

**SCHEME AND SYLLABUS FOR THE POST OF CIVIL ASSISTANT SURGEONS IN  
INSTITUTE OF PREVENTIVE MEDICINE SERVICE.**

**SCHEME**

<b><u>PART-A:</u></b> WRITTEN (OBJECTIVE TYPE) EXAMINATION				
<i>Paper-1</i>	General Studies & Mental Ability (Degree standard)	150 Marks	150 Minutes	150 Questions
<i>Paper-2</i>	Concerned Optional subject (P.G. Standard) i.e., Micro Biology OR Pathology OR Bio-Chemistry OR Transfusion Medicine	300 Marks	150 Minutes	150 Questions
<b><u>PART-B:</u></b>	INTERVIEW	50 Marks		

**SYLLABUS**

**PAPER-1.: GENERAL STUDIES AND MENTAL ABILITY**

1. General Science – Contemporary developments in Science and Technology and their implications including matters of every day observation and experience, as may be expected of a well-educated person who has not made a special study of any scientific discipline.
2. Current events of national and international importance.
3. History of India – emphasis will be on broad general understanding of the subject in its social, economic, cultural and political aspects with a focus on AP Indian National Movement.
4. World Geography and Geography of India with a focus on AP.
5. Indian polity and Economy – including the country's political system- rural development – Planning and economic reforms in India.
6. Mental ability reasoning and inferences

## TRANSFUSION MEDICINE

- 1) BLOOD DONATION AND COLLECTION:
  - a) Donor selection and Blood collection
  - b) Autologous Blood donation and Transfusion
  - c) Apheresis
  - d) Component testing and labeling
  - e) Collection, Preparation, Storage and distribution of components from whole Blood donations.
  
- 2) IMMUNOLOGIC AND GENETIC PRINCIPLES
  - a) Molecular Biology in Transfusion Medicine
  - b) Blood group genetics
  - c) Immunology
  - d) Redcell antigen – antibody reaction and their detection
  - e) Blood groups – A B O H and Lewis blood groups and structurally related antigens
  - f) Rh system
  - g) Other blood groups – M N S System, Kell system, Duffy system, Kidd system
  - h) Platelet and granulocyte Antigens and Antibodies
  - i) The HLA system
  
- 3) SEROLOGIC PRINCIPLES AND TRANSFUSION MEDICINE
  - a) Pretransfusion testing
  - b) Initial detection and Identification of Allo Antibodies to Red cell antigens
  - c) Positive Direct anti globulins Test and Immune mediated Red cell destruction
  
- 4) CLINICAL CONSIDERATIONS IN TRANSFUSION PRACTICE
  - a) Blood Transfusion Practice
  - b) Administration of Blood and components
  - c) Prenatal issues in Transfusion practice
  - d) Neonatal and Paediatric Transfusion practice
  - e) Cell therapy and Cellular product transplantation
  - f) Tissue and Organ transplantation
  - g) Non Infectious complications of Blood transfusion
  - h) Transfusion Transmitted Disease
  
- 5) Quality control of blood and blood components reagents and kits – external and internal quality control
  
- 6) Bio-safety
  
- 7) Blood utilization management
  
- 8) Transportation and shipment dangerous goods
  
- 9) Red cell typing
  
- 10) Adsorption and elution technique
  
- 11) Haemolytic anaemias
  
- 12) Haemolytic disease of the fetus and new born

## **MICROBIOLOGY**

### **General Microbiology**

1. Organization of Clinical Microbiology Lab & quality assurance
2. Microscopy and staining methods
3. Automation in Microbiology
4. Biomedical waste management and safety in Microbiology
5. Basic equipment used Microbiology lab and its maintenance
6. Laboratory strategy in the diagnosis of infective syndromes
7. Disease surveillance and outbreak investigation
8. National Programmes in disease control and their implementation
9. Specimen collection, culture methods, identification and storage of bacteria
10. Laboratory control of antimicrobial therapy and mechanism of action of antibiotics
11. Bacterial genetics and recombinant DNA technology
12. Nucleic acid techniques in diagnostic Microbiology
13. Molecular Epidemiology of infectious agents – significance and methods
14. Management of Experimental animals
15. Examination of water, milk, food and air
16. Sterilization and disinfection

