SYLLABUS FOR DIRECT RECRUITMENT TO THE POST OF CARDIOLOGY, GRADE-I OF MHS (SUPER SPECIALIST SUB-CADRE) UNDER HEALTH & FAMILY WELFARE DEPARTMENT

PAPER – I

Total marks - 200
Duration - 3 hours

PART A

(a) Current events of national and international importance.
(b) Indian Polity and Indian Constitution.
(c) General issues on Environmental Ecology, Bio-diversity and Climate Change - that do not require subject specialization.
(d) General awareness on Mizo culture, its heritage and society.
(e) Interpersonal skills including communication skills.
(f) Logical reasoning and analytical ability.
(g) Decision-making and problem-solving.

Note: Part A will carry 100 marks. Questions will be set in English only and of Multiple choice objective questions (MCQ) without negative marking. There will be 50 questions carrying 2 (two) mark each.

PART B

(a) Essay writing	-	25 marks
(b) Précis writing	-	15 marks
(c) English Comprehension	-	20 marks
(d) English Language (Class XII level)	-	40 marks

Note: Part B will carry 100 marks. Questions will be set in English only and of Conventional type questions without negative marking.

Note: Paper II, Paper III and Paper IV shall be classified as Technical Papers.

1. Paper-II, Paper-III and Paper-IV shall be classified as Technical Paper.
2. Questions will be set in English without negative markings.
3. Questions should be prepared in the form of Multiple Choice Objective Questions (MCQ).
4. Each Question will carry2 (two) marks and will consist of 100 questions for a total of 200 marks.
5. Duration of the examination for each technical papers is fixed as 2 (two) hours each.

TECHNICAL PAPERS

Paper	Subject	Marks
Paper-II	Basic Sciences related to Cardiology	100
	Fundamentals of Cardiovascular Disease	30
	Molecular Biology and Genetics	20
	Evaluation of the patient	50
	Total	**200**

Paper	Subject	Marks
Paper-III	Heart Failure	100
	Arrhythmias, Sudden Death and Syncope	50
	Preventive Cardiology	50
	Total	**200**

Paper	Subject	Marks
Paper-IV	Atherosclerotic Cardiovascular Disease	50
	Diseases of the Heart, Pericardium and Pulmonary Vasculature Bed	50
	Cardiovascular disease in special populations	10
	Cardiovascular disease and disorders of other organs	30
	Interventional Cardiology	20
	Cardiac Instrumentation	20
	Recent advances in Cardiology, Cardiac Epidemiology, Preventive Cardiology including related Cardiac surgery	20
	Total	**200**

PAPER-II (TECHNICAL)

Total marks - 200
Duration - 2 hours

I. BASIC SCIENCES RELATED TO CARDIOLOGY (100 MARKS)

A. Cardiac Anatomy

1) Development of heart and blood vessels.
2) Foetal circulation and its changes in post-natal life.
3) Coronary circulation.
4) Venous drainage of heart.
5) The heart and pericardium and its relation to neighbouring structures.
6) Anatomy of cardiac chambers and valves.
7) Arteries and veins; histology of heart and blood vessels.
8) Functional anatomy of the heart.
9) Orientation of the heart within the Thorax.
10) Methods used to study cardiac anatomy, correlative anatomy.
11) New developments and future challenges.
12) Quantum computing.
13) Ultrastructure of the heart.
14) Cardiac Embryology and Histology.

B. Cardiac Physiology

Cardiac Physiology will cover all the physiological changes in the heart during its normal function with special reference to cardiac cycle; myocardial contractility; pressure changes in the cardiac chambers; cardiac output; factors controlling blood flow; regulation of cardiac function; cardiac reflexes; coronary blood flow; exercise physiology; physiology of blood pressure regulation; normal influence on cardiovascular system; preload; after-load; assessment of ventricular function; regulation of cardiac contraction; action potentials; the cellular basis of cardiac contraction, Integration of the cardiovascular system the response to dynamic exercise, etc.

C. Cardiac Molecular Biology

1) Principles of molecular biology including Gene Structure.
2) Expression and regulation.
3) Recombinant DNA Technology; PCR Techniques.
4) Molecular basis for cellular growth.
5) Molecular and cellular biology of the normal, hypertrophied and failing heart including cardiac growth and hypertrophy.
6) Molecular and Cellular biology of the blood vessels including endothelial cell vascular smooth muscle interactions, atherosclerosis etc,.
7) The Human Genome and its future implications for cardiology including bioethical implications and genetic counselling,
8) Cardiovascular Tissue modification by genetic approaches including Gene Transfer etc, Molecular Development of the heart including anomalies.

D. Cardiac Biochemistry

All aspects of normal and abnormal patterns of cardiac biochemistry including cardiac enzymes; lipid profile, cardiac metabolism, electrolytes and their effect on cardiac function etc.

E. Cardiac Pharmacology

All the drugs used in the treatment of cardiac disorders inclusive of antiangi nal agents like -

1) Beta-blocking agents.
2) Nitrates and calcium channel blockers.
3) Anti-failure agents like diuretics.
4) Angiotensin-Converting Enzyme (ACE) Inhibitors.
5) Angiotensin-II Receptor Blocking Drugs (ARBs) and aldosterone antagonism, Digitalis.
6) Acute Inotropes and inotropic Dilators.
7) Antihypertensive Drugs.
8) Antiarrhythmic Drugs.
9) Antithrombotic agents like Platelet Inhibitors, Anticoagulants and Fibrinolytics, Lipid-Lowering and Atherosclerotic Drugs, choice of drugs, which drug for which disease? Adverse Cardiovascular Drug Interactions and Complications.

F. Cardiac Pathology

1) All pathological changes in various cardiac diseases with special reference to clinical correlation included.
2) Special emphasis on pathological changes in the pulmonary vascular system in various cardiac disorders.
3) Pathogenesis and pathology of rheumatic fever and rheumatic heart disease.
4) Cardiomyopathies
5) Dilated hypertrophic and obliterative / restrictive; congenital heart disease.
6) Cyanotic and acyanotic; atherosclerosis.
7) Coronary artery disease.
8) Cardiac involvement in other systemic diseases and storage disorders etc.

G. Cardiac Microbiology

The various microbiological aspects of cardiac diseases including rheumatic fever, infective endocarditis, myocarditis. Cardiac Molecular Biology has been included under a separate head.

II. FUNDAMENTALS OF CARDIOVASCULAR DISEASE (30 MARKS)

1) Global Burden of Cardiovascular Disease, Heart Disease in Varied Populations.
2) Economics and Cardiovascular Disease.
3) Clinical Decision-Making in Cardiology.
4) Measurement and Improvement of Quality of Cardiovascular Care.
5) The Principles of Drug Therapy.

III. MOLECULAR BIOLOGY AND GENETICS (20 MARKS)

1) Molecular Biology.
2) Genomics and Proteomics in Cardiovascular Disease.
3) Genetics and Cardiovascular Disease.
4) Genetics of Cardiac Arrhythmias.
5) Genetics of Myocardial Disease.

IV. EVALUATION OF THE PATIENT (50 MARKS)

1) The History and Physical Examination: An Evidence-Based Approach.
2) Electrocardiography.
3) Exercise Stress Testing.
4) Echocardiography.
5) The Chest Radiograph in Cardiovascular Disease.
6) Nuclear Cardiology.
7) Cardiovascular Magnetic Resonance.
8) Computed Tomography of the Heart.
9) Cardiac Catheterization, Coronary.
10) Angiography Intravascular Ultrasound Imaging.

PAPER –III (TECHNICAL)

Total marks - 200
Duration - 2 hours

I. Heart Failure (100 Marks)

1) Mechanisms of Cardiac Contraction and Relaxation.
2) Pathophysiology of Heart Failure.
3) Clinical assessment.
4) Acute and Chronic Heart Failure.
5) Systolic Heart Failure.
6) Heart Failure with Preserved Systolic Function.
7) Surgical management of Heart Failure.
8) Assisted Circulation in the treatment of Heart Failure.
9) Emerging therapies for Heart Failure.
10) Care of Patients with End-Stage Heart Disease.

II. Arrhythmias, Sudden Death, and Syncope (50 Marks)

1) Genesis of Cardiac Arrhythmias: Electrophysiological Considerations.
2) Diagnosis of Cardiac Arrhythmias.
3) Therapy for Cardiac Arrhythmias.
4) Cardiac Pacemakers and Cardioverter-Defibrillators.
5) Specific Arrhythmias: Diagnosis and Treatment.
6) Cardiac Arrest and Sudden Cardiac Death.
7) Hypotension and Syncope.

III. Preventive Cardiology (50 marks)

1) The Vascular Biology of Atherosclerosis.
2) Risk Factors for Atherothrombotic Disease.
3) Systemic Hypertension: Mechanisms and Diagnosis.
4) Systemic Hypertension: Therapy.
5) Lipoprotein Disorders and Cardiovascular Disease.
6) The Metabolic Syndrome.
7) Diabetes Mellitus and Atherosclerotic Vascular Disease.
8) Nutrition and Cardiovascular Disease.
9) Primary and Secondary Prevention of Coronary Heart Disease.
10) Comprehensive rehabilitation of Patients with Cardiovascular Disease.
11) Complementary and Alternative Approaches to Management.

PAPER - IV (TECHNICAL)

Total marks - 200
Duration - 2 hours

I. Atherosclerotic Cardiovascular Disease (50 Marks)

1) Coronary Blood Flow and Myocardial Ischemia.
2) Approach to the Patient with Chest Pain.
3) ST-Elevation Myocardial Infarction: Pathology, Pathophysiology, and Clinical Features.
4) ST-Elevation Myocardial Infarction: Management.
5) Primary Percutaneous Coronary Intervention in the Management of Acute MI.
6) Unstable Angina and Non-ST Elevation Myocardial Infarction.
7) Chronic Coronary Artery Disease.
8) Percutaneous Coronary and Vascular Intervention.
9) Diseases of the Aorta.
10) Peripheral Arterial Diseases.
11) Prevention and Management of Stroke.
12) Endovascular Treatment of Noncoronary Obstructive Vascular Disease.

II. Diseases of the Heart, Pericardium, and Pulmonary Vasculature Bed (50 Marks)

1) Congenital Heart Disease.
2) Valvular Heart Disease.
3) Infective Endocarditis,
4) The Dilated, Infiltrative and Restrictive Cardiomyopathies, Hypertrophic Cardio-myopathies.
5) Myocarditis.
6) Cardiovascular Abnormalities in HIV-Infected Individuals.
7) Toxins and the Heart.
8) Primary Tumors of the Heart.
9) Pericardial Diseases.
10) Traumatic Heart Disease.
11) Pulmonary Embolism.
12) Pulmonary Hypertension.
13) Sleep Disorders and Cardiovascular Disease.

III. Cardiovascular Disease in Special Populations (10 Marks)

1) Cardiovascular Disease in the Elderly.
2) Cardiovascular Disease in Women.
3) Pregnancy and Cardiovascular Disease.
4) Sports Cardiology.
5) Medical Management of the Patient Undergoing Cardiac Surgery.
6) Anesthesia and Noncardiac Surgery in Patients with Heart Disease.

IV. Cardiovascular Disease and Disorders of Other Organs (30 Marks)

1) Endocrine Disorders and Cardiovascular Disease.
2) Haemostasis, Thrombosis, Fibrinolysis and Cardiovascular Disease.
3) Rheumatic Fever.
4) Rheumatic Diseases and the Cardiovascular System.
5) The Patient with Cardiovascular Disease and Cancer.
6) Psychiatric Behavioural Aspects of Cardiovascular Disease.
7) Neurological Disorders and Cardiovascular Disease.
8) Interface between Renal Disease and Cardiovascular Illness.
9) Cardiovascular Manifestations of Autonomic Disorders.

V. Interventional Cardiology (20 Marks)

1) Percutaneous Coronary Interventions.
2) Coronary Angioplasty.
3) Atherectomy, Atheroablation and Thrombectomy.
4) Coronary Stenting.
5) Balloon Valvuloplasty.
6) Peripheral Intervention.
7) Pediatric interventions.
8) Intra-aortic Balloon Counter-pulsation and other Circulatory Assist Devices.
9) Interventional Electrophysiology.
10) Cardiac pacemakers.
11) Implantable devices for heart failure and for the treatment of cardiac arrhythmias.

VI. Cardiac Instrumentation (20 Marks)

1) Principles of cardiac instrumentation.
2) Pressure recording invasive and non-invasive.
3) ECG Machines.
4) Cardiac Monitors.
5) Defibrillators.
6) Cath-Lab Equipment.
7) EP Lab Equipment.
8) Gamma Camera.
9) CT Scan, MRI Equipment, PET Scans.
10) Echocardiography including Stress Echo, Colour Doppler and TEE.
11) Pacemakers temporary and Permanent, ICDs.
12) Triple Chamber Devices.
13) Radiofrequency ablation equipment.
14) Programmed stimulators.
15) IABP, Holter and Signal Averaging and ABP machines.
16) Treadmill equipment.
17) Hemodynamic recorders.
18) Oximeters.
19) Computers and image processing in Cardiology etc.

VII. Recent Advances in Cardiology, Cardiac Epidemiology, Preventive Cardiology Including Related Cardiac Surgery. (20 Marks)

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