yours Sincerely,

Dr. A.D. Urhekar
Professor & Head
Department of Microbiology

Dr. A.D. Urhekar, M.D.
Professor & Head
Department of Microbiology
MGM Medical College & Hospital
Kamothe, Navi Mumbai-410209.

Acad
16/1/16

Copy to COE. for implementation & immediate effect.

16/1/16

MGM Institute Of Health Sciences
INWARD NO. 350
DATE: 15/1/16

Date: 13th Jan, 2016

To,

The Registrar

MGMIHS

Subject: Changes to be made in Microbiology Syllabus.

Respected Sir,

There are some changes which need to be made on page No 32 of Microbiology syllabus sent to you.

The following things need to be changed:

Sr No:	Existing	Changes
1.	A candidate has to obtain minimum of 47 marks out of 95 in theory, 13 marks out of 25 in practical, 11marks out of 30 in internal assessment and 75 marks out of 150 total to be declared as passed	A candidate has to obtain minimum of 47.5 marks out of 95 in theory, 12.5 marks out of 25 in practical, 10.5 marks out of 30 in internal assessment and 75 marks out of 150 total to be declared as passed

The hard copy of the page has been attached herewith for your reference.

Anahit (BOS member)

for Dr A.D. Urhekar
HOD Microbiology
MGMMC, NM

M. Bhalchandra

Dr M. Bhalchandra
HOD Microbiology
MGMMC, Aurangabad

Deshmukh

Dr Deshmukh
Chairperson
BOS, Paraclinical

Dr A.Shroff
Chairperson
Faculty of Medicine

Dept. of Microbiology

Minuted to BOM 95/2016, Dated 28/04/2016

Resolution No. 3.2(b)

Resolution No. 3.2(b): Resolved to accept revised method to calculate internal assessment marks for IInd MBBS Exam effective from batch entering into 2nd MBBS from August 2016 onwards.

For Theory:

	Microbiology	Pharmacology	Pathology	FMT
IIIrd, IVth Sem. & Prelim Exam.	10	10	10	07
Day to day assessment as per MCI norms	05	05	05	03
Total marks	15	15	15	10

For Practical:

	Microbiology	Pharmacology	Pathology	FMT
IIIrd, IVth Sem. & Prelim Exam.	10	10	10	07
Day to day assessment as per MCI norms	05	05	05	03
Total marks	15	15	15	10

Printed on. 14.12.2016 (1576)

REGISTRAR

From: anahita BHESANIA [anahitapb@hotmail.com]
Sent: Wednesday, December 14, 2016 1:12 PM
To: REGISTRAR
Cc: mgmihsaurangabad@gmail.com; anahita BHESANIA
Subject: Model question papers and Integrated teaching topics to b included in Microbiology syllabus
Attachments: Model question paper 1 for Microbiology Syllabus.docx; Model Question Paper 2 for Microbiology Syllabus.docx; Integrated teaching topics.docx

As asked by Dr Goel, Herewith sending

- Model question papers 1 and 2 and
- Integrated teaching topics

to be included in Microbiology syllabus. Shall be sending the hard copies of the same tomorrow.

Regards
Dr Anahita V Bhesania Hodiwala
Professor, Department of Microbiology.
MGMMC, NM

Dear

MGM Institute Of Health Sciences
INWARD NO. 9879
DATE: 14/12/16
REF:

MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

MBBS university examination

Paper 1: General Microbiology, Systemic Bacteriology and Applied Microbiology

Subject: Microbiology **Marks:40**

Duration : 2 hrs **Month/Year: _____**

Instructions:

1. Attempt all questions
2. Mark the most appropriate answer in Sec –A (MCQS) by shading the respective circle option.
3. Maximum marks are indicated in the right
4. Illustrate the answers with suitable diagrams wherever necessary.
5. Please surrender your SWICHED OFF cell phones at entry point into examination hall.
6. Mobile phones, pagers, blue tooth or any other such communication devices are not allowed in the examination premises and in adjacent area.

Multiple Choice Questions: **Marks: 16x0.5=8mks**

(Darken the correct choice answer on the response sheet)

1. Pure growth is a growth of a single organism belonging to the same
   a. Order
   b. Family
   c. Species
   d. Genus
2. Spores are visible in
   a. Grams staining
   b. Negative staining
   c. Modified ZN staining
   d. Alberts staining
3. All are capsulated organisms except
   a. B.anthracis
   b. Y.pestis
   c. H.influenzae
   d. P.aeruginosa
4. Percentage of agar-agar in Loeffler's serum slope is
   a. 0.2%
   b. 1%
   c. 2%

d. Nil

5. Dark field microscopy is useful to identify
   a. Mycoplsma
   b. Rickettisia
   c. Spirochaetes
   d. Brucella
6. Who is called "Father of antiseptic surgery"
   a. Robert Koch
   b. Louis Pasteur
   c. Joseph Lister
   d. Antony Von Leuwenhok
7. Red fluorescence when exposed to UV light is characteristic of
   a. B.uniformis
   b. B.stercoris
   c. B.fragilis
   d. B.melaninogenicus
8. The single most frequent etiologic agent of ascending UTI is
   a. K.pneumoniae
   b. E.coli
   c. E.cloacae
   d. S.marcescens
9. Pathogenesis of which disease does not involve an exotoxin
   a. Typhoid fever
   b. Botulism
   c. Scarlet fever
   d. Toxic shock syndrome
10. Pseudomonas are classified on basis of
   a. Phage typing
   b. Pyocin typing
   c. Serology
   d. Neutralisation
11. Number of serotypes of H.influenzae are
   a. 4
   b. 6
   c. 10
   d. 13
12. Xenodiagnosis is used for
   a. Chlamydia
   b. Rickettsiae
   c. Brucella
   d. Yersinia
13. Chicken cholera is caused by

a. Pasteurella
b. Yersinia
c. Francisella
d. Vibrio

14. Tularaemia is also called as
    a. Malta fever
    b. Haemorrhagic fever
    c. Rabbit fever
    d. Rift valley fever
15. Food poisoning due to ice cream is most probably due to
    a. S.aureus
    b. S.typhimurium
    c. C.botulinum
    d. Cl.perfringens
16. Which of the below organism does not have vertical transmission?
    a. Syphilis
    b. Tuberculosis
    c. Measles
    d. Toxoplasmosis

SECTION B

Brief answer questions: (Answer any 4) **Marks: 4x4=16mks**

1. Enumerate all anaerobic culture methods. Add a note on Mc Intosh Fildes jar.
2. Plasmids
3. Give the principle and uses of dark ground microscope
4. Vapour phase disinfectants
5. Newer techniques for diagnosis of pulmonary tuberculosis.

SECTION C

Long answer questions: (Answer any 2) **Marks: 2x8=16 mks**

1. Define Hospital Acquired infections (HAI) , Sources of HAI , Write a note on Infection control policy .

2. Classify Streptococci ,Discuss pathogenesis of Streptococcus pyogenes ,Discuss lab diagnosis in a case of sore throat .

3. Classify pathogenic Clostridia , Add a note on lab diagnosis of gas gangrene ,Discuss morphology and toxins produced by Cl. Welchii.

MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

MBBS university examination

Paper 2: Immunology, Virology, Parasitology, mycology

Subject: Microbiology **Marks:40**

Duration : 2 hrs **Month/Year: _____**

Instructions:

1. Attempt all questions
2. Mark the most appropriate answer in Sec –A (MCQS) by shading the respective circle option.
3. Maximum marks are indicated in the right
4. Illustrate the answers with suitable diagrams wherever necessary.
5. Please surrender your SWICHED OFF cell phones at entry point into examination hall.
6. Mobile phones, pagers, blue tooth or any other such communication devices are not allowed in the examination premises and in adjacent area.

Multiple Choice Questions: Marks: 16x0.5=8mks

(Darken the correct choice answer on the response sheet)

1. Fab fragment of an immunoglobulin is made of
   a. H chains
   b. L chains
   c. K chains
   d. H and L chains
2. The predominant class of immunoglobulin in the blood of a newborn is
   a. IgA
   b. IgG
   c. IgM
   d. IgD
3. HLA is usually detected on
   a. Neutrophils
   b. Monocytes
   c. Lymphocytes
   d. Macrophages
4. Antigen presenting cells (APC) in the body include
   a. Macrophage
   b. B cells
   c. T cells

d. NK cells

5. Romana's sign is positive in
   a. Filariasis
   b. Chaga's disease
   c. Malaria
   d. Dracunculosis

6. Trichuris trichura is also known as

   a. Pinworm
   b. Seatworm
   c. Whipworm
   d. Roundworm

7. Stool examination for ova is not diagnostic in
   a. Strongyloides
   b. Trichuris
   c. Ascaris
   d. Ancyclostoma

8. Pruritis ani in children is caused by
   a. Necator americanus
   b. Ascaris lumbricoides
   c. Trichuris trichura
   d. Enterobius vermicularis

9. How many types of herpes viruses have been recognised?
   a. 3
   b. 6
   c. 12
   d. 40

10. Virus having affinity to lymphoid tissue is
    a. Pox virus
    b. Herpes virus
    c. Cytomegalo virus
    d. Epstein barr virus

11. Hepatitis A is an enteric virus of serotype
    a. 68
    b. 69
    c. 70
    d. 72

12. Number of segments in ssRNA genome in Orthomyxovirus is
    a. 2
    b. 8
    c. 11

d. 20

13. Candida infection is more commonly associated with
    a. Diabetes
    b. Immunosuppression
    c. Both the above
    d. None of the above

14. Example of zoophilic dermatophytes include
    a. T.rubrum
    b. T.violecium
    c. M.audonii
    d. M.canis
15. The largest worm is
    a. Ascaris
    b. Hymenolepsis
    c. Echinococcus
    d. Taenia
16. Pathogenic free living amoebae include
    a. Nagleria
    b. B.coli
    c. H.nana
    d. Giardia

SECTION B

Short answer questions: (Attempt any 4) **4x4marks=16marks**

1. Differences between bacillary and amoebic dysentry
2. Lab diagnosis of Candida infection
3. Lab diagnosis of Human immunodeficiency virus
4. Innate immunity
5. Rabies vaccine

Long answer questions: (Attempt any 2) **2x8marks= 16marks**

1. Discuss pathogenicity, complications and lab diagnosis of E.histolytica in detail.

2. Define Agglutination. Discuss different types of agglutination reactions with their applications.

3. Name the viruses causing respiratory tract infections. Discuss Pathogenesis and Lab diagnosis of Influenza virus in detail.

1st Year - MBBS

Resolution No. 1.3.7.1 of BOM-51/2017: Resolved to continue the current Internal Assessment pattern for MBBS (i.e. 5 marks for Day-to-day assessment) for Pre and Para Clinical subjects (Anatomy, Physiology, Biochemistry, Microbiology, Pharmacology, Pathology and FMT).
For rest of the subjects, Internal Assessment is to be calculated from terminal/Post end exam marks and Prelims examination, with immediate effect.

2nd MBBS, Microbiology

Resolution No. 1.3.8.13 of BOM-51/2017: Resolved to approve the topics for vertical and horizontal integrated teaching in II[nd] MBBS Curriculum from batch entering in II[nd] MBBS in 2017-18 onwards. Annexure XI

2. Microbiology

Horizontal Teaching:

Sr no.	Topic	Hrs	Departments
1.	Malaria	2hrs	Microbiology, Pathology, Pharmacology
2.	Tuberculosis	2 Hrs	Microbiology, Pathology, Pharmacology

Vertical Teaching:

Sr no.	Topic	Hrs	Departments
1.	Typhoid and typhoid Ulcers	2 Hrs	Microbiology, Pathology, Medicine
2.	Meningitis	2 Hrs	Anatomy, Microbiology, Medicine
3.	Dermatophytes	2 Hrs	Microbiology and Dermatology

Syllabus of MBBS in Microbiology

Topics for Integrated Teaching.

Horizontal Teaching:

Sr no.	Topic	Hrs
1.	Malaria	2hrs
2.	Autoimmune Diseases	2 hrs
3.	Tuberculosis	2 Hrs

Vertical Teaching:

Sr no.	Topic	Hrs
1.	Typhoid and typhoid Ulcers	2 Hrs
2.	HIV	2 Hrs
3.	Meningitis	2hrs
4.	Fungal Infection	2 Hrs
5.	Rheumatic heart disease	2hrs

Resolution No. 1.3.8.11 of BOM-51/2017: Resolved to approve the topics to be included under Bioethics in UG. [Annexure-IX]

Bioethics Topics for UG/PG

Microbiology

For Under-graduates (MBBS):

1. Universal principles
2. Sterilization techniques
3. Drug resistance minimization

MBBS, Microbiology

Resolution No. 1.3.8.8 of BOM-51/2017: Resolved to:

(i) Introduce problem case discussion (problem based learning) in all para-clinical subjects on topics identified from batch entering in II[nd] MBBS in 2017-18 onwards. Annexure-VII

Problem based learning topics for undergraduates (MBBS)

1. Microbiology

Propose & circulate a novel teaching learning process Problem based learning in the form of discussion on case history or on slides / specimen in practical class after completion of that particular topic in theory.

A minimum of 2 Problem based learning classes shall be scheduled in 4[th]Sem and 5[th]Sem MBBS each Covering the Following topics :

1) Discussion on clinical case history of enteric fever, Gonorrhoea&Leptospira.

2) Discussion on clinical history along with slide presentation :-
   - Malaria- Peripheral smear
   - Rhinosporidiasis
   - Molluscumcontagiosum / Negri bodies

Resolution No. 1.3.8.1 of BOM-51/2017: Resolved that in absence of positive findings in stool mounts, students may be asked to draw diagrams/identify the possible findings of Ova / Cyst / Trophozoites Microbiology practical examination to be effective immediately.

II MBBS

Resolution No. 3.5.9 of BOM-52/2018:

a) BOM reiterated the earlier BOM resolution as mentioned below:

Resolution No. 1.3.7.5 of BOM-51/2017: It was resolved that

i) In all the subjects of all courses, MCQ weightage (Section A) shall be a maximum of 20% of the total marks in each paper.

ii) BOS will have to accordingly workout the changes in Section B & C weightage and put up in forthcoming BOS meeting.

iii) Further University Examination section must validate the MCQ Question Bank by Faculties before giving it to question paper-setter.

b) To be effective from:

(i) Ist MBBS - Batch appearing in University August/September 2018 examination onwards.

(ii) IInd MBBS - Batch appearing in University January 2019 examination onwards.

(iii) IIIrd MBBS (Part I) and IIIrd MBBS (Part II) - Batch appearing in University January 2019 examination onwards.

Resolution No. 4.2.1 of BOM-53/2018: Resolved that the printed format of the Medico-legal examination proforma (sexual violence) may be provided to 2nd MBBS students during practical's in formative and summative assessments **[Annexure-X]**, to be applicable from batch entering into 2nd MBBS 2017-18 onwards.

Annexure 38 for item NO. (4)

Annexure - X

CONFIDENTIAL

Medico-legal Examination Report of Sexual Violence

1. Name of the Hospital ..... OPD No. ..... Inpatient No .....
2. Name . . .. D/o or S/o (where known)..... .....
3. Address..... .....
4. Age (as reported) ..... Date of Birth (if known).....
5. Sex (M/F/Others) ..,.....
6. Date and Time of arrival in the hospital .....
7. Date and Time of commencement of examination.....
8. Brought by..... (Name & signatures)
9. MLC No. . ..... Police Station. ....
10. Whether conscious, oriented in time and place and person ✓.....
11. Any physical/intellectual/psychosocial disability .....

(Interpreters or special educators will be needed where the survivor has special needs such as hearing/speech disability, language barriers, intellectual or psychosocial disability.)

12. Informed Consent/refusal

I.....D/o or S/o.....

hereby give my consent for:

a) medical examination for treatment Yes ☐ No ☐
b) this medico legal examination Yes ☐ No ☐
c) sample collection for clinical & forensic examination Yes ☐ No ☐

I also understand that as per law the hospital is required to inform police and this has been explained to me.

I want the information to be revealed to the police Yes ☐ No ☐

I have understood the purpose and the procedure of the examination including the risk and benefit, explained to me by the examining doctor. My right to refuse the examination at any stage and the consequence of such refusal, including that my medical treatment will not be affected by my refusal, has also been explained and may be recorded. Contents of the above have been explained to me in ..... language with the help of a special educator/interpreter/support person (circle as appropriate).....

If special educator/interpreter/support person has helped, then his/her name and signature.....

(31)

(2)

Name & signature of survivor or parent/Guardian/person in whom the child reposes trust in case of child (<12 yrs)

.. ..
.. ..
... .

With date, time & place
Name & signature/thumb impression of Witness
.....
.....
.....

With Date, time and place

13. Marks of identification (Any scar/mole)
(1) .....
(2) .....

Left Thumb impression

14. Relevant Medical/Surgical history

Onset of menarche (in case of girls) Yes No Age of onset.....
Menstrual history – Cycle length and duration ..... Last menstrual period.....

Menstruation at the time of Incident - Yes/ No, Menstruation at the time of examination - Yes/ No

Was the survivor pregnant at time of incident - Yes/No, If yes duration of pregnancy ..... weeks

Contraception use: Yes/No..... If yes – method used: .....

Vaccination status – Tetanus (vaccinated/not vaccinated), Hepatitis B (vaccinated/not vaccinated)

(32)

(3)

15 A.History of Sexual Violence

(I) Date of incident/s being reported (ii) Time of incident/s (iii) Location/s

(iv)Estimated duration : 1-7 days..... 1 week to 2 months.....
2-6 months..... >6 months.....
Episode: One..... Multiple .....Chronic (>6 months) .....Unknown.....

(v) Number of Assailant(s) and name/s.....
(vi) Sex of assailant(s).....Approx. Age of assailant (s)..... If known to the survivor – relationship with the survivor.....

(vii) Description of incident in the words of the narrator:
Narrator of the incident: survivor/informant (specify name and relation to survivor)
.....

If this space is insufficient use extra page

15 B. Type of physical violence used if any (Describe):

Hit with (Hand, fist, blunt object, sharp object)	Burned with
Biting	Kicking
Pinching	Pulling Hair
Violent shaking	Banging head
	Dragging

Any other:

(33)

15 C.

i. Emotional abuse or violence if any (insulting, cursing, belittling, terrorizing).....
.....

ii. Use of restraints if any .....

iii. Used or threatened the use of weapon(s) or objects if any.....
.....

iv. Verbal threats (for example, threats of killing or hurting survivor or any other person in whom the survivor is interested; use of photographs for blackmailing, etc.) if any:
.....

v. Luring (sweets, chocolates, money, job) if any: .....

vi. Any other:.....

15 D.

i. Any H/O drug/alcohol intoxication:

ii. Whether sleeping or unconscious at the time of the incident: .....

15 E. If survivor has left any marks of injury on assailant/s, enter details: .....

15 F. Details regarding sexual violence:

Was penetration by penis, fingers or object or other body parts (Write Y=Yes, N=No, DNK=Don't know) Mention and describe body part/s and/or object/s used for penetration.

	Penetration			Emission of Semen		
Orifice of Victim	By Penis	By body part of self or assailant or third party (finger, tongue or any other)	By Object	Yes	NO	Don't know
Genitalia (Vagina and/or urethra)						
Anus						
Mouth						

Oral sex performed by assailant on survivor	Y	N	DNK
Forced Masturbation of self by survivor	Y	N	DNK
Masturbation of Assailant by Survivor, Forced Manipulation of genitals of assailant by survivor	Y	N	DNK
Exhibitionism (perpetrator displaying genitals)	Y	N	DNK
Did ejaculation occur outside body orifice (vagina/anus/mouth/urethra)?	Y	N	DNK

If yes, describe where on the body			
Kissing, licking or sucking any part of survivor's body	Y	N	If Yes, describe
Touching/Fondling	Y	N	If Yes, describe
Condom used*	Y	N	DNK
If yes status of condom	Y	N	DNK
Lubricant used*	Y	N	DNK
If yes, describe kind of lubricant used			
If object used, describe object:			
Any other forms of sexual violence			

*** Explain what condom and lubricant is to the survivor**

Post Incident has the survivor	Yes/No/Do Not know	Remarks
Changed clothes		
Changed undergarments		
Cleaned/washed clothes		
Cleaned/washed undergarments		
Bathed		
Douched		
Passed urine		
Passed stools		
Rinsing of mouth/Brushing/ Vomiting (Circle any or all as appropriate)		

Time since incident..... H/o vaginal/anal/oral bleeding/discharge prior to the incident of sexual violence.....

H/o vaginal/anal/oral bleeding/discharge since the incident of sexual violence.....

H/o painful urination/ painful defecation/ fissures/ abdominal pain/pain in genitals or any other part since the incident of sexual violence

16. General Physical Examination-

i. Is this the first examination.....

ii. Pulse..... BP.....

iii. Temp.....Resp. Rate.....

iv. Pupils .....

v. Any observation in terms of general physical wellbeing of the survivor.....

17. Examination for injuries on the body if any

The pattern of injuries sustained during an incident of sexual violence may show considerable variation. This may range from complete absence of injuries (more frequently) to grievous injuries (very rare).

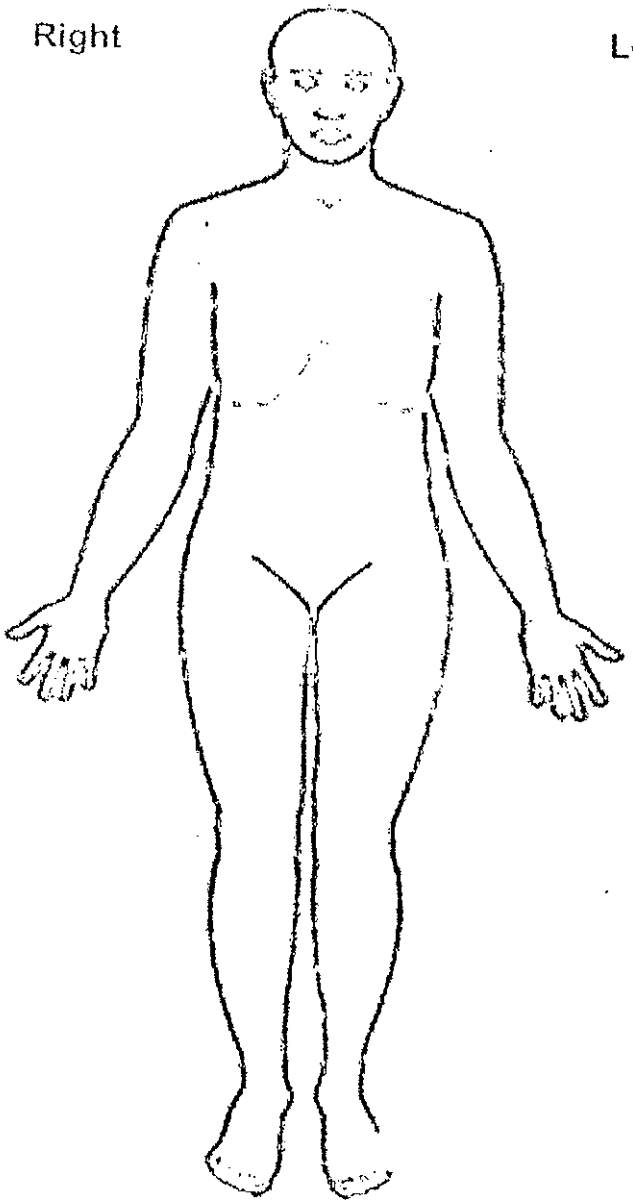
(Look for bruises, physical torture injuries, nail abrasions, teeth bite marks, cuts, lacerations, fracture, tenderness, any other injury, boils, lesions, discharge specially on the scalp, face, neck, shoulders, breast, wrists, forearms, medial aspect of upper arms, thighs and buttocks) Note the Injury type, site, size, shape, colour, swelling signs of healing simple/grievous, dimensions.)

Scalp examination for areas of tenderness (if hair pulled out/ dragged by hair)	
Facial bone injury: orbital blackening, tenderness	
Petechial haemorrage in eyes and other places	
Lips and Buccal Mucosa / Gums	
Behind the ears	
Ear drum	
Neck, Shoulders and Breast	
Upper limb	
Inner aspect of upper arms	
Inner aspect of thighs	
Lower limbButtocks	
Other, please specify	

(7)

Right

Left



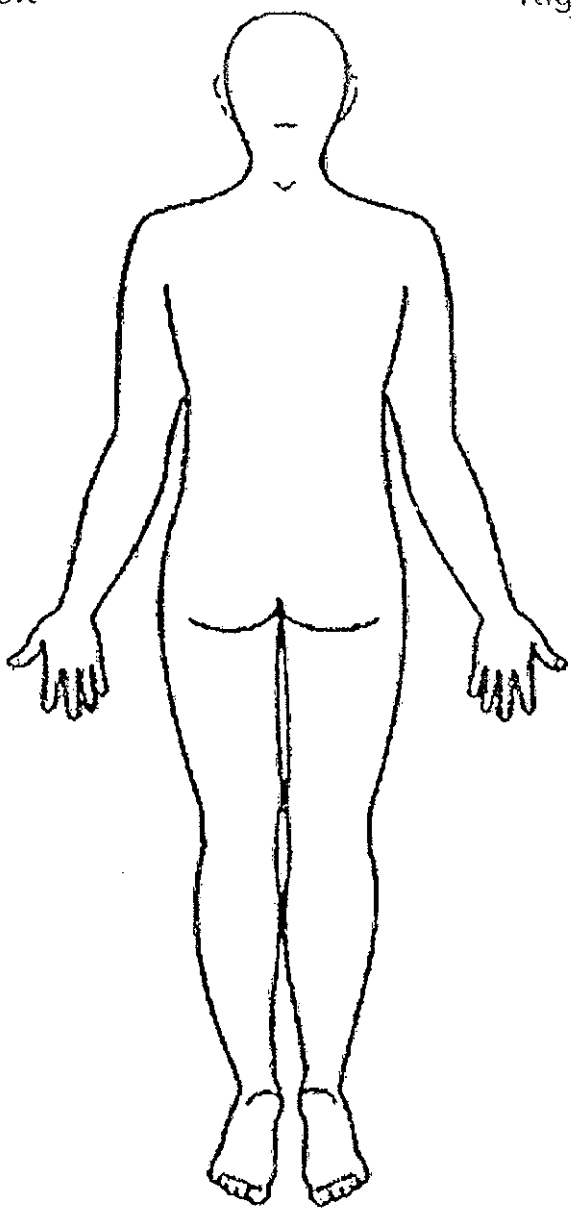
08

(37)

(8)

Left

Right



(38)

(9)

18. Local examination of genital parts/other orifices*:

A. External Genitalia: Record findings and state NA where not applicable.

Body parts to be examined	Findings	
Urethral meatus & vestibule		
Labia majora		
Labia minora		
Fourchette & Introitus		
Hymen Perineum		
External Urethral Meatus		✓
Penis		
Scrotum		
Testes		
Clitoropenis		
Labioscrotum		
Any Other		

* Per/Vaginum /Per Speculum examination should not be done unless required for detection of injuries or for medical treatment.

P/S findings if performed .....
P/V findings if performed .....
Record reasons if P/V of P/S examination performed .....

C. Anus and Rectum (encircle the relevant)
Bleeding/ tear/ discharge/ oedema/ tenderness

D. Oral Cavity - (encircle the relevant)
Bleeding/ discharge/ tear/oedema/ tenderness

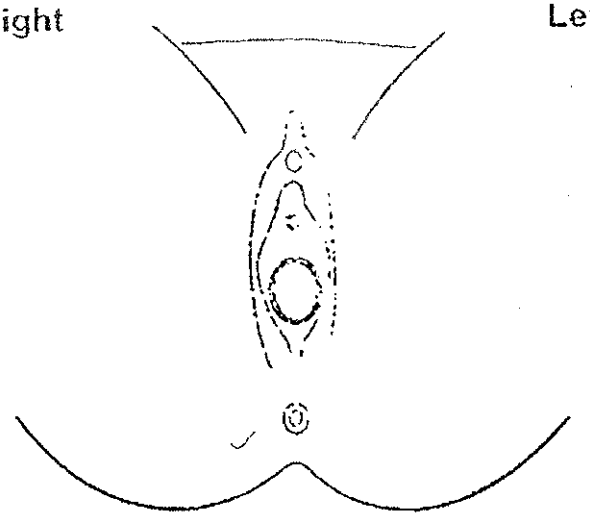
19. Systemic examination:

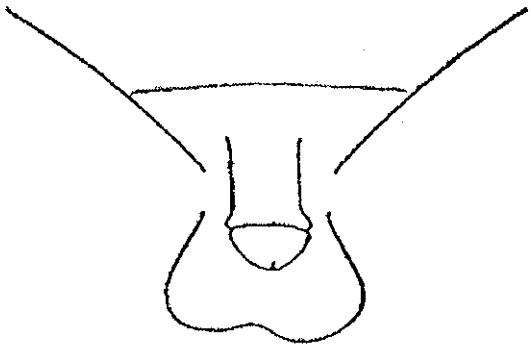
Central Nervous System: .....
Cardio Vascular System: .....
Respiratory System: .....
Chest: .....
Abdomen: .....

(39)

(10)

Right Left





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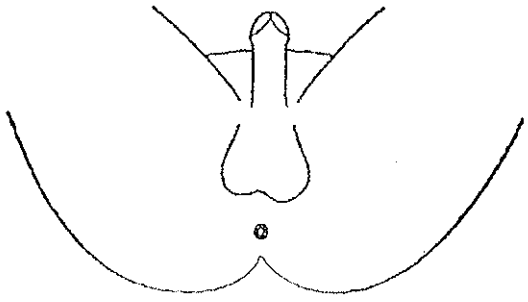


(40)

20. Sample collection/investigations for hospital laboratory/ Clinical laboratory

1) Blood for HIV, VDRL, HbsAg
2) Urine test for Pregnancy/
3) Ultrasound for pregnancy/internal injury
4) X-ray for injury

21. Samples Collection for Central/ State Forensic Science Laboratory

1) Debris collection paper
2) Clothing evidence where available – (to be packed in separate paper bags after air drying)

List and Details of clothing worn by the survivor at time of incident of sexual violence

3) Body evidence samples as appropriate (duly labeled and packed separately)

	Collected/Not Collected	Reason for not collecting
Swabs from Stains on the body (blood, semen, foreign material, others)		
Scalp hair (10-15 strands)		
Head hair combing		
Nail scrapings (both hands separately)		
Nail clippings (both hands separately)		
Oral swab		
Blood for grouping, testing drug/alcohol intoxication (plain vial)		
Blood for alcohol levels (Sodium fluoride vial)		
Blood for DNA analysis (EDTA vial)		
Urine (drug testing)		
Any other (tampon/sanitary napkin/condom/object)		

(12)

4) **Genital and Anal evidence** (Each sample to be packed, sealed, and labeled separately-to be placed in a bag)

* Swab sticks for collecting samples should be moistened with distilled water provided.

	Collected/Not Collected	Reason for not collecting
Matted pubic hair		
Pubic hair combing (mention if shaved)		
Cutting of pubic hair (mention if shaved)		
Two Vulval swabs (for semen examination and DNA testing)		
Two Vaginal swabs (for semen examination and DNA testing)		
Two Anal swabs (for semen examination and DNA testing)		
Vaginal smear (air-dried) for semen examination		
Vaginal washing		
Urethral swab		
Swab from glans of penis/clitoropenis		

*Samples to be preserved as directed till handed over to police along with duly attested sample seal.

22. Provisional medical opinion

I have examined (name of survivor).....M/F/Other.....aged..... reporting_ (type of sexual violence and circumstances)....., XYZ days/hours after the incident, after having (bathed/douched etc)..... My findings are as follows:

- Samples collected (for FSL), awaiting reports
- Samples collected (for hospital laboratory)
- Clinical findings
- Additional observations (if any)

(42)

(13)

23. Treatment prescribed:

Treatment	Yes	NO	Type and comments
STI prevention treatment			
Emergency contraception			
Wound treatment			
Tetanus prophylaxis			
Hepatitis B vaccination			
Post exposure prophylaxis for HIV			
Counselling			
Other			

24. **Date and time of completion of examination** .....

This report contains ..... number of sheets and ..... number of envelopes.

Signature of Examining Doctor

Name of Examining Doctor

Place:

Seal

25. **Final Opinion** (After receiving Lab reports)

Findings in support of the above opinion, taking into account the history, clinical examination findings and Laboratory reports of ..... bearing identification marks described above, ... hours/ days after the incident of sexual violence, I am of the opinion that:

Signature of Examining Doctor

Name of Examining Doctor

Place:

Seal

COPY OF THE ENTIRE MEDICAL REPORT MUST BE GIVEN TO THE SURVIVOR/ VICTIM FREE OF COST IMMEDIATELY

(43)

Resolution No. 4.3.5 of BOM-53/2018: Resolved to add reference book entitled "ESSENTIAL IN RESPIRATORY MEDICINE" by Dr. S.H. Talib in the UG/PG curriculum in medicine and allied subjects

Resolution No. 4.5.2.1 of BOM-55/2018: Resolved to introduce training in 'Research Methodology' for 3rd Semester MBBS students entering in 3rd Semester from September 2018 onwards. It was further resolved that responsibility of this training will be with Pharmacology department.

Resolution No. 4.5.2.2 of BOM-55/2018: Resolved to include the topic on 'Emerging and Re-emerging infections' in MBBS Microbiology syllabus with immediate effect.

Resolution No. 4.5.2.3 of BOM-55/2018: Resolved to provide the printed standard format of the Medico-legal examination (Age,Alcoholic,Weapon,Injury,Death,Potency,Sickness,Fitness) to 2nd MBBS students during practical examination in formative and summative assessments. **[Annexure-34-A,B,C,D,E,F,G,H]**

Recd. on 18/11/2018

Examination for Determination/Estimation of Age

Annexure - 34-A

To,

The _____

Reference : Your Letter No. _____ Dated _____

Name : _____

Age stated : _____ ; Sex : _____ ; Occupation : _____

Marital status : _____

Address : _____

Brought by Police Constable : _____ No. : _____ ; P.S. _____

Identified by : _____

Date and Time of Examination : _____

Place of Examination : _____

Consent : _____

_____

Signature of Examinee

(If minor below 12 yrs. consent of Parents/Guardian)

Examined in presence of : _____

(If female)

(Signature of female attendant)

Identification marks :

1. _____

2. _____

Birth Date : _____ Education : _____

Physical Examination :

1. Height : _____ cm 2. Weight : _____ kg

3. Chest girth at the level of nipple : _____ cm

4. Abdominal girth at the level of navel : _____ cm

5. General build and appearance : _____

6. Hairs : Pubic : _____, Axillary : _____, Facial : _____, Scalp : _____

7. Development of breasts : _____

8. Development of genitals : _____

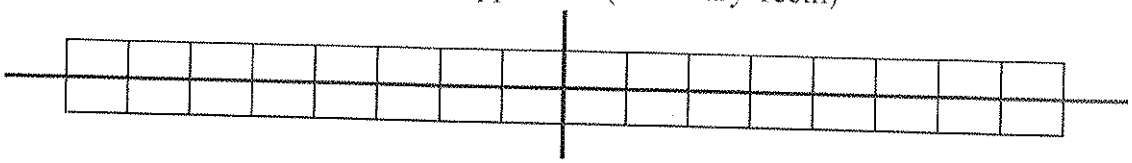
9. Onset of Puberty :

Voice : _____ Adam's apple : _____

Date of menarche : _____ Regularity of menses : _____

10. Dental Status :

Upper Jaw (Maxillary Teeth)



Lower Jaw (Mandibular Teeth)

11. Advised X-ray :

a.

b.

c.

'X-ray' plate No.: a._____ b._____ c._____

Dated :

Provisional Age Certificate

On clinical examination of the individual, age is about _____ years. However, the final opinion regarding the age should be collected from this office after submission of the Radiological report and the birth certificate.

Signature

(Dr.)

Designation & Seal

Place : _____

Date : _____

Age Certificate

To

The _____

Reference : Age estimation of_____, Dated _____

Sir,

I, Dr. _____, after going through the findings

of_____

Physical examination report No. _____, Dated _____

'X' ray plate No. _____, Dated_____

Radiological Examination report No_____, Dated_____

and the Date of Birth Certificate No._____, Dated_____

produced before me,

I am of the opinion that the individual's age is about _____ years

Signature

(Dr.)

Designation & Seal

Place : _____

Date : _____

Examination / Certification of Alcoholic

A Model Scheme of Examination

Annexure-34-B

To,

The Investigating Officer P.S.

Reference : Your letter No. Dated :

I am forwarding herewith the result of my examination of

Name : Son / daughter / wife / widow of

Age : Sex : M/F Weight :

Address :

Consent for examination :

Signature / Thumb impression of Examinee

Identification Marks :

1.

2.

Brought by P.C. Name : No. P.S.

Date and time of examination :

Place of examination :

History :

a. Alleged case -

b. Related to alcohol -

c. Illness -

General behaviour :

Clothing :

Attitude :

Memory : Mental alertness :

Pulse : Respiration :

Temperature : Blood pressure :

Skin :

Smell of alcohol, if any :

Lips :

Tongue :

Eye :

Pupils :

Conjunctiva :

Muscle co-ordination :

Gait :

Speech :

Handwriting

Reflexes :

Systemic examination :

Respiratory System :

Cardio-vascular System :

Gastro-intestinal Tract :

Laboratory investigations :

a. Blood (5 to 10 ml venous blood) **Preservative :**

b. Urine (10 to 20 ml - 2 samples) **Preservative :**

c. Expired air :

Diagnosis :

Opinion : I am of the opinion that -

1. The above person has consumed alcohol and is under its influence.
2. The above person has consumed alcohol and is not under its influence.
3. The above person has not consumed alcohol.

Place :

Date :

Time :

Signature

(Dr.)

Designation & Seal

Form 'A'

(See Rule No. 3)

(Certificate by Registered Medical Practitioner showing whether a person examined by him has or has not consumed an intoxicant)

Serial No. _____ Name & location of the Dispensary or Hospital

Certified that Shri / Smt / Kum. _____ Resident of _____

was brought to this Hospital / Dispensary by _____

(Here state the Name & Designation of the Officer)

on _____ at _____ A.M. / P.M. & was examined by me on _____ at _____ A.M. / P.M.

A clinical examination of the above person disclosed the following :

Age: _____ Years, Weight : _____ kg, Height : _____ cm

Breath : Smelling / Not smelling of Alcohol / Ganja / Bhang.

Speech : Incoherent / Normal

Gait : Unsteady / steady

Pupils Dilated / Normal

Additional remarks, if any :

I find that the above named person _____

_____ HAS CONSUMED _____ Alcohol / Ganja / Bhang

HAS NOT CONSUMED ANY INTOXICANT

I also find that he / she is not under the influence of alcohol.

(N.B. : Blood from the body of the above named was / was not collected by me for chemical examination)

"Certified that the procedure laid down under the rule (4) of Bombay Prohibition Medical Examination and Blood Test Rule 1959 has been followed."

Date : Signature

Time : _____ A.M. / P.M. Designation

Signature / Thumb impression of the Person examined.

Marks of identification of the person examined in case he refuses to give his signature or thumb impression

Form "B"

No. _____

From,
The Casualty Medical Officer, / Assistant Professor in Forensic Medicine
MGM Medical College and Hospital,
Aurangabad

To,
The Director
Forensic Science Laboratory & Chemical Analyser
Govt. of Maharashtra, Mumbai

Date :

Sir / Madam,

I am forwarding herewith a parcel by post / with Shri _____ of _____ containing _____ ml. of Blood and / or Urine sample collected by me on _____ at _____ A.M. / P.M. from the body of Shri / Shrimati / Kumari _____ of _____ who was produced before me for medical examination and/or collection of Blood and / or Urine from his / her body by _____ and request to test the Blood and / or Urine and issue a certificate (in duplicate) regarding the result of the tests.

"Certified that the procedure laid down under the rule (4) of Bombay Prohibition Medical Examination Blood Test Rule 1959 has been followed".

Yours faithfully,

(Dr.)
Casualty Medical Officer
Assistant Professor in Forensic Medicine
MGM Medical College and Hospital,
Aurangabad

Facsimile of the Seal or
Monogram used for Sealing the
Phial containing Blood and/or Urine

Examination of the Weapon

Annexure-34C

To

The Investigating Officer,

Police Station _____

Reference : Your letter No. _____ Dated _____

Sir,

With reference to the above letter, I am sending the report about weapon sent sealed in connection with the injuries of _____

Name of weapon : _____ Kind of weapon : _____

Type of weapon : _____

Description of the weapon :

Blade : Is of _____, Texture : _____

Length : _____, Breadth : _____, Thickness : _____

Edges / Margins : _____, Point : _____

Stains / Foreign body, if any : _____

Joint : Type : _____, Hilt : Size : _____

Handle : Is of _____, Texture : _____

Length : _____, Breadth / Circumference : _____

Stains / Foreign body, if any : _____

(Advised to send it to C.A. for further detail examination)

Injuries possible :

Injuries impossible :

Identification marks if any on the weapon.

(Put the signature on the weapon)

The weapon packed, sealed and handed over to P.C._____ No. _____ P.S. _____

Place : _____

Date & Time : _____

Receipt of weapon & report

Signature

(Dr.)

Designation & Seal

Examination / Certification of the Injured (Injury Report/Certificate)

Annexure-34-D

To

The Investigating Officer.

Police Station _____

Reference : Your Letter No. _____ Dated _____

Sir,

I am forwarding herewith the report of examination of :

Name of Injured : _____ Son/Wife/Daughter/Widow of _____

Surname _____ resident of _____

Age: _____ Sex _____ Occupation _____

Brought by PC _____ No. _____ P.S. _____

Consent for examination :

Signature of Witness Signature of Examinee

Identification marks:

1.

2.

History :

Sr. No.	Type of injury	Size of injury	Situation over the body	Nature of injury	Probable weapon	Age of injury	Advice

Remark

Place :

Date :

Signature

(Dr)

Receipt

Designation & Seal

Form No. 4

(For hospital in patient death, not to be used for still birth)

Annexure-34-E

MEDICAL CERTIFICATE OF CAUSE OF DEATH

(To be sent to Registrar of Births and Deaths along with Death Report form no. 2)

Name of Hospital : _____

I do hereby certify that the person whose particulars are given below died in Hospital in Ward No. _____

on _____ at _____ A.M. / P.M.

Name of the deceased :

Address of normal Residence :

For use by statistical office

Sex	Age in yrs..	Date of Birth	Marital status S, M, W or D	Occupation	Religion	Age at Death				Detailed list code
						If under 1 year Months	Days	If under 24 hours Hrs.	Min.	

Cause of Death — Interval between onset and death approx

1. Immediate Cause :
State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc.

a) _____

Due to :

or as a consequence of

Antecedent cause :
Morbid condition, if any, giving rise to the above cause, stating underlying condition last.

b) _____

Due to :

or as a consequence of

c) _____

2. Other significant conditions contributing to death, but not related to the disease or condition causing it

_____

Natural / Accident / Suicide / Homicide (specify) : How did the injury occur?

IF DECEASED WAS A FEMALE

Was the death associated with pregnancy? **Yes/No**

Was there a delivery? **Yes/No**

Name or rubber-stamp of institution : Serial Number of institution Date of report

Date and Time :

Signature and address of

(Dr.)

Designation & Seal

(To be detached and handed over to the relative of the deceased)

Certified that Shri / Smt/Kum._____S/W/D of Shri _____ Resident of _____

_____ was admitted to the hospital and expired on _____ at _____ a.m./p.m.

Date Time :

Signature

(Dr.)

Designation & Seal

EXAMINATION OFA CASE FOR DETERMINATION OF POTENCY

FM No/ /20

Date : / / / 20

Annexure-34-F

To,

_____

_____

Reference : Your letter / order no. _____ Dated -_____

Name of the individual-_____

Age as stated: _____, Sex: _____ Marital status (If married, duration) _____

Address : _____

_____

Occupation : _____

Brouught by (Name, signature & designation) _____

Date, place & time of examination :_____

Light arrangement - _____

Consent :

Q - Are you willing to be examined by me / us to opine in relation to your potency ? The examination will include physical examination, laboratory investigations and psychological assessment. The examination by dept of Urology would also include administration of drugs to evaluate your potency. You have right to refuse but this refusal may go against you in the court of law.

Answer given - Yes / No

Name, signature of the person giving consent with Date -

Witness to the consent - Name, signature & Date -

Identification marks-

1.

2.

History

1. Do you have erectile dysfunction ? - Yes / No

   If yes

   a. Since how long have you noticed the erectile dysfunction?

   b. Did the problem being abruptly or insidiously?

c. Do you have inability to achieve or maintain an erection or both ?

d. Are you able to penetrate or not ?

e. Whether partial penetration or ejaculation before penetration ?

f. Do you ever get normal or near normal erection (During masturbation with other partner, early morning)

2. H/o any major illness - HT / DM / TB / Vascular disease / Endocrinal diseases etc.
3. H/o STD -
4. H/o mental illness -
5. Any stress-
6. Family environment-
7. Any history of medication / for what ailment / duration of medication
8. H/o Drug abuse - Nicotine / Ganja /Alcohol / other
9. H/o any head injury / spinal injury / any operation on genitals -
10. H/o aversion dislike / dejection / for any particular sex partner

Obsevations

General examination

General built and appearance : _____

Weight : kg Height : cm

Teeth : Total No. :

Secondary sexual characters :

Beard : Moustache :

Axillary hairs : Pubic hairs :

Breast development / Gynaecomastia if any :

Any marks of injury / scar on the body :

Local examination : (Along with Urology department) done in ward no_____

a. Penis :

Circumcised / Non-Circumcised :

Stretched penile length -

Length when erect -

Circumference (flaccid & erect) :

Disease / deformity / injury (if any) :

Sensation over glans penis :

Foreskin (Retractable / Non-retractable) :

Dorsal penile pulsation :

Any Discharge :

Smegma :

Hygine :

b. Scrotum :
Pendulous or not :
Developmental defects :
Deformities :
Cremasteric reflex :

c. Testes :
Whether present in scrotum or not :
Size :
Consistency :

d. Prostate (Per rectal examination) :

e. Bulbocavernous reflex :

£ Any evidence of S.T.D

g. Effect of administration of _____ in _____ dose _____ After _____ minutes
Result :

SYSTEMIC EXAMINATION

- C.N.S. :
- R. S. :
- C. V. S. Pulse : BP:

  Femoral artery :

  Dorsalispedis artery :
- G.I.T. :

Laboratory Investigations (If required)

1. CBC :
2. Hb :
3. BSL (Fasting & PP) :
4. Sr. FSH :
5. Sr. LH :
6. Sr. testosterone & Oestrogen :
7. Sr. prolactin :
8. VDRL :
9. USG/Colour doppler :
10. TFT (TSH, T3, T4) :
11. LFT :
12. HbA1C :

Opinion : After detailed examination i.e. based on physical examination, psychiatric evaluation and examination by urologist, we are of the following opinion". There is nothing to suggest that the above examined person is incapable to perform sexual intercourse ". / The person is in capable of performing sexual intercourse due to.....

Place : _____

Date _____

Signature

Name & Qualification :

Designation

Registration No. :

MEDICAL SICKNESS / UNDER TREATMENT CERTIFICATE

Annexure-34-G

Signature of the applicant _____
(Government servant / Private)

I Dr._____ after careful personal examination of the case hereby certify that Mr. / Mrs./ Ms._____ _____ whose signature is given above was suffering from _____ and was under my treatment for the same as Outdoor / indoor patient. And I consider that a period of absence from duty of _____ _____ with effect from _____ is absolutely necessary for restoration of his / her health

He / She was advised rest for a period of _____ days

Identification marks:

1)

2)

Hospital No.

Date:

Authorised Medical Attendant
Seal & Reg. No.

MEDICAL FITNESS CERTIFICATE

Signature of the applicant _____
(Government servant / Private)

I Dr._____ after careful personal examination of the case hereby certify that Mr. / Mrs. / Ms._____ _____ whose signature is given above was suffering from _____ and was under my treatment for the same. He / She was advised rest for a period of _____days.

He / She recovered completely from the illness and he/she is fit to resume his / her duty with effect from_____

Identification marks:

1)

2)

Hospital No.

Date:

Authorised Medical Attendant
Seal & Reg. No.

Certificate of Physical Fitness

Annexure-34-H

This is to Certify that I have examined Shri / Smt / Kum. _____ _____ who signed below in my presence and who is a candidate for employment for the post of _____ in the department / office _____ at _____ I could not discover that he / she has any disease (communicable or otherwise) constitutional weakness or bodily infirmity, except _____. I do consider / do not consider this is a disqualification for such an employment.

He / she _____ age is according to his / her own statement _____ years and by appearance about _____ years.

Identification marks:

1)

2)

Signature of the applicant : _____

(Government servant / Private)

Hospital No.

Date:

Authorised Medical Attendant

Seal & Reg. No.

Resolution No. 4.13 of BOM-55/2018: Resolved as follows:-

(i) Slow learners must be re-designated as potential learners.

(ii) Students scoring less than 35% marks in a particular subjects/course in the 1st formative exam are to be listed as potential learners. These learners must be constantly encouraged to perform better with the help of various remedial measures.

(iii) Students scoring more than 75% marks in a particular subjects/course in the 1st formative exam are to be listed as advanced learners. These learners must be constantly encouraged to participate in various scholarly activities.

Resolution No. 3.1.4.2 of BOM-57/2019:

i. Resolved to include "Gender Sensitization" into UG (from new batch 2019-2020) and PG (from existing batches) curricula. **[Annexure-21]**

ii. Resolved to align the module of "Gender Sensitization" with MCI CBME pattern for MBBS students.

iii. Resolved that Dr. Swati Shiradkar, Prof., Dept. of OBGY., MGM Medical College, Aurangabad will coordinate this activity at both campuses.

Annexure - 21

Gender sensitization for UG (2nd , 3rd , 8th semesters) and PG (3 hours)

INCLUSION OF " GENDER SENSATIZATION" IN CURRICULUM

Introduction :

The health care provider should have a healthy gender attitude, so that discrimination, stigmatization, bias while providing health care will be avoided. The health care provider should also be aware of certain medico legal issues related with sex & gender.

Society particularly youth & adolescents need medically accurate, culturally & agewise appropriate knowledge about sex, gender & sexuality. So we can train the trainers for the same. It is need of the hour to prevent sexual harassment & abuse .

To fulfill these objectives, some suggestions are there for approval of BOS.

Outline

1)For undergraduates :- Three sessions of two hours each, one in 2nd term, one in 3rd term & one in 8th term.

2)For Faculties and postgraduates :- One session of two hrs .

3)For those want to be trainers or interested for their ownself, value added course, which is optional about sex, gender, sexuality & related issues.

Responsibility

ICC of MGM, MCHA , with necessary support from IQAC & respective departments.

Details of undergraduate sessions

1)First session in 2nd term

Aim – To make Students aware about the concept of sexuality & gender**.**

To check accuracy of knowledge they have,

To make them comfortable with their own gender identify & related issues.

To make them aware about ICC & it is functioning.

Mode – Brain storming , Interactive power point presentation experience sharing.

Duration – Around two hours

Evaluation – Feedback from participants.

2)Second session in 3rd / 4th term

Aim – To ensure healthy gender attitude in these students as now they start interacting with patients.

To ensure that the maintain dignity privacy while interacting with patients and relatives, particularly gender related.

To make them aware about importance of confidentiality related with gender issues.

To encourage them to note gender related issues affecting health care & seek solutions.

Mode – focused group discussions on case studies, Role plays & discussion.

Duration – Around two hours.

Evaluation – Feedback from participants.

Third session in 8th term.

Aim – To understand effect of gender attitudes on health care in various subjects.

To develop healthy gender attitude while dealing with these issues.

Mode – Suggested PBL by departments individually. (In collaboration with ICC till faculty sensitization is complete)

Evaluation – Feedback

****

FOR POSTGRADUATES

Session of 2-3 hrs preferably in induction program.

Aim – To introduce medically accurate concept of gender, sex, gender role & sex role.

To ensure healthy gender attitude at workplace.

To understand gender associated concepts on health related issues & avoid such bias wile providing health care.

To make them aware about ICC & it's functioning.

Mode – Interactive PPT

Role plays & discussion

Duration – 2 to 3 hrs

Evaluation – Feedback.

FOR FACULTIES

Session of 2 hours may be during combined activities.

Aim – To ensure clarity of concept abut gender & sex.

To discuss effect of these concept on health related issues.

To identify such gender & sex related issues in indivual subject specialties.

To discuss methodology like PBL for under graduate students when whey are in 7^{th}-8^{th} semester.

Mode – Role play

Focused group discussion

Case studies

Evaluation – Feed back.

******

MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

Grade 'A' Accredited by NAAC

Sector-01, Kamothe, Navi Mumbai - 410209

Tel 022-27432471, 022-27432994, Fax 022-27431094

E-mail- registrar@mgmuhs.com Website : www.mgmuhs.com