### **Immunology**

#### I. Concept of self and non-self recognition

1. Need for self recognition
2. Antigens and Receptors

#### II. The Innate Immune System

1. Barriers to infection
2. Cells of the Innate Immune system
3. Innate Immune function

#### III. The Adaptive Immune system

1. Cells and Organs of adaptive immunity
2. Molecules of adaptive immunity
3. Generation of Immune diversity
4. Lymphocyte development, activation and function
5. Regulation of adaptive responses

#### IV. Clinical aspects of Immunity

1. Hypersensitivity reactions
2. Immune deficiency
3. Autoimmunity
4. Transplantation
5. Immune Pharmacotherapy
6. Tumor Immunity
7. Measurement of Immune function – Antigen antibody reactions

### **Parasitology**

#### I. General Parasitology

1. Taxonomy
2. Morphology, life cycle & Epidemiology
3. Immunity and Pathogenesis of Parasitic infections
4. Laboratory diagnosis of parasitic infections

#### II. Protozoa

1. Amoebae
2. Intestinal, oral and genital flagellates – Giardia, Trichomonas
3. Blood and Tissue flagellates – Leishmania, Trypanosomes
4. Malaria parasites and Piroplasms

5. Coccidia – Cryptosporidium, Cyclospora, Isospora, Toxoplasma, Sarcocystis, Blastocystis
6. Ciliate Protozoa & Protozoa of undertermined taxonomic status – Balantidium, Pnemucystis.

### III. Helminths

1. Pseudophyllidean Tape worms – Diphylobothrium, Spirometra
2. Cyclophyllidean Tape worms – Taenia, Echinococcus, Hymenolepis, Dypylidium
3. Trematodes - Schistosomes
4. Trematodes – Fasciola, Echniostoma, Dicrocoelium, Paragoniums, Clonorchis, Ophisthorchis, Heterophyes
5. Nematodes – Apharid – Trichinella, Trichuris, Capillaria, Strongyloides
6. Burrata Nematodes – Hookworm, Trichostrongylus, Angiostrongylus, Enerobius, Ascaris
7. Filarial Nematodes – Wuchereria, Brugia, Onchocerca, Loa loa, Manronella, Dirofilaria
8. Spirurid Nematodes – Drancunculus, Gnathostoms
9. Ectoparasites – Mosquito, Sandfly, Tick, Mite, Cyclops, Louse

### **Systemic Bacteriology**

1. Staphylococcus: Cluster-forming Gram positive Cocci
2. Streptococcus and Enterococcus
3. Streptococcus pneumoniae
4. Neisseria, Moraxella, Acinetobacter
5. Corynebacterim
6. Listeria, Erysipelothrix
7. Bacillus
8. Mycobacterium
9. Actinomycetes: Actinomyces, Actinomadura, Nocardia, Streptomyces and related genera
10. Enterobacteriaceae: Escherichia, Klebsiella, Proteus and other genera
11. Salmonella
12. Shigella
13. Pseudomonas, Stenotrophomonas, Bukholderia
14. Vibrio, Aeromonas, Pleisomonas, Camphylobacter, Arcobacter, Helicobacter, Wolinella
15. Haemophilus, Garderella and other bacilli
16. Bordatella
17. Brucella
18. Yersinia, Pasteurella, Francisella
19. Legionellacea
20. Bacteroides, Fusobacterium and other Gram-negative anaerobic rods; anaerobic cocci  
identification of anaerobes
21. Clostridia of wound infection
22. Eneropathogenic clostridia and Clostridium
23. Treponema; Serological tests for Syphilis
24. Leptospira, Borrelia, Spirillum
25. Coxiella burneti and other medically important members of the Family Rickettsiaceae
26. Mycoplasma pneumoniae and other medically important members of the family  
Mycoplasmataceae
27. Chlamydia

### **Virology**

1. The nature of viruses
2. Classification of viruses
3. Morphology: virus structure
4. Virus replication
5. The genetics of viruses
6. The pathogenicity of viruses
7. Epidemiology of viral infections
8. Vaccines and anti-viral drugs
9. Bacteriophages
10. Pox viruses
11. Herpes viruses
12. Vesicular viruses
13. Togaviridae
14. Bunyaviridae
15. Arenaviridae

16. Marburg and Ebola viruses
17. Rubella virus
18. Orbi viruses
19. Influenza virus
20. Respiratory disease: Rhinoviruses, adenoviruses and corona viruses
21. Paramyxoviridae
22. Enteroviruses: Polio, Echo and Coxsackie viruses
23. Other enteric viruses
24. Hepatitis viruses
25. Rabies virus
26. Slow viruses
27. Human immunodeficiency viruses
28. Oncogenic viruses
29. Teratogenic viruses
30. Viruses of gastroenteritis
31. Emerging viruses
32. Investigation of viral epidemics

### **Mycology**

1. The morphology and reproduction in fungi
2. Classification of fungi
3. Contaminant and opportunistic fungi
4. Fungi causing superficial mycoses
5. Fungi causing subcutaneous mycoses
6. Fungi causing systemic infections
7. Antimycotic agents
8. Mycotoxins and Mycetismus

## BIOCHEMISTRY

### 1. Introduction to Biochemistry

### 2. Cell Molecular and Functional Organisation

### 3. Chemistry of Carbohydrates:

- a. Classification of Carbohydrates
- b. Structural and Functional aspects of Monosaccharides, Disaccharides, Homo and Hetero Polysaccharides.

### 4. Chemistry of Lipids:

- a. Classification
- b. Structural and functional aspects of simple, compound and derived lipids including saturated, Unsaturated and essential fatty acids.

### 5. Proteins:

- a. Classification and functional aspects
- b. Electrophoretic separation of proteins
- c. Classification and properties of Amino acids
- d. Separation of Amino acids by Chromatography
- e. Outlines of structure and protein structure
- f. Biologically active peptides

### 6. Nucleic Acids:

- a. Bases, Nucleotides, Nucleic acids (Structural and functional aspects)
- b. Synthetic nucleotides

### 7. Enzymes:

- a. Classification
- b. Mechanism of Enzyme action
- c. Enzyme kinetics
- d. Factors affecting enzyme activity
- e. Isoenzymes
- f. Coenzymes
- g. Enzyme inhibition
- h. Cellular and plasma enzymes
- i. Diagnostic importance of enzymes
- j. Regulation of enzyme activity

### 8. Biological Oxidation:

- a. Bioenergetics
- b. Exergonic and Endergonic reaction
- c. Oxidases
- d. Electron transport chain
- e. Oxidative Phosphorylation
- f. High energy compounds
- g. Low energy compounds

### 9. Vitamins:

- a. Classification
- b. Structure, Sources, Daily requirement
- c. Physiological role and deficiency disorders of Fat soluble vitamins A, D, E & K and Water soluble vitamins-B complex group and Vit-C.

### 10. Carbohydrate Metabolism:

- a. Digestion and absorption
- b. Metabolism of Glucose
  - i. Entry of Glucose into the cells
  - ii. Glycolysis
  - iii. Rapoport-Leubering cycle
  - iv. Pyruvate dehydrogenase complex
  - v. Citric acid cycle
  - vi. Gluconeogenesis
  - vii. Glycogenesis
  - viii. Glycogenolysis
  - ix. Glycogen storage diseases
  - x. Hexose monophosphate shunt pathway
  - xi. Uronic acid pathway
  - xii. Metabolism of Galactose and Fructose
- c. Blood Glucose homeostasis, Glucose tolerance test, Diabetes mellitus and Hypoglycemia

**11. Metabolism of Proteins:**

- a. Protein digestion and absorption
- b. General pathways of Metabolism including
- c. Transamination and Deamination and Ammonia transport
- d. Urea cycle
- e. Metabolism of individual Aminoacids & Molecular disorders
- f. Creatine & Creatinine

**12. Metabolism of Nucleic acids:**

- a. Outlines of Metabolism of purines and pyrimidines and Metabolic disorders
- b. DNA replication and transcription
- c. Protein biosynthesis
- d. Regulation of gene expression
- e. Outlines of Genetic Engineering

