

August 2009

[KV 073]

Sub. Code: 1502

**D.M. DEGREE EXAMINATION**

**(Super Specialities)**

**Branch II - Cardiology**

**(Revised Regulations)**

**Paper III – HAEMODYNAMICS THERAPEUTICS AND INTERVENTION**

*Q.P. Code: 161502*

**Time: Three hours**

**Maximum: 100 Marks**

**Answer ALL questions**

**Draw suitable diagrams wherever necessary.**

**I. Essays:**

**2 x 20 = 40**

1. Discuss in detail the haemodynamics of constrictive pericarditis.
2. Non invasive assessment of LV end diastolic pressure.

**II. Write short notes on:**

**10 x 6 = 60**

1. Prasugrel.
2. Nebivolol.
3. Lytic protocols for pulmonary embolism.
4. Treatment of prosthetic valve thrombosis.
5. Loop recorders.
6. Non surgical closure of ductus.
7. Endovascular stenting for dissection of aorta.
8. Role of stents in acute STEMI.
9. Left main stenting.
10. Balloon atrial septostomy.

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August 2011

[KZ 010]

Sub. Code: 1423

**DOCTORATE OF MEDICINE (D.M.) DEGREE EXAMINATION  
(SUPER SPECIALITIES)**

**BRANCH II – CARDIOLOGY**

**HEMODYNAMICS THERAPEUTICS AND INTERVENTION**

*Q.P. Code: 161423*

**Time : 3 hours  
(180 Min)**

**Maximum : 100 marks**

**Answer ALL questions in the same order.**

**I. Elaborate on :**

**Pages Time Marks  
(Max.) (Max.) (Max.)**

- |  |    |    |    |
|--|----|----|----|
| 1. Draw and explain the Clinical, Echocardiographic features and Hemodynamic appearances of pressure curves of Pulmonary Stenosis and its interventional management. | 11 | 35 | 15 |
| 2. Discuss Bare Metal versus Drug Eluting Stent deployment and the recent advances in the Stent technology.  | 11 | 35 | 15 |

**II. Write notes on :**

- |  |   |    |   |
|--|---|----|---|
| 1. Pharmacologic versus interventional management for ST segment elevation myocardial infarction.            | 4 | 10 | 7 |
| 2. Management of Supraventricular tachycardia in a Fetus.  | 4 | 10 | 7 |
| 3. Adjuvant therapy in Primary Percutaneous intervention for Non ST segment elevation Myocardial infarction. | 4 | 10 | 7 |
| 4. Device management of Ventricular Tachycardia.   | 4 | 10 | 7 |
| 5. Ablation therapy for Atrial fibrillation.   | 4 | 10 | 7 |
| 6. Intra cardiac echocardiography.   | 4 | 10 | 7 |
| 7. Thrombolytic therapy for Acute Pulmonary Embolism.  | 4 | 10 | 7 |
| 8. Interventional management of Saphenous Venous Graft disease.  | 4 | 10 | 7 |
| 9. Focal Atrial Tachycardia.   | 4 | 10 | 7 |
| 10. Cardiac resynchronization therapy.   | 4 | 10 | 7 |

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February 2012

[LA 010]

Sub. Code: 1423

DOCTORATE OF MEDICINE (D.M.) DEGREE EXAMINATION

(SUPER SPECIALITIES)

BRANCH II – CARDIOLOGY

HEMODYNAMICS THERAPEUTICS AND INTERVENTION

*Q.P. Code: 161423*

**Time : 3 hours  
(180 Min)**

**Maximum : 100 marks**

**Answer ALL questions in the same order.**

**I. Elaborate on :**

	<b>Pages (Max.)</b>	<b>Time (Max.)</b>	<b>Marks (Max.)</b>
1. Discuss in detail clinical pathophysiology, echocardiogram, pressure data with diagrams the features of severe aortic stenosis and add note on its interventional management.	16	35	15
2. Discuss in detail clinical, echo and catheterization features of Patent Ductus Arteriosus with interventional management.	16	35	15

**II. Write notes on :**

1. Measurement of Coronary blood flow.	4	10	7
2. Tandem lesions.	4	10	7
3. Adjuvant Pharmacotherapy in Non STEMI.	4	10	7
4. Combo Device.	4	10	7
5. Ablation of Post Myocardial infarction ventricular tachycardia.	4	10	7
6. Post operative intervention in congenital heart disease.	4	10	7
7. Coronary artery dissection.	4	10	7
8. Carotid artery stenting.	4	10	7
9. Trans radial interventions.	4	10	7
10. Rota blators.	4	10	7

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[LB 010]

AUGUST 2012

Sub. Code: 1423

D.M – CARDIOLOGY

Paper – III HEOMODYNAMICS THERAPEUTICS  
AND INTERVENTION

Q.P. Code: 161423

Time: 3 hours  
(180 Min)

Maximum: 100 marks

Answer ALL questions in the same order.

