

Curriculum DM Cardiology Index

1. Goals
2. Objectives
3. Syllabus
4. Teaching Programme
5. Schedule of posting
6. Research Projects
7. Assessment
8. Job responsibilities
9. Suggested Books & Journals
10. Model Test Papers

Curriculum DM Cardiology

The infrastructure and faculty of the department will be as per MCI guidelines.

1. Goals

The goal of DM course is to produce a competent cardiologist who:

- ❖ Recognizes the health needs of patients and carries out professional obligations in keeping the principles of National Health policy and professional ethics
- ❖ Has acquired the competencies pertaining to neurology that are required to be practiced in the community and at all levels of health care system
- ❖ Has acquired skills in effectively communicating with the patients, family and the community
- ❖ Is aware of the contemporary advances and developments in medical sciences
- ❖ Acquires a spirit of scientific enquiry and is oriented to principles of research methodology
- ❖ Has acquired skills in educating medical and paramedical professionals

2. Objectives

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

- ❖ Recognize the key importance of medical problems in the context in the health priority of the country;
- ❖ Practice the specialty of cardiology in keeping with the principles of professional ethics.
- ❖ Identify social, economic, environmental, biological and emotional determinants of adult cardiovascular diseases and know the therapeutic, rehabilitative, preventive and promotion measures to provide holistic care to all patients.
- ❖ Take detailed history, perform full physical examination and make a clinical diagnosis.
- ❖ Perform and interpret relevant investigations (Imaging and Laboratory).
- ❖ Perform and interpret important diagnostic procedures.
- ❖ Diagnose cardiovascular illnesses based on the analysis of history, physical examination and investigative work up;
- ❖ Plan and deliver comprehensive treatment for illness using principles of rational drug therapy.
- ❖ Plan and advice measures for the prevention of cardiovascular diseases.
- ❖ Plan rehabilitation of adults suffering from chronic illness, and those with special needs;
- ❖ Manage cardiological emergencies efficiently;

- ❖ Demonstrate skills in documentation of case details, and of morbidity and mortality data relevant to the assigned situation;
- ❖ Demonstrate empathy and humane approach towards patients and their families and respect their sensibilities;
- ❖ Demonstrate communication skills of a high order in explaining management and prognosis, providing counseling and giving health education messages to patients, families and communities.
- ❖ Develop skills as a self- directed learner, recognize continuing educational needs; use appropriate learning resources, and critically analyze published literature in order to practice evidence-based medicine;
- ❖ Demonstrate competence in basic concepts of research methodology and epidemiology;
- ❖ Facilitate learning on MD residents, medical/nursing students, practicing physicians, paramedical health workers and other providers as a teacher- trainer;
- ❖ Play and assigned role in the implementation of national health programs, effectively and responsibly;
- ❖ Organize and supervise the desired managerial and leadership skills;
- ❖ Function as a productive member of a team engaged in health care, research and education.

3. Syllabus

3.1 Theory

The syllabus should include the cardinal manifestations, definition, epidemiology, etiopathogenesis, genetics, clinical presentation, complications, differential diagnosis, investigations, treatment and prevention and prognosis of all cardio-vascular diseases. In addition the candidate should be well versed with all the common and important pediatric cardiological diseases. It should also cover the recent advances that have occurred in the field of cardiology.

❖ **Fundamentals of Cardiovascular Disease**

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

❖ **Molecular Biology and Genetics**

Molecular Biology, Genomics and Proteomics in Cardiovascular Disease, Genetics and Cardiovascular Disease, Genetics of Cardiac Arrhythmias, Genetics of Myocardial Disease.

❖ **Evaluation of the Patient**

The History and Physical Examination: An Evidence-Based Approach, Electrocardiography, Exercise Stress Testing, Echocardiography, Genetics of Myocardial Disease, Genetics of Myocardial Disease, The Chest Radiograph in Cardiovascular Disease, Nuclear Cardiology, Cardiovascular Magnetic Resonance,

Computed Tomography of the Heart, Cardiac Catheterization, Coronary Angiography and Intravascular Ultrasound Imaging.