**13. Lipid Metabolism:**

- a. Digestion and absorption
- b. Plasma lipids
- c. Mobilisation of Fats from Adipose Tissues
- d. Oxidation of fatty acids
- e. Biosynthesis of fatty acids
- f. Metabolism of Phospholipids and Triacylglycerols
- g. Metabolism of Ketone Bodies
- h. Metabolism of Cholesterol
- i. Lipo-proteins – Metabolism and disorders
- j. Lipotropic factors
- k. Chemistry and Metabolism of prostaglandins

**14. Haemoglobin structure, function and Metabolism, Porphyrias and Hemoglobinopathies****15. Integration of Metabolism:**

- a. Metabolic integration; liver, adipose tissue, skeletal muscle and brain

**16. Mineral metabolism:**

Sodium, Potassium, Calcium, Phosphorus, Magnesium, Manganese, Sulphur, Iron, Copper, Zinc, Iodine, Cobalt, Fluorine, Selenium, Chromium

**17. Nutrition:**

- a. Calorific value
- b. Specific dynamic action
- c. Energy requirements
- d. Balance diet, Nitrogen balance, Dietary fiber
- e. Food fads
- f. Nutritional disorders Kwashiorkor and Marasmus

**18. Detoxification****19. Hormones:**

- a. General principles of Hormone action
- b. Outlines of Hormone structure
- c. Mechanism of action and metabolic roles of:
  - i. Pituitary
  - ii. Pancreas
  - iii. Adrenal
  - iv. Gonadal
  - v. Thyroid

**20. Function Tests:**

- a. Renal
- b. Hepatic
- c. Pancreatic
- d. Gastric

**21. Fluid Electrolyte and Acid base balance****22. Plasma proteins and immunoglobulin****23. Biological membrane****24. Carcinogenesis and malignancy**

## CLINICAL CHEMISTRY

### LABORATORY PRINCIPLES

#### 1. GENERAL LABORATORY TECHNIQUES, PROCEDURES AND SAFETY

Chemicals and Related Substances  
 Laboratory Ware  
 Laboratory Operations  
 Volumetric Equipments  
 Solutions  
 Buffer Solutions and their actions  
 Units of Measurement  
 Safety

#### 2. SPECIMEN COLLECTION AND OTHER PRE-ANALYTICAL VARIABLES

### ANALYTICAL TECHNIQUES AND INSTRUMENTATION

#### 1. SPECTROPHOTOMETRIC TECHNIQUES

Photometry and Spectrophotometry  
 Flame Emission Spectrophotometry  
 Atomic Absorption Spectrophotometry

#### 2. BASIC PRINCIPLES OF RADIO ACTIVITY AND ITS MEASUREMENT

Atomic Structure, Radiation and Radioactivity  
 Interaction of Radiation with Mater  
 Detection and Measurement of Radioactivity  
 Radiation Safety

#### 3. ELECTROCHEMISTRY

Potentiometry  
 Voltammetry  
 Amperometry  
 Coulometry  
 Conductometry  
 Bio-sensors

#### 4. ELECTROPHORESIS

Basic concepts and definitions  
 Theory and types of Electrophoresis  
 Description of Technique  
 Technical considerations

#### 5. CHROMATOGRAPHY/ MASS SPECTOMETRY

Basic concepts and definitions  
 Separation Mechanisms  
 Resolution  
 Column Chromatography  
 Mass Spectrometry

#### 6. PRINCIPLES OF CLINICAL ENZYMOLOGY

Basic Enzymology  
 Diagnostic Enzymology

#### 7. PRINCIPLES OF IMMUNOCHEMICAL TECHNIQUES

Basic concepts and definitions  
 Antigen-Antibody Binding  
 Qualitative and Quantitative Methods  
 Immuno-chemical techniques

#### 8. NUCLEIC ACID TECHNIQUES

Nucleic acid analysis  
 Diagnostic Application



## 9. AUTOMATION IN CLINICAL LABORATORY

- Basic concepts
- Integrated Automation for Clinical Laboratory
- Automation of Analytical Process and of Point of Care Analysers

### **LABORATORY OPERATIONS**

1. Evaluation of Methods with an introduction to statistical techniques
  - Basic Statistics
  - Selecting and evaluating an analytical method
2. Establishment and use of reference values
3. Clinical laboratory informatics
  - Laboratory information systems
  - Micro-Computer applications
  - Future use of computers
4. Laboratory Management
5. Quality Management
  - Fundamentals
  - Control of Analytical Variables
  - External Quality Assessment
  - Total Quality Management
  - New Quality initiatives

### **ANALYTES**

1. Amino Acids Amind Acidurias
2. Proteins
3. Enzymes
4. Tumor Markets
5. Non-Protein Nitrogen Metabolites
6. Carbohydrates
7. Lipids, Lypoproteins and Apolypoproteins
8. Electrolytes and Blood Gases
9. Hormones
10. Vitamins
11. Trace Elements
12. Therapeutic Drug Monitoring
13. Clinical Toxicology

### **ORGAN FUNCTION TESTS**

1. Renal Function Tests
2. Liver Function Tests
3. Gastric, Pancreatic and Intestinal function tests
4. Thyroid functional tests
5. Reproductive endocrine functions

### **PREGNANCY**

### **INHERITED DISEASES**

## PATHOLOGY

### CELLULAR ADAPTATIONS :

Cell injury & Cell death, Hyperplasia, Hypertrophy, Metaplasia, Necrosis, Apoptosis, Intracellular Accumulation, Pathologic Calcification.

### CELLULAR EVENTS :

Leukocyte extravasation & Phagocytosis, Chemical mediators of inflammation, Chronic inflammation

### TISSUE RENEWAL & REPAIR:

Regeneration, Healing and fibrosis, Growth factors, Angiogenesis, edema, Thrombosis, Embolism, Infarction, Shock

Cytogenetic disorders involving Autosomes

Cytogenetic disorders involving sex chromosome

### AUTOIMMUNE DISEASE:

AIDS, Amyloidosis, Neoplasia, Molecular Basis of cancer Carcinogenesis, Laboratory diagnosis of cancer Nutrition & diseases.

Neonatal Respiratory distress syndrome, fetal hydrops, Tumors & Tumor like lesions of childhood.

**BLOOD VESSELS:** Atherosclerosis, Anemias

### THE HEART:

Coronary Heart disease, Valvular heart disease (Rheumatic Heart disease) Pericardial

### RED BLOOD CELLS & BLEEDING DISORDERS:

Anemias of Blood loss, Hemolytic Anemia, Anemias of diminished erythropoiesis Bleeding disorders

**LYMPH NODES:** Lymphoma Neoplasms, Myeloid Neoplasms, Splenomegaly Thrombocytopenia

### THE LUNG:

Obstructive Pulmonary disease Diffuse Interstitial disease, Pulmonary Infection, Lung Abscess Lung Tumors

**HEAD & NECK:** Leukoplakia squamous cell carcinoma Odontogenic Tumors Salivary gland Tumors.

**GASTROINTESTINAL TRACT :** Peptic ulcer disease, gastric carcinoma, Malabsorption syndrome Tumors of small & large intestine

**LIVER:** Jaundice, Hepatic failure, Alcoholic liver disease

**KIDNEY:** Glomerular disease Nephrotic syndrome Tubulointerstitial disease, Cystic disease of kidney Urolithiasis Tumors of kidney Urine Examination

**MALE GENITAL SYSTEM:** Testicular Tumors: Prostatic enlargement

**FEMALE GENITAL SYSTEM :** CIN, Squamous cell carcinoma, Endometriosis Adenomyosis, Tumours of endometrium & Myometrium, Ovarian Tumours Gestation Trophoblastic disease

**THE BREAST :** Mastitis, Mammary, Carcinoma of breast, stromal tumour, gynecomastia

**ENDOCRINE SYSTEM :** Hyperparathyroidism Thyroid gland – CRETINISM Myxedema, Graves disease Hyperparathyroidism Diabetes Mellitus, Multiple endocrine Neoplasia.

**SKIN** inflammatory dermatosis, Infections & Verrucae Molluscum, Contagium

**BONES JOINTS & SOFT TISSUE:** Tumor Arthritis, Peripheral Nerve and Skeletal muscle: Muscular dystrophies.

**CNS** CSF Examination, Meningitis

Questions to be framed mostly clinical oriented & investigation angle such as liver function tests,

Renal function tests,  
CSF, Blood Investigation  
HIV Detection.

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