I. Elaborate on:

	Pages (Max.)	Time (Max.)	Marks (Max.)
1. Discuss in detail catheter versus noninvasive assessment of left to right shunts of congenital heart diseases.	16	35	15
2. Discuss the hemodynamics, causes and management of acute mitral regurgitation.	16	35	15

II. Write notes on:

1. Describe the pharmacology, clinical indications and adverse effects of nesiritide.	4	10	7
2. Write on the role of implantable cardioverter defibrillator in heart failure.	4	10	7
3. How will you measure cardiac output in the catheterization laboratory?	4	10	7
4. Indications, contraindications and technique of device closure of atrial septal defect.	4	10	7
5. Give a brief account on congenital heart lesions which require Fontan procedure.	4	10	7
6. Discuss the overall view of prosthetic tissue valves.	4	10	7
7. Indications, technique and complications of pericardiocentesis.	4	10	7
8. Absolute indications for endomyocardial biopsy.	4	10	7
9. Describe the pathology, clinical presentation and management of instent restenosis.	4	10	7
10. Describe the role of nonpharmacologic treatment of hypertension.	4	10	7

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**(LD 010)**

**AUGUST 2013**

**Sub. Code:1423**

**D.M. – CARDIOLOGY**  
**Paper – III HEOMODYNAMICS THERAPEUTICS AND**  
**INTERVENTION**  
*Q.P.Code: 161423*

**Time: Three Hours**

**Maximum: 100 marks**

**I. Elaborate on:**

**(2X15=30)**

1. Causes, pathology, pathophysiology, clinical presentation, diagnosis, natural history and management of Mitral Regurgitation.
2. Physiology, evaluation of hemodynamic compromise, etiologic diagnosis, management and procedures of pericardial drainage for Pericardial effusion.

**II. Write notes on:**

**(10X7=70)**

1. Radionuclear imaging to assess myocardial viability.
2. Coronary perforation-risk factors and management.
3. Natural history of venous and arterial coronary bypass grafts.
4. Surgical ventricular reconstruction in ischemic heart failure.
5. Mechanism of ischemic pre and post conditioning.
6. Genotypic variations in the efficacy of clopidogrel.
7. Facilitated versus rescue percutaneous coronary intervention in ST elevation myocardial infarction.
8. Vasodilator therapy for pulmonary arterial hypertension.
9. Indications for reoperation following surgical repair of Tetralogy of Fallot.
10. Fontan procedure requiring congenital heart diseases.

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(LF 010)

AUGUST 2014

Sub. Code:1423

**D.M. – CARDIOLOGY**

**Paper – III HEMODYNAMICS, THERAPEUTICS AND INTERVENTION**

*Q.P.Code: 161423*

**Time: Three Hours**

**Maximum: 100 marks**

**I. Elaborate on:**

**(2X15=30)**

1. Discuss the present status of Bifurcation Stenting
2. What is the current status and modes of assessment of patients prior to CRT (Cardiac Resynchronisation therapy)?

**II. Write notes on:**

**(10X7=70)**

1. Dabigatran in Atrial Fibrillation - present status.
2. Indication for Rotational Atherectomy.
3. Tolvaptan.
4. Management of Post Myocardial Infarction Ventricular Septal Rupture
5. Fibrin Specific Thrombolytic agents.
6. Tilting disc valves
7. Extra Corporeal Membrane Oxygenation
8. Milrinone.
9. Potassium Channel Blocking Drugs.
10. Cangrelor.

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**(LG 010)**

**FEBRUARY 2015**

**Sub. Code:1423**

**D.M. – CARDIOLOGY**

**Paper III – HEMODYNAMICS, THERAPEUTICS AND INTERVENTION**

***Q.P.Code: 161423***

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Discuss Fractional Flow Reserve (FFR) and its role in the management of CAD.
2. Device management of cardiac failure

**II. Write notes on:**

**(10 x 7=70)**

1. Afterload mismatch.
2. Septal Myectomy.
3. Indications for Carotid Artery Stenting.
4. Role of Distal protection devices in coronary interventions.
5. Covered Stents.
6. Atrial Septostomy.
7. Ambrisentan.
8. Bivalirudin.
9. Current indications for IVC Filter implantation.
10. Levosimendan.

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**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND INTERVENTION**

*Q.P.Code: 161423*

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Discuss about the pathology, pathophysiology, clinical presentation, natural history and management of Acute AR.
2. Hemo dynamic assessment of operability in common congenital heart disease. Discuss the scientific basis for the same.

**II. Write notes on:**

**(10 x 7=70)**

1. Current status of IVC filters.
2. Non invasive assessment of coronary flow reserve.
3. Coronary venous circulation with diagrams and its clinical application in cardiovascular practice.
4. Fick principle.
5. Microvolt Twave alternans.
6. Epicardial ventricular tachycardia.
7. Clinical stress test in patients with permanent pace maker.
8. Force-frequency response in normal and failing heart.
9. Assessment of different rims for device closure of ASD.
10. Intra cardiac echocardiography.

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**(LJ 010)**

**AUGUST 2016**

**Sub. Code:1423**

**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND  
INTERVENTION**

*Q.P.Code: 161423*

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Anticoagulants in current clinical practice in cardiology.
2. Surgical interventions in common congenital cyanotic heart diseases.

**II. Write notes on:**

**(10 x 7=70)**

1. Contrast nephropathy.
2. Rhythm control for Atrial Fibrillation.
3. Role of digoxin in current practice.
4. Phosphodiesterase inhibitors in heart failure.
5. Antibiotic treatment of native valve endocarditis.
6. Management of Diuretic resistance.
7. Management of Heart failure with preserved Ejection Fraction.
8. Chelation therapy for coronary artery disease.
9. Management of Prinzmetal Angina.
10. Management of Atrial Myxoma.

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(LK 010)

FEBRUARY 2017

Sub. Code:1423

**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND  
INTERVENTION**

*Q.P.Code: 161423*

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Pharmacotherapy of Arrhythmias.
2. Management of pulmonary arterial hypertension.

**II. Write notes on:**

**(10 x 7=70)**

1. Cyanotic spell.
2. Treatment of foetal arrhythmias.
3. Alcohol and heart.
4. Management of peripartum cardiomyopathy.
5. Treatment of atrial tachycardia.
6. Management of pregnant women with mechanical prosthetic valve.
7. Management of Atrial fibrillation in elderly without structural heart disease.
8. Amiodarone.
9. Systemic Lