

## SCHEME FOR 2<sup>ND</sup> PROFESSIONAL MBBS EXAMINATION OF WBUHS

### MICROBIOLOGY

A. Written Paper: Two Papers, (40+40=80), 2hrs.each paper.

.Paper I -General Bacteriology, Systemic Bacteriology, Immunology.

Paper II –Virology, Mycology, Parasitology.

The four questions in each theory paper will preferably have the following distribution of mark.

Full marks-40, Time-2 hrs..

Q.1. One (out of two) Clinical problem oriented question consisting of 2-4 small segments. Marks for each segment will be indicated separately. =10

Q.2. Three short note type questions (out of four) 4x3=12

Q.3. Three (out of four) short answer type/explanation of statement/difference between/mechanism of action/comment on 4x3=12

Q 4. Three short answer type questions 2x3=6

Answer to each question should be given by the candidates in a separate answer book. Only one examiner will examine all the answer scripts to the same question in that center.

B. Oral /Viva

i) General Bacteriology, Immunology, Systemic Bacteriology -9 marks

ii) Virology, Mycology, Parasitology -6 marks

C. Practical- 25 marks. Time 1.1/2 hr. + 1/2h hr for spotting = 2 hrs.

O	Identification of unknown bacterial culture	-8
O	Ziehl-Neelsen Staining of Sputum smear supplied	-3
O	Microscopical examination of supplied stool smear	-3
O	A serological test by common slide agglutination method	3
O	Laboratory Note Book	-3
O	Spotting	-5

### **ASSESSMENT CARD**

( TO BE KEPT IN THE DEPARTMENT)

Full Marks – Viva voce – 10 X 20 = 200, Practical = 20 X 3 = 60.

Name of student :

Batch :

No :

Roll

Sl. No.	Topics	Oral	Marks Obtained	
	3 <sup>rd</sup> semester		Practical	Signature of Teacher
1.	History, Classification, Morphology & Physiology of Bacterial genetics.			

2.	Sterilization, methods of isolation & identification.			
3.	Gram positive cocci			
4.	Gram negative cocci, corynebacteria			
5.	Mycobacteria			
	<b>4<sup>th</sup> semester</b>			
6.	Spore bearers			
7.	Enterobacteriaceae			
8.	Vibrios, Pseudomonas & Pravobacteria.			
9.	Spirillum, Actinomyces, Campylobacter.			
10.	Antigen, Immunoglobulin, Complement.			
11.	Immunity & hypersensitivity.			
12.	Immunodeficiency states & immunological reactions.			
	<b>5<sup>th</sup> semester</b>			
13.	Spirochetes.			
14.	Rickettsiae, Chlamydia, mycoplasma, general virology.			
15.	D.N.A. viruses.			
16.	R.N.A. Viruses.			
17.	Mycology			
18.	Protozoa			
19.	Nematodes			
20.	Cestodes & trematodes.			

N. B. 1. Students must appear for assessment on scheduled dates, failing which no assessment will be taken on later dates except on special grounds.

Students must keep laboratory note book up to date failing which no student will be allowed for practical assessment.

Signature of the Head of the Department.

#### ITEM CARD

Name :  
Roll No.

College :

Year :

#### **DISTRIBUTION OF INTERNAL ASSESSMENT MARKS THEROTICAL DAY TO DAY ASSESSMENT**

GENERAL BACTERIOLOGY	SYSTEMIC BACTERIOLOGY	PROTOZOLOGY	HELMINTHOLOGY	IMMUNOLOGY	VIROLOGY	MYCOLOGY	TOTAL	10% OF 75
10	10 10	10	10	10	10	5	75	7.5

#### **PRACTICAL DAY TO DAY ASSESSMENT**

Microscope & Sterilization	Culture media	Grams' stain	AFB Stain	Stool Exam.	Identification of unknown Culture	Spotting	Serology	Total	10% of 75
10	10	10	10	10	10	10	5	75	7.5

**SENT UP EXAMINATION – THEROTICAL**
**TOTAL THEORITICAL**

Theory 40x2=80	Oral 20	Total Theory + Oral	Total Theory + Oral in 75	10% of Theory + Oral	(1) Day to day Assessment Theoretical-7.5 (2) Sent up Exam. Theory + Oral = 7.5	Total (1+2) 7.5+7.5=15

**PRACTICAL**
**TOTAL PRACTICAL**

Internal Assessment Practical 25 (calculated in 75, i.e. 25 X 3)	10% of Practical (7.5)	Day to day assessment Practical 7.5	Practical Day to day 7.5	Sent up Exam. Pr. 7.5	Total ( 1+2) 7.5+7.5=15

**CURRICULUM & SYLABUS FOR THE MBBS COURSE OF STUDIES**

A Duration : 1.5 yrs. 3<sup>rd</sup>, 4<sup>th</sup> & 5<sup>th</sup> Semester

B. Total hours of Teaching : 250 hrs. Comprising of

1) Lecture + Lecture demonstration =	100 x 1 hr	= 100 hrs
2) Practical class	50 x 2 hrs	= 100 hrs
3) Tutorials	25 x 2 hrs.	= 50 hrs.
<b>TOTAL</b>		<b>=250 hrs</b>

C. Curriculum (Syllabus)

Topic for theoretical Class

1. THEORY

No. hrs.	Topic	Class
1.	Introduction to Microbiology. History and Classification.	One
	<u>General Bacteriology</u>	
2.	Morphology of Bacteria & Methods of study of Morphology.	Two
3.	Physiology of Bacteria, Metabolism & products thereof	One
4.	Growth requirements of Bacteria, Growth Curve/measurement of growth	One
5.	Sterilization & disinfection	One

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|----|--|-----|
| 6. | Host-parasite relationship   | One |
| 7. | Bacterial genetics with variation  | One |
| 8. | Antimicrobial agents, mechanism of action,<br>Mechanisms of bacterial drug resistance and Sensitivity Testing. |     |

### IMMUNOLOGY

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|-----|---|-----|
| 1.  | Introduction to Immunology. Natural &<br>Non-specific Immune Mechanisms | One |
| 2.  | Antigen, Hapten, Adjuvants  | One |
| 3.  | Antibody  | One |
| 4.  | Complement System   | One |
| 5.  | Structure & Function of Immune System                                   | Two |
| 6.  | Immune response with T -B Cell Co-operation                             | One |
| 7.  | Cytokines with its role in cell mediated<br>Immune response             | One |
| 8.  | Hypersensitivity and related disorders                                  | Two |
| 9.  | Antigen -antibody reactions methodology<br>of testing .                 | Two |
| 10. | Immune deficiency disorders and autoimmune Diseases                     | One |
| 11. | Vaccine and scope of Immunotherapy                                      | One |

#### Pathogenic Bacteria and Diseases

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|----|--|-----|
| 1. | Methods of study of bacteria   | One |
| 2. | Staphylococcus: Diseases produced, modes of<br>transmission, pathogenesis & diagnosis.             | One |
| 3. | Streptococcus: diseases, transmission, pathogenesis, diagnosis<br>Streptopneumoniae: epidemiology. | Two |
| 4. | Neisseria: Important species, diseases caused<br>: Pathogenesis, diagnosis, Epidemiology           |     |
| 5. | Corynebacterium diphtheriae: pathogenesis, transmission, diagnosis, Vaccine.                       |     |
| 6. | Listeria, Erysipelothrix, Legionella, etc.<br>Diseases caused, diagnosis.                          | One |

7. *Mycobacterium tuberculosis* -Transmission, Pathogenesis, types, immunity  
Hypersensitivity, interpretation of Results of Mantoux test diagnosis, Vaccine- Two  
Leprosy—transmission, features, types diagnosis etc., Role of vaccine  
Atypical *Mycobacteria*.  
Classification, diseases, diagnosis
8. *Actinomyces* & : Disease caused, mode of transmission,  
*Nocardia* Diagnosis  
  
Aerobic spore-Bearers: *Bacillus*. Important species, disease caused.  
Pathogenesis. diagnosis, epidemiology of Anthrax. One
9. Nonsporing *Bacteroides* Sp. etc. : Diseases produced,  
anaerobes features, diagnosis.
10. Anaerobic *Clostridia*- Tetanus, Gas-gangrene, Food poisoning,  
Spore bearers Botulism : Pathogenesis, infection, transmission,  
Diagnosis, treatment and prophylaxis. Three
11. Enterobacteriaceae: Diseases caused by *E.coli*, *Klebsiella*, *Enterobacter* etc. Two
12. Enteric fever and *Salmonella* sp: Food poisoning, Pathogenesis, Diagnosis. Two
13. Shigellosis & Acute Bacillary dysentery One
14. UTI and other diseases of *proteus* sp. *Providencia* etc. One
15. *Yersinia* sp. - Plague – Pathogenesis Types, diagnosis,  
epidemiology, food poisoning One
16. *Vibrios* - Important species, Cholera -pathogenesis, transmission,
17. *Campylobacter* & *Helicobacter* -Diseases caused, pathogenesis, diagnosis. One
18. *Pseudomonadeceae* Importance, pathogenesis, diagnosis One
19. *Haemophilus*: Disease, pathogenesis diagnosis One
20. *Bordetella* sp : Disease caused, transmission, pathogenesis, diagnosis One
21. *Brucella* sp.: Disease caused, transmission, pathogenesis. diagnosis. One
22. Miscellaneous bacteria like  
*Pasteurella*, *francisella*, : Disease caused  
*Streptobacillus*, *spirillum* etc. epidemiology One
23. Spirochetes: Nonpathogenic spirochetes syphilis  
yaws, pinta, bejel, leptospirosis,  
Relapsing fevers & lyme disease Four
24. Rickettsial disease Epidemiology & diagnosis Two
25. *Mycoplasma* and *Chlamydia*: diseases including diagnosis. Two
26. Normal flora of Human body. One

### VIROLOGY

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|-------|--|-----|
| 1.    | Introduction to virology, general properties of viruses and Classification of viruses                          | One |
| 2.    | Replication of viruses, Antiviral agents   | One |
| 3.    | Principles of viral diseases   |     |
| 4.    | Principles of diagnosis of viral infections  | One |
| 5.    | Common viral vaccines  | One |
| 6.    | Bacteriophage  |     |
| 7.    | Diseases caused by Herpes viruses, Varicella zoster virus, CMV EBV etc.  | One |
| 8.    | Hepatitis viruses, A,B,C,D,E; Hepatitis A & B properties laboratory diagnosis                                  | One |
| 9.    | Picorna viruses -and diseases produced with special mention to Pathogenesis of polio diagnosis and prevention. | One |
| 10.   | Viral gastroenteritis -agents, pathogenesis, diagnosis.  | One |
| 11.   | Rhabdo viruses -General character of Rabies virus, pathogenesis of disease diagnosis prophylaxis.              | One |
| 12.   | Orthomyxo and paramyxo viral diseases (Influenza, Mumps, Measles Rubella) including vaccines.                  | One |
| 13(a) | Retrovirus -HIV infection & AIDS & other retrovirus;   |     |
| (b)   | Oncoviruses -examples & properties & mechanisms of viral etiology of tumor scope of immunotherapy.             | One |
| 14(a) | Arboviruses and arboviral diseases prevalent in India: epidemiology & diagnosis                                |     |
| (b)   | Slow viral diseases -etiology, diagnosis   | One |



### MYCOLOGY

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|----|--|-----|
| 1. | Introduction, Classification, principles of laboratory diagnosis | One |
| 2. | Superficial mycosis  | One |
| 3. | Subcutaneous mycosis   | One |
| 4. | Deep mycosis   | One |
| 5. | Opportunistic mycosis  | One |

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### PARASITOLOGY

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|-----|--|-------|
| 1.  | Introduction, Classification, definition and types of hosts.<br>Definition and types of parasites  | One   |
| 2.  | Intestinal amoebiasis and complications -mode of infection<br>pathogenesis, laboratory diagnosis.  | One   |
| 3.  | Flagellated protozoa -intestinal & genitourinary   | One   |
| 4.  | Haemoflagellates -diseases, life cycle, vector for transmission,<br>laboratory diagnosis (Trypanosomes, leishmania).   | One   |
| 5.  | Malaria -types, parasite -Morph., life cycle, vector,<br>laboratory diagnosis.   | Two   |
| 6.  | Toxoplasmosis and other opportunistic protozoa infections.   | One   |
| 7.  | Classification of helminthes and general characters of nematodes,<br>introduction to intestinal nematodes, strongyloides stercoralis,<br>Ascaris lumbricoides, Hook worm, Trichinella spiralis, Enterobius<br>Vermicularis trichiurae life cycle, disease, laboratory. Diagnosis, epidemiology | Three |
| 8.  | Filariasis -diseases, vector, life cycle of parasite Pathogenesis<br><br>of disease, laboratory diagnosis.   | Two   |
| 9.  | Dracunculosis -life cycle of parasite, mode of infection,<br>epidemiology, laboratory diagnosis.   | One   |
| 10. | General characters of cestodes, Taeniasis -hosts, mode of<br>infection, life cycle of parasite infection, laboratory diagnosis.  | One   |

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|-----|--|-----|
| 11. | Echinococcus granulosus-Morphology, life cycle of parasite, mode of infection, prevention, laboratory diagnosis.       | One |
| 12. | D.latum and other cestode infections   | One |
| 13. | Trematodes -classification, diseases caused, Life cycle of schistosomes and general principles of laboratory diagnosis | One |

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Nineteen

## II. PRACTICAL:

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|-----|--|-------------|
| 1.  | Parts and use of microscope and microscopy   | 1           |
| 2.  | Instruments and glass wares used in Microbiology   | 1           |
| 3.  | Universal presence of microbes   | 1           |
| 4.  | Commonly used media and culture techniques<br>(Media -simple basal media -liquid, solid, enriched media, selective media, enrichment media, Indicator Media)<br>Transport Media, Blood culture media, sugar media, Anaerobic media Name, type, composition, sterilization and use. | 2           |
| 5.  | Sterilization methods used for different purpose-<br>basic principles, instruments/chemical agents used  | 1           |
| 6.  | Study of morphology of bacteria :<br>a) Gram staining<br>b) Albert staining<br>c) Ziehl-Neelsen staining   | 2<br>1<br>2 |
| 7.  | Study of motility of bacteria by<br>a) Hanging drop method                      d) Capillary tube method.<br>b) Cragie's tube method                      c) Dark-ground microscopy<br>c) Straight loop inoculation method   | 2           |
| 8.  | Methods of antimicrobial sensitivity testing<br>a) Disk diffusion                      (b) Tube dilution   | 1           |
| 9.  | Study of Staphylococcus aureus and staph. epidermidis.<br>Colony morphology. Pigment production. Gram stain.<br>Motility, Coagulase and other confirmatory tests including Catalase test.  | 2           |
| 10. | Study of -Gram + cocci<br>a) Haemolytic properties of Staph., Strepto., Pneumococci<br>b) Gram staining, Morphology, Study of Strepto, Staphylo<br>Neisseria, Pneumococcus, Clostridia.  | 1           |



11.	Corynaebacterium -	Albert Stain Media used	2
12.	Mycobacterium -	Z -N Stain Study of charts Confirmatory diagnosis of Tuberculosis & Leprosy D/D Myco. tuberculosis & M. leprae in smear.	3
13.	Study of spores -Gram stain, Spore-Stain (Carbol Fuchsin)		1
14.	Study of Stained Smear, Capsule -India Ink staining (Negative - Stain) Carbol Fuchsin (Positive stain), Methods of Anarobiasis.		
15.	Enterobacteriace	(a) E.coli (Use of media) Colony character Biochemical reactions for Identification of the bact. & Final jdentificajon with antibiogram)	1
		(b ) Klebsiella sp.	1
		(c) Proteus sp.	1
		(d) Salmonella sp.	1
		(e) Shigella sp	1
16.	Vibrio -Gram Stain Motility test Oxidase Biochemical Reactions.		1
17.	Pseudomonas sp. -Gram Stain, Motility test, Oxidase		1
18.	Serological Tests: VDRL Test RPR Agglutination -Widal, Latex Agglutination test, ELISA -any common test done.		3
19.	Introduction to Parasitology - Types of clinical materials different types of tests done. Steps of exam. of Stool Smear Steps of exam. of Blood Smear Steps of exam. of marrow Smear.		2
20.	Blood Parasites -	Malaria Parasite L.D.Body Microfilaria	1 1 1
21.	Adult Parasites -	Nematodes Cestodes Trematodes	2 2 1

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|-----|--|---|
| 22. | Examination of Stool for ova, parasite & Cyst<br>Saline and Iodine preparations. | 3 |
| 23. | Demonstration of fungus by KOH prepn./ lactophenol cotton blue staining.         | 1 |
| 24. | Demonstration of yeast cells in Gram stains & culture                            | 1 |

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**III. Tutorials – 25 x2 hrs =50 hrs**

- A. Interpretation of laboratory investigation for diagnosis of Infectious disease and correlation between clinical features with aetiological agents to be taken up in the form of charts on diseases of national importance e.g.

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|---|------------------|
| a) Tuberculosis<br>b) Leprosy<br>c) Cholera<br>d) Enteric fever<br>e) Diphtheria<br>f) Whooping coughs<br>g) Tetanus<br>h) Malaria<br>i) Kala-azar<br>j) Filaria<br>k) Dengue<br>t) Hepatitis B<br>m) AIDS<br>n) Hookworm anaemia | 14 x 2 Hrs. = 28 |
|---|------------------|

- B. Clinical Microbiology: 11 x 2 hrs.= 22 hrs

1. Upper respiratory tract. Infections with lab diagnosis
2. Lower respiratory tract infections with lab diag.
3. Bacterial food poisoning with lab. diag.
4. Terminology: gastroenteritis, diarrhoea, dysentery, pseudo membranous colitis diarrhoea and its lab. diag.
5. Dysentery and its lab. diag.
6. Meningitis -types, agents and its lab. diag
7. Terminology of Bacteraemia, Septicaemia, pyaemia and its lab. Diagnosis/ PUO (Blood culture)
8. Urinary tract Infection, organism and its lab. diag.
9. Sexually transmitted diseases list and lab. diag.
10. Hospital acquired infection and its control
11. Bacteriology of milk, water air.

**Model Question in Microbiology****2nd Professional MBBS****MICROBIOLOGY****Time :- 2 hours****First -Paper****Full****Marks: 40**

Q1. A 8 year old girl was admitted through emergency because of high fever and limping gait. Her mother states that she developed these symptoms after a bout of sore throat accompanied by high fever three weeks back.

What may be the probable diagnosis? How do you proceed in the microbiological laboratory for finding its aetiological agents? What serological tests do you suggest in this case? 1 +6+ 3 = 10

Or

A 24 years old person was admitted through emergency because of severe dehydration with sunken eyes following a bout of rice watery stool accompanied with vomiting.

What is this condition?

What are the aetiological agents responsible for this situation?

How do you confirm any one of the aetiological agents in the laboratory?

1 + 3+6 = 10

Q2. Write short notes on the following (any three)

3 x 4 =12

- i) Fimbria and its clinical significance.
- ii) Bacterial capsule.
- iii) Weil Felix test.
- iv) Environmental Mycobacteria.
- v) Pyoderma gangrenosum.

Q3. Comments on (any three)

3 x 4 = 12

- i) A positive mantoux test in an adult has many fallacies.
- ii) Antibigram is must for staphylococcus because of MRSA.
- iii) The presence of morphologically similar organisms does not prove the case to be of diphtheria.
- iv) The presence of acid fast bacilli in sputum smear should be reported in exact or approximate number because of prognostic value.
- v) Apart from pyogenic lesion streptococci may be related to Non pyogenic lesions with grave consequences.

Q4. Differentiate between

3 x 2 = 6

- i) Gram positive and gram negative cell wall.
- ii) Active and passive immunity.
- iii) IgG and IgM.



## Second Paper

**Time :- 2 hours**
**Full Marks: 40**

- Q1. A twenty five year old male came to you with history of fever and yellow colouration of urine which developed within two to three days. On examination his abdominal examination is quite normal expect tenderness and slight soft enlargement of liver.

What is your diagnosis? .

What are the tests that you will do in microbiological lab to confirm the aetiology?

If the icterus or the symptoms persist beyond six months, what are the serological parameters you will ask for?

1 +6+ 3 = 10

Or

An emaciated young person comes to you with history of fever for three months and pain in the left side of abdomen. On examination he has a huge hepatosplenomegaly with severe anemia.

What may be the condition?

If it is a parasitological disease how do you go for diagnosis in laboratory?

What are the serological tests done for this condition? 1+6+3 = 10

- Q2. Write short notes on (any three) 3 x 4 = 12

- Prion mediated diseases.
- Neurological vaccines of Rabies.
- CD4 and CD8 counts for HIV.
- Congenital defects associated with viruses.
- Infective forms of Giardia lamblia, Ascaris lumbricoides, Enterobius vermicularis.

- Q3. Comment on (any three) 3 x 4 = 12

- Neurological vaccines against Rabies have many problems.
- There are many vaccines against Hepatitis viruses used presently.
- The floatation concentration technique may be used for ova, cysts etc.
- The filarial infections can be detected in blood even in daytime.
- The asexual spores of fungi can be used for diagnosis in superficial dermatological infection.

- Q4. Differentiate between 3 x 2 = 6

- Superficial and subcutaneous dermatophytes.
- Virus and Viroids.
- Antigenic shift and antigenic drift in influenza viruses.