❖ **Heart Failure**

Mechanisms of Cardiac Contraction and Relaxation, Pathophysiology of Heart Failure, Clinical assessment, Acute Heart Failure, Systolic Heart Failure, Heart Failure w/Preserved Systolic Fx, Surgical management of Heart Failure, Assisted Circulation in the treatment of Heart Failure, Emerging therapies for Heart Failure, Care of Patients with End-Stage Heart Disease.

❖ **Arrhythmias, Sudden Death, and Syncope**

Genesis of Cardiac Arrhythmias: Electrophysiological Considerations, Diagnosis of Cardiac Arrhythmias, Therapy for Cardiac Arrhythmias, Cardiac Pacemakers and Cardioverter-Defibrillators, Specific Arrhythmias: Diagnosis and Treatment, Cardiac Arrest and Sudden Cardiac Death, Hypotension and Syncope.

❖ **Preventive Cardiology**

The Vascular Biology of Atherosclerosis, Risk Factors for Atherothrombotic Disease, Systemic Hypertension: Mechanisms and Diagnosis, Systemic Hypertension: Therapy, Lipoprotein Disorders and Cardiovascular Disease, The Metabolic Syndrome, Diabetes Mellitus, and Atherosclerotic Vascular Disease, Nutrition and Cardiovascular Disease, Primary and Secondary Prevention of Coronary Heart Disease, Comprehensive Rehabilitation of Patients with Cardiovascular Disease, Complementary and Alternative Approaches to Management.

❖ **Atherosclerotic Cardiovascular Disease**

Coronary Blood Flow and Myocardial Ischemia, Approach to the Patient with Chest Pain, ST-Elevation Myocardial Infarction: Pathology, Pathophysiology, and Clinical Features, ST-Elevation Myocardial Infarction: Management, Primary Percutaneous Coronary Intervention in the Management of Acute Myocardial Infarction, Unstable Angina and Non-ST Elevation Myocardial Infarction, Chronic Coronary Artery Disease, Percutaneous Coronary and Valvular Intervention, Diseases of the Aorta Peripheral Arterial Diseases, Prevention and Management of Stroke, Endovascular Treatment of Noncoronary Obstructive Vascular Disease, Diabetes and Heart Disease.

❖ **Diseases of the Heart, Pericardium, and Pulmonary Vasculature Bed**

Congenital Heart Disease, Valvular Heart Disease, Infective Endocarditis, The Dilated, Infiltrative and Restrictive Cardiomyopathies, Hypertrophic Cardiomyopathies, Myocarditis, Cardiovascular Abnormalities in HIV-Infected Individuals, Toxins and the Heart, Primary Tumors of the Heart, Pericardial Diseases, Traumatic Heart Disease, Pulmonary Embolism, Pulmonary Hypertension, Sleep Disorders and Cardiovascular Disease.

❖ **Cardiovascular Disease in Special Populations**

Cardiovascular Disease in the Elderly, Cardiovascular Disease in Women, Pregnancy and Cardiovascular Disease, Sports Cardiology, Medical Management of the Patient Undergoing Cardiac Surgery, Anesthesia and Noncardiac Surgery in Patients with Heart Disease.

❖ **Cardiovascular Disease and Disorders of Other Organs**

Endocrine Disorders and Cardiovascular Disease, Hemostasis, Thrombosis, Fibrinolysis, and Cardiovascular Disease, Rheumatic Fever, Rheumatic Diseases and the Cardiovascular System, The Patient with Cardiovascular Disease and Cancer, Psychiatric Behavioral Aspects of Cardiovascular Disease, Neurological Disorders and Cardiovascular Disease, Interface Between Renal Disease and Cardiovascular Illness, Cardiovascular Manifestations of Autonomic Disorders.

3.2. Practical:

History, examination and writing of records:

- History taking should include the background information, presenting complaints and the history of present illness, history of previous illness, family history, social and occupational history and treatment history.
- Detailed physical examination should include general physical and CVS examination
- Skills in writing up notes, maintaining problem-oriented medical records (POMR), progress notes, and presentation of cases during ward rounds, planning investigation and making a treatment plan should be taught.
- The resident should fortify the skills of hemodynamic monitoring in emergency situations and should learn procedures like arterial line insertion, temporary venous pacing, central line insertion, pericardiocentesis, intra aortic balloon pump insertion, swan ganz catheter insertion etc.
- The resident should assist and perform procedures like coronary angiography, percutaneous coronary angioplasty, balloon valvuloplasty, cardiac catheterization of congenital heart disease patients, temporary pacemaker, permanent pacemaker, Electrophysiological diagnosis and management of arrhythmias, AICD, Bi-ventricular pacemaker, IABP insertion etc.
- Ability to perform echo-cardiograms of adults, adolescents and infants under direct supervision. He should observe transesophageal echo's and should also master the skills of performing and interpreting stress tests and holter monitoring.

3.3. Clinical Teaching

General physical and CVS examination should be mastered. The resident should be able to analyse the history and correlate it with clinical findings with the assistance of basic investigations like ECG, X-Ray etc. Besides, during the bed side rounds he/she should learn to improvise on management skills, haemodynamic monitoring, fluid balance and identification of cardiac emergencies like tamponade, arrhythmias etc.

4. Teaching Programme

4.1 General Principles

Acquisition of practical competencies being the keystone of postgraduate medical education, postgraduate training is skills oriented.

Learning in postgraduate program is essentially self-directed and primarily emanating from clinical and academic work. The formal sessions are merely meant to supplement this core effort.

4.2 Teaching Sessions

The teaching methodology consists of bedside discussions, ward rounds, case presentations, clinical grand rounds, statistical meetings, journal club, lectures and seminars. Along with these activities, trainees should take part in inter-departmental meetings i.e clinico-pathological and clinico-radiological meetings that are organized regularly.

Trainees are expected to be fully conversant with the use of computers and be able to use databases like the Medline, Pubmed etc.

They should be familiar with concept of evidence based medicine and the use of guidelines available for managing various diseases.

4.3 Teaching Schedule

Following is the suggested weekly teaching programme in the Department of Cardiology:

Sr. No.	Description	Frequency
1.	Bedside clinical case	Once a week
2.	Seminar / Journal club	Once a week
3.	will take PG/Undergraduate ward	Once a week
4.	Cath conference	Once a week
5.	Session on ECG's/X-ray's	Once month
6.	Session on echocardiography / TMT/ Holter	Once a month

There should be 3 teaching sessions at least of one hour per week duration.

- ❖ Each unit should have regular teaching rounds for residents posted in that unit. The rounds should include bedside case discussions, file rounds (documentation of case history and examination, progress notes, round discussions, investigations and management plan), interesting and difficult case unit discussions.
- ❖ Central hospital teaching sessions will be conducted regularly and DM residents would present interesting cases, seminars and take part in clinico-pathological case discussions.

4.4 Conferences and Papers

- ❖ A resident must attend at least one conference per year.
- ❖ One paper must be presented in at least 3 years.

5. Schedule of posting

❖ **Ward & ICCU's Duties** : **12 months**

Duties should include diagnostic case workup and day to day management of common cases (angina, myocardial infarction, rheumatic heart disease, hypertension, congestive heart failure, congenital heart disease,). The resident should acquire the expertise / knowledge to diagnose and manage the cardiac emergencies (acute myocardial infarction and its complications, LVF, common arrhythmias, cardiogenic shock, pericardial tamponade etc).

❖ **Cardiac Emergency posting** : **6 months**

The resident should learn prompt diagnosis and management of cardiac emergencies. He/she should fortify the skills of hemodynamic monitoring in emergency situations and should learn procedures like arterial line insertion, temporary venous pacing, central line insertion, pericardiocentesis, intra aortic balloon pump insertion, swan ganz catheter insertion etc.

❖ **Cath Lab posting** : **8 months**

The resident should acquaint himself with the pre, peri and post procedural management of patients to be taken up for intervention in a cath lab. He/she should assist and perform procedures like coronary angiography, percutaneous coronary angioplasty, balloon valvuloplasty, cardiac catheterization of congenital heart disease patients, temporary pacemaker, permanent pacemaker, Electrophysiological diagnosis and management of arrhythmias, AICD, Bi-ventricular pacemaker, IABP insertion etc.

❖ **Non-invasive lab posting** : **8 months**

The resident should learn the principles and fundamentals of echocardiography. He should be able to perform echo-cardiograms of adults, adolescents and infants under direct supervision. He should observe transesophageal echo's and should also master the skills of performing and interpreting stress tests and holter monitoring.

❖ **Cardiac surgery posting** : **2 months**

The resident should learned pre operative preparation and management of post operative recovery patients. He/She should have seen CABG, valve replacement, congenital heart disease surgery and aortic surgery.

❖ **Log Book:**

The student will maintain log book of all the procedures done in non-invasive (diagnostic) lab and cath lab including emergency procedures, which will indicate the procedure assisted as 1st and 2nd assistant and procedures conducted by self for

following procedures: Pericardial Tap, Hemodynamic Monitoring, Echocardiography – transthoracic & Transesophageal, TMT, Holter Monitoring, Tilt Table Test, Coronary Angiography, PTCA, Balloon Valvuloplasty, Temporary Pacemaker, Permanent Pacemaker, AICD, Biventricular Pacemaker, IABP Insertion.

6. Research Project:

- ❖ Every candidate shall carry out work on an assigned research project under the guidance of a recognized postgraduate teacher, the project shall be written and submitted in the form of a Project.
- ❖ Every candidate shall submit project plan to university within time frame set by university
- ❖ Thesis shall be submitted to the University within 9 months of joining the course.
- ❖ The student will (i) identify a relevant research problem, (ii) conduct a critical review of literature, (iii) formulate a hypothesis, (iv) determine the most suitable study design, (v) state the objectives of the study, (vi) prepare a study protocol, (vii) undertake a study according to the protocol, (viii) analyze and interpret research data, and draw conclusion, (ix) write a research paper.

7. Assessment

All the residents are assessed daily for their academic activities and also periodically.

7.1. General Principles:

- ❖ The assessment should be valid, objective, and reliable.
- ❖ It should cover cognitive, psychomotor and affective domains.
- ❖ Formative and summative (final) assessment is to be conducted in theory as well as practicals /clinical. In addition, project should be assessed separately.

7.2. Formative Assessment

- ❖ The formative assessment is continuous as well as end of term.
- ❖ The former is based on the feedback from the consultants concerned.
- ❖ Formative assessment will provide feedback to the candidate about his/her performance and help to improve in the areas they lack.
- ❖ Record of internal assessment should be presented to the board of examiners for consideration at the time of final examination.

7.3. Internal Assessment

The performance of the resident during the training period should be monitored throughout the course and duly recorded in the log books as evidence of the ability and daily work of the student. Marks should be allotted out of 100 as follows.

Sr. No.	Items	Marks
1.	Personal Attributes	20
2.	Clinical Work	20
3.	Academic activities	20

4.	End of term theory examination	20
5.	End of term practical examination	20

7.3.1 Personal attributes:

- ❖ **Behavior and Emotional Stability:** Dependable, disciplined, dedicated, stable in emergency situations, shows positive approach.
- ❖ **Motivation and Initiative:** Takes on responsibility, innovative, enterprising, does not shirk duties or leave any work pending.
- ❖ **Honesty and Integrity:** Truthful, admits mistakes, does not cook up information, has ethical conduct, exhibits good moral values, loyal to the institution.
- ❖ **Interpersonal Skills and Leadership Quality:** Has compassionate attitude towards patients and attendants, gets on well with colleagues and paramedical staff, is respectful to seniors, has good communication skills.

7.3.2 Clinical Work:

- ❖ **Availability:** Punctual, available continuously on duty, responds promptly on calls and takes proper permission for leave.
- ❖ **Diligence:** Dedicated, hardworking, does not shirk duties, leaves no work pending, does not sit idle, competent in clinical case work up and management.
- ❖ **Academic ability:** Intelligent, shows sound knowledge and skills, participates adequately in academic activities, and performs well in oral presentation and departmental tests.
- ❖ **Clinical Performance:** Proficient in clinical presentations and case discussion during rounds and OPD work up. Preparing Documents of the case history/examination and progress notes in the file (daily notes, round discussion, investigations and management) Skill of performing bed side procedures and handling emergencies.

7.3.3 Academic Activity: Performance during presentation at Journal club/ Seminar/ Case discussion/Stat meeting and other academic sessions. Proficiency in skills as mentioned in job responsibilities.

7.3.4 End of term theory examination conducted at end of 1st, 2nd year and after 2 years 9 months

7.3.5 End of term practical/oral examinations after 2 years 9 months.

Marks for **personal attributes** and **clinical work** should be given annually by all the consultants under whom the resident was posted during the year. Average of the three years should be put as the final marks out of 20.

Marks for **academic activity** should be given by the all consultants who have attended the session presented by the resident.

The Internal assessment should be presented to the Board of examiners for due consideration at the time of Final Examinations.

7.4. Summative Assessment

- ❖ Ratio of marks in theory and practical will be equal.
- ❖ The pass percentage will be 50%.
- ❖ Candidate will have to pass theory and practical examinations separately.

A. Theory examination

Paper	Title	Marks
Paper - I	Basic sciences as related to Cardiology	100
Paper - II	Clinical/ Cardiology	100
Paper - III	Investigative Cardiology	100
Paper - IV	Recent advances in Cardiology	100
Total		400

B. Practical & Viva-Voce Examinations

Sr. No.	Description	Marks
1.	Long case (Valvular heart disease)(1)	100
2.	Short cases (Including one case of congenital heart disease)(2) 75 marks each	150
3.	Procedures (The candidate will be expected to perform echocardiography during the examination)	50
4.	Viva-Voce	100
Total		400

The practical examination would include a final viva-voce on fundamentals and principles of cardiovascular diseases, their management and recent advances in field of cardiology. It would also include viva-voce on spotters like:

- Electrocardiogram (Coronary artery disease, arrhythmias, Congenital heart disease, dyselectrolytemia etc.)
- Cardiac catheterization and hemodynamic data

- Arterial blood gas
- Chest x-ray (Congenital heart disease, valvular heart disease, cardiomyopathy, pericardial involvement etc.)
- Reporting coronary angiogram.

8. Job Responsibilities

❖ Outdoor Patient (OPD) Responsibilities

- The working of the residents in the OPD should be fully supervised.
- They should evaluate each patient and write the observations on the OPD card with date and signature.
- Investigations should be ordered as and when necessary using prescribed forms.
- Residents should discuss all the cases with the consultant and formulate a management plan.
- Patient requiring admission according to resident's assessment should be shown to the consultant on duty.
- Patient requiring immediate medical attention should be sent to the casualty services with details of the clinical problem clearly written on the card.
- Patient should be clearly explained as to the nature of the illness, the treatment advice and the investigations to be done.
- Resident should specify the date and time when the patient has to return for follow up.

❖ In-Patient Responsibilities

Each resident should be responsible and accountable for all the patients admitted under his care. The following are the general guidelines for the functioning of the residents in the ward:

- Detailed work up of the case and case sheet maintenance:
- He/She should record a proper history and document the various symptoms. Perform a proper patient examination using standard methodology. He should develop skills to ensure patient comfort/consent for examination. Based on the above evaluation he/she should be able to formulate a differential diagnosis and prepare a management plan. Should develop skills for recording of medical notes, investigations and be able to properly document the consultant round notes.
- To organize his/her investigations and ensure collection of reports.
- Bedside procedures for therapeutic or diagnostic purpose.
- Presentation of a precise and comprehensive overview of the patient in clinical rounds to facilitate discussion with senior residents and consultants.
- To evaluate the patient twice daily (and more frequently if necessary) and maintain a progress report in the case file.
- To establish rapport with the patient for communication regarding the nature of illness and further plan management.

- To write instructions about patient's treatment clearly in the instruction book along with time, date and the bed number with legible signature of the resident.
- All treatment alterations should be done by the residents with the advice of the concerned consultants and senior residents of the unit.

❖ **Admission day**

Following guidelines should be observed by the resident during admission day.

- Resident should work up the patient in detail and be ready with the preliminary necessary investigations reports for the evening discussion with the consultant on duty.
- After the evening round the resident should make changes in the treatment and plan out the investigations for the next day in advance.

❖ **Doctor on Duty**

- Duty days for each Resident should be allotted according to the duty roster.
- The resident on duty for the day should know about all sick patients in the wards and relevant problems of all other patients, so that he could face an emergency situation effectively.
- In the morning, detailed over (written and verbal) should be given to the next resident on duty. This practice should be rigidly observed.
- If a patient is critically ill, discussion about management should be done with the consultant at any time.
- The doctor on duty should be available in the ward through out the duty hours.

❖ **Care of Sick Patients**

- Care of sick patients in the ward should have precedence over all other routine work for the doctor on duty.
- Patients in critical condition should be meticulously monitored and records maintained.
- If patient merits ICU care then it must be discussed with the senior residents and consultants for transfer to ICU.

❖ **Resuscitation skills**

At the time of joining the residency programme, the resuscitation skills should be demonstrated to the residents and practical training provided at various work stations.

- Residents should be fully competent in providing basic and advanced cardiac life support.
- They should be fully aware of all advanced cardiac support algorithms and be aware of the use of common resuscitative drugs and equipment like defibrillators and external cardiac pacemakers.
- The resident should be able to lead a cardiac arrest management team.

❖ **Discharge of the Patient**

- Patient should be informed about his/her discharge one day in advance and discharge cards should be prepared 1 day prior to the planned discharge.
- The discharge card should include the salient points in history and examination, complete diagnosis, important management decisions, hospital course and procedures done during hospital stay and the final advice to the patient.
- Consultants and DM Residents should check the particulars of the discharge card and counter sign it.
- Patient should be briefed regarding the date, time and location of OPD for the follow up visit.

❖ In Case of Death

- In case it is anticipated that a particular patient is in a serious condition, relatives should be informed about the critical condition of the patient beforehand.
- Residents should be expected to develop appropriate skills for breaking bad news and bereavements.
- Follow up death summary should be written in the file and face sheet notes must be filled up and the sister in charge should be requested to send the body to the mortuary with respect and dignity from where the patient's relatives can be handed over the body.
- In case of a medico legal case, death certificate has to be prepared in triplicate and the body handed over to the mortuary and the local police authorities should be informed.
- Autopsy should be attempted for all patients who have died in the hospital especially if the patient died of an undiagnosed illness.

❖ Bedside Procedures

The following guidelines should be observed strictly:

- Be aware of the indications and contraindications for the procedure and record it in the case sheet. Rule out contraindications like low platelet count, prolonged prothrombin time, etc.
- Plan the procedure during routine working hours, unless it is an emergency. Explain the procedure with its complications to the patient and his/her relative and obtain written informed consent on a proper form. Perform the procedure under strict aseptic precautions using standard techniques. Emergency tray should be ready during the procedure.
- Make a brief note on the case sheet with the date, time, nature of the procedure and immediate complications, if any.
- Monitor the patient and watch for complications(s).

❖ Medico-Legal Responsibilities of the Residents

- All the residents are given education regarding medico-legal responsibilities at the time of admission in a short workshop.
- They must be aware of the formalities and steps involved in making the correct death certificates, mortuary slips, medico-legal entries, requisition for autopsy etc.

- They should be fully aware of the ethical angle of their responsibilities and should learn how to take legally valid consent for different hospital procedures & therapies.
- They should ensure confidentiality at every stage.

9. Suggested Books & Journals

9.1 Books

- ❖ Braunwald's Heart Disease
- ❖ Hurst's The Heart
- ❖ Grossman's Cardiac Catheterization, Angiography, and Intervention
- ❖ Stress Testing: Principles and Practice by Myrvin H. Ellestad
- ❖ Drugs for the Heart by Lionel H. Opie
- ❖ The Cardiac Catheterization Handbook by Morton L. Kern
- ❖ Hemodynamic Rounds by Morton J. Ker
- ❖ Moss and Adams' Heart Disease in Infants, Children, and Adolescents
- ❖ Pediatric Cardiology for Practitioners (4th Edition) by Myung K. Park
- ❖ Feigenbaum's Echocardiography
- ❖ Shamroth's An Introduction to Electrocardiography
- ❖ Valvular Heart Disease by Alpert & Dalen

9.2 Journals

- ❖ New England Journal of Medicine
- ❖ The Lancet
- ❖ Journal of American College of Cardiology
- ❖ Circulation
- ❖ Heart
- ❖ Indian Heart Journal
- ❖ Hypertension
- ❖ American Journal of Cardiology
- ❖ Journal of Interventional Cardiology

10. Model Question Papers

MODEL TEST PAPERS
DM (Cardiology)
Paper -I
Basic sciences as related to Cardiology

Maximum Marks : 100

Time : 3 Hours

- Attempt **ALL** questions.
 - Answer each question and its parts in **SEQUENTIAL ORDER**.
 - **ALL** questions carry equal marks.
 - Illustrate your answer with **SUITABLE DIAGRAMS**.
-

1. Laplace Principle :- Definition and clinical implication in natural history of chronic severe mitral regurgitation.
2. Describe the schematic of the evolution of atherosclerotic plaque and enumerate the features of vulnerable atherosclerotic plaque.
3. Describe fetal circulation and changes at birth.
4. Mention the 3 natriuretic peptides : Discuss the role of BNP in patients with heart failure.
5. Treppe (Bowditch effect) – Definition and relevance in normal and disease states.
6. Left atrial appendage : Anatomical features, pathophysiology & therapeutic importance.
7. Write a short note on mechanism of action of Ezetimibe and fibrates.
8. Write a short note on endothelin its mode of action and the clinical implications.
9. Described the phases of action potential and its implication in arrhythmias
10. Describe the different types of reperfusion injury with their etiopathogenesis and enumerate common reperfusion arrhythmias.

MODEL TEST PAPERS

DM (Cardiology) Paper –II Clinical Cardiology

Maximum Marks : 100

Time : 3 Hours

- Attempt **ALL** questions.
 - Answer each question and its parts in **SEQUENTIAL ORDER**.
 - **ALL** questions carry equal marks.
 - Illustrate your answer with **SUITABLE DIAGRAMS**.
-

1. Discuss in detail the management of post operative TOF patient aged 18 years.
2. Write a short note on classification and pathogenesis of stent thrombosis.
3. Differentiate in tabular form the haemodynamics in cardiac tamponade and constrictive pericarditis.
4. Write a short note on etiopathogenesis and management of carcinoid heart disease.
5. Enumerate the features associated with high risk of sudden cardiac death in a patient of hypertrophic obstructive cardiomyopathy (HOCM) and describe Brockenbrough – Braunwald phenomenon in HOCM.
6. Describe the arterial pressure tracings in 4 phases of valsalva manouver in a normal adult and a case of heart failure.
7. Write a short note on catecholaminergic polymorphic ventricular tachycardia (CPVT) – the clinical features; electrocardiogram, genetic basis and mention the treatment options.
8. Write a short note on HAPE (High altitude pulmonary edema) –definition, pathophysiology, mechanism and treatment.
9. Describe the mechanism & clinical presentation of neurocardiogenic syncope and enumerate the pharmacological agents used for its treatment.
10. Discuss in detail microvascular obstruction and no reflow phenomenon after percutaneous coronary interventions.

MODEL TEST PAPERS

DM (Cardiology) Paper –III Investigative Cardiology

Maximum Marks : 100

Time : 3 Hours

- Attempt **ALL** questions.
 - Answer each question and its parts in **SEQUENTIAL ORDER**.
 - **ALL** questions carry equal marks.
 - Illustrate your answer with **SUITABLE DIAGRAMS**.
-

Write a short note on the following :-

1. Sinus node recovery time and its clinical implication.
2. Myocardial perfusion imaging in cardiology.
3. Fractional flow reserve as a determinant of myocardial revascularization.
4. Intravascular imaging for vulnerable plaque.
5. BNP & its role in evaluation of heart failure.
6. Head up tilt test (HUTT).
7. Carotid intimal medial thickness.
8. Lipoprotein a.
9. Endo myocardial biopsy.
10. Echocardiographic findings and cardiac catheterization in evaluation of constrictive pericarditis, cardiac tamponade and restrictive cardiomyopathy.

MODEL TEST PAPERS
DM (Cardiology)
Paper –IV
Recent advances in Cardiology

Maximum Marks : 100

Time : 3 Hours

- Attempt **ALL** questions.
 - Answer each question and its parts in **SEQUENTIAL ORDER**.
 - **ALL** questions carry equal marks.
 - Illustrate your answer with **SUITABLE DIAGRAMS**.
-

Write a short note on the following :-

1. Management of left main disease - current status and discuss results of SYNTAX trial.
2. Multisite pacing.
3. Cardiocerebral resuscitation.
4. Percutaneous aortic valve implantation.
5. Mechanism of action and role of Dronedarone in management of atrial fibrillation.
6. CARTO Mapping.
7. Percutaneous implantable cardioverter defibrillation.
8. Status of prasugrel in present day era.
9. Newer therapy for pulmonary hypertension.
10. Advances in AF ablation.