APPENDIX - I

SCHEME AND SYLLABUS OF EXAMINATION FOR THE PURPOSE OF FILLING UP THE POST OF *SPECIALIST* IN THE SIKKIM STATE HEALTH SERVICE:-

1. The examination will consist of 2 papers:-

PAPERS	SUBJECT	FULL MARKS	TIME ALLOWED
PAPER-I	General English & General Knowledge	100 MCQ/Conventional	2.00 hours
PAPER-II	Compulsory Subjects in their respective Specialised discipline	300 MCQ & Conventional	3.30 hours
VIVA-VOICE/Personality Test – 50 marks			

PAPER-I: GENERAL ENGLISH

The question will be designed to test the candidate's understanding and command of the English language. *Mode of Examination pattern shall be objective MCQ, Conventional/MCQ for both Paper-I, General English-General Knowledge and Paper-II (Compulsory Subjects in their respective specialised discipline).*

English: Candidate will be required to answer questions designed to test their understanding of English and workman like use of words. The Patterns of questions would be broadly as follows:

(i) Comprehension & Grammar.
(ii) Letter Writing/Report Writing/ Project Writing.

General Knowledge: Knowledge of current events of local, National and International importance and of such matter of everyday observation and experience in their scientific aspects as may be expected of any educated person who has not made a special study of any scientific subject.

PAPER-II

The questions will be conventional & MCQ type and will cover areas of knowledge of the following subject and topics:-

GOVT. OF SIKKIM

DEPARTMENT OF MICROBIOLOGY
SIR THOTUB NAMGYAL MEMORIAL HOSPITAL
SOCHAKGANG GANGTOK

Microbiology Syllabus for filling up of post of Specialist in Sikkim State Specialist wing of Sikkim State Health Service

The syllabus is divided into theory, affective domain and psycho motor skills

Section A

Sections/ units (theory)

1. GENERAL MICROBIOLOGY
2. IMMUNOLOGY
3. BACTERIOLOGY
4. MYCOLOGY
5. VIROLOGY
6. PARASITOLOGY
7. APPLIED MICROBIOLOGY
8. RECENT ADVANCES

General Microbiology

1. Introduction to microbiology
    a. History of Microbiology
    b. Role of Microbiology laboratory in diagnosis of infections
    c. Guidelines for the Collection, Transport, Processing, Analysis and Reporting of Cultures
2. Microscopy – Types and principles
3. Bio-safety in laboratory
4. Quality control and Quality assurance
5. Sterilization and disinfection
6. Types and preparation of Culture media
7. Morphology of bacteria
8. Growth, Nutrition and requirement of bacteria
8. Normal flora of human body
9. Bacterial toxins and Bacteriocins and their role
10. Microbiology of air, milk and water
11. Host-parasite relationship including bacterial virulence factors and pathogenecity
12. Antibacterial substances and drug resistance
13. Bacterial genetics
14. Molecular diagnosis of microorganisms
15. Accreditation of laboratories

16. Bioterrorism
17. Risk management and Laboratory Safety practices
18. Laboratory diagnosis of bacteria
19. Syndromic approach
20. Hospital Acquired Infections – Types, Surveillance and prevention
21. Human Microbiome

Immunology

1. Structure and function of the immune system
2. Immunity – Types and features
3. Antigens
4. Immunoglobulins
5. Complement – Role in infections and diagnostics
6. Antigen & antibody reactions
7. Hypersensitivity reactions
8. Cytokines and their role
9. Immunodeficiency
10. Auto-immunity
11. MHC complex
12. Transplantation immunity
13. Tumor immunity
14. Vaccines and immunotherapy
15. Immunological techniques
16. Immunomodulation

Bacteriology (systemic)

1. Systemic classification of bacteria
2. Gram positive cocci - Staphylococcus, Micrococcus, Streptococci, Enterococci, anaerobic cocci etc.
3. Gram negative cocci - Neisseria, Branhamella, Moraxella etc.
4. Gram positive bacilli of medical importance including Lactobacillus, Coryneform organisms, Bacillus & aerobic bacilli, Actinomyces, Nocardia, Actinobacillus and other Actinomycetales, Erysipelothrix, Listeria, Clostridium and other spore bearing anaerobic bacilli etc.
5. Gram negative bacilli of medical importance including Vibrios,Aeromonas, Plesiomonas, Haemophilus, Bordetella, Brucella, Gardnerella, Pseudomonas
6. Non- fermenters
6. Miscellaneous bacteria - Helicobacter, Campylobacter, Legionella &Spirillium
7. Enterobacteriaceae
8. Mycobacteria
9. Spirochaetes
10. *Chlamydiae*
11. Mycoplasmatales: *Mycoplasma, Ureaplasma, Acholeplasma*and other *Mycoplasmas.*

12. Rickettsiae, Coxiella, Bartonella etc.

13. Anaerobic bacteriology –

a. Introduction to Anaerobic bacteria

b. Human infections caused by anaerobic bacteria

c. Collection, transport and handling of anaerobic specimens and cultures

d. Isolation and identification of anaerobic bacteria

e. Anaerobic Gram negative bacilli – Bacteroidis, Fusobacterium etc.

f. Anaerobic Gram positive bacilli – Propionibacterium, Eubacterium, Lactobacillus, Mobiluncus, etc

g. Clostridium species

h. Anaerobic Gram positive and negative cocci

Virology

1. General characteristics of viruses

a. Classification of viruses

b. Morphology of viruses

c. Replication of viruses

5. Pathogenesis and host response of viral infections

6. Laboratory diagnosis of viruses

7. DNA viruses - Poxviridae, Herpesviridae, Adenoviridiae, Hepadna virus and Parvo viruses etc.

9. RNA viruses - Enteroviruses, Togaviridae, Flaviviruses, Orthomyxoviruses, Paramyxoviruses, Reoviridiae, Rhabdoviridae, Arenaviridae, Bunyaviridae, Filoviruses, Arboviruses, Coronaviridae,

10. Retroviridae, Human immunodeficiency virus

10. Slow viruses including prions

11. Unclassified viruses

12. Carcinogenic viruses

13. Teratogenic viruses

14. Vaccines & anti-viral drugs

15. Recent advances in diagnosis of Viral infection

Parasitology

1. Introduction to parasitology

a. Taxonomical and systemic classification of parasites

b. General characteristics of parasites

2. Laboratory diagnosis of parasitic infections

3. Protozoan parasites - Entamoeba, Free living amoebae, *Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodium, Toxoplasma, Sarcocystis, Cryptosporidium, Microsporidium, Cyclospora. Isospora, Babesia, Balantidium* etc.

4. Helminthology –

a. Cestoda (*Diphyllobothrium, Taenia, Echinococcus, Hymenolepis, Dipyllidium, Multiceps*etc.)

b. Trematoda (*Schistosomes, Fasciola. Fasciolopsis, Gastrodiscoides, Paragonimus, Clonorchis, Opisthorchis* etc.)

c. Nematoda(*Trichiuris, Trichinella, Strongyloides, Ancylostoma, Necator, Ascaris, Toxocara, Enterobius. Filarial worms, Dracunculus*etc.)

5. *Entomology:* common arthropods & other vectors

6. Antiparasitic agents

7. Drug resistance in parasites

8. Recent advances in parasitology

Mycology

1. Introduction to Mycology including classification, morphology, nomenclature, reproduction and laboratory diagnosis of fungi

2. Host response to fungal infections

3. Superficial mycoses including Dermatophytes

4. Subcutaneous mycoses- Sporotrichosis, Chromomycosis, Mycetoma and all fungi causing these infections

5. Yeasts and yeast like fungi of medical importance including *Candida, Cryptococcus, Malassezia, Trichosporon, Geotrichum, Saccharomyces* etc.

6. Systemic fungi of medical importance including *Aspergillus, Zygomycetes,Pseudoallescheria, Fusarium, Piedra*

7. Hyphomycetes and hyalohyphomycetes

7. Dimorphic fungi including *Histoplasma, Blastomyces, Coccidioides, Paracoccidioides, Sporothrix, Penicillium marneffei*

8. Fungi causing mycetoma, keratomycosis, otomycosis and opportunistic infections.

9. Pneumocystis carinii infection

10. Rhinosporidiumseeberi&Loboaloboi

15. Common laboratory contaminants

16. Mycetism& mycotoxicosis

17. Antifungal agents & invitro antifungal susceptibility tests

18. Newer fungi

19. Recent Advances in diagnosis of fungal infections

Applied Microbiology

1. Epidemiology of various infectious diseases

2. Hospital acquired infections – Types, Surveillance systems, prevention

3. Biomedical waste management in hospital

4. Outbreak investigation

5. Infections of various organs and systems of human body viz. respiratory tract infections, urinary tract infections, central nervous system infections, congenital infections, reproductive tract infections, gastrointestinal infections, hepatitis, pyrexia of unknown origin, infections of eye, ear & nose, septicaemia, endocarditis, haemorrhagic fever etc.

6. Opportunistic infections.

7. Sexually transmitted diseases

8. Vaccinology: principle, methods of preparation, administration of vaccines information technology (Computers) in microbiology

9. Gene cloning

10. Molecular techniques as applicable to microbiology

11. Automation in Microbiology

12. Statistical analysis of microbiological data and research methodology

13. Animal & human ethics involved in microbiological work

Section B

AFFECTIVE DOMAIN

1. Should be able to develop inter- and intra-collaborative communication and work skills to provide the best possible diagnosis.

2. Should be epithetical, etiquette, respectful and ethical approach towards patients, relatives and other health personnel.

Section C

PSYCHOMOTOR SKILLS

1. Collection/transportation of microbiological specimens

2. Preparation, staining, examination and interpretation of direct smears from clinical specimens

3. Inoculation of clinical specimens on solid/liquid media for isolation, purification, identification.

4. Preparation of stains/reagents viz. Gram, Albert's, ZiehlNeelsen (ZN), Silver impregnation

stain and special stains for capsule and spore, KOH, oxidase, Kovac, catalase etc.

5. Preparation, pouring and Sterility tests of different solid/liquid medias and biochemicals like Sugars, Kligler iron agar/Triple sugar iron agar (TSI), Robertson's cooked meat broth, Lowenstein Jensens medium, Sabouraud's dextrose agar etc.

6. Quality control of media and reagents

7. Operation, care and maintenance of various equipments like autoclave, hot air oven, incubators, centrifuge etc.

8. Maintenance and care of microscopes

9. Washing and sterilization of glassware (including plugging and packing)

10. Aseptic practices in laboratory and safety precautions.

11. Identification of bacteria up to species level by using morphotyping and biotyping

12. Preparation of anaerobic isolation and identification medias

13. Isolation and identification of anaerobic media at least upto genus level

14. Motility demonstration techniques: hanging drop, Cragie's tube, dark ground microscopy for *Spirochaetes*

15. Basic identification tests - Catalase test, Oxidase test, slide and tube coagulase tests, niacin and catalase tests for *Mycobacterium,* bile solubility, chick cell agglutination, sheep cell haemolysis, satellitism, CAMP test, and other biochemical tests.

16. Selection of proper drugs for putting up of AST for a particular organism from a particular site.

17. Performance of antimicrobial susceptibility testing eg. Kirby-Bauer, Stoke's method and by automated methods

18. Estimation of Minimal Inhibitory/Bactericidal concentrations by tube/plate dilution methods.

19. Tests for ß-lactamase production.

20. Screening and confirmatory tests of Gram negative isolates for ESBL and MBL

21. Screening of *Staphylococci* for Methicillin Resistance.

22. Screening of *Enterococci* for Vancomycin resistance.

23. Interpretation and proper reporting of antimicrobial susceptibility testing.

23. Testing of disinfectants.

24. Quantitative analysis of urine by pour plate method and semi quantitative analysis by standard loop tests for finding significant bacteriuria

25. Bacteriological tests for water, air and milk

27. Maintenance and preservation of bacterial stock cultures

28. Maintenance and preservation of fungal stock cultures

29. Performing and reporting of bacterial, fungal, mycobacterial Quality control and proficiency testing samples

30. Performing and interpretation of basic serological reactions like – rapid ICT's, Widal (Slide and Tube), Latex agglutination tests, VDRL flocculation test etc.

31. Ethical approach towards animal handling and animal inoculation (in case applied)

32. Identification of viruses: Selection of egg of proper age, proper incubation of eggs, monitoring of eggs for development of embryo and egg inoculation and harvesting technique for virus isolation, Tissue culture, Hemagglutination inhibition, Viral load estimation, Polymerase chain reaction

33. Putting drug susceptibility testing for Mycobacterium tuberculosis on solid and liquid media.

34. Proper use, operation, maintenance of Automated systems in Microbiology

35. Interpretation of various tests by Automated systems.

36. Molecular testing of various organisms

37. Genotypic antimicrobial susceptibility testing of bacteria by molecular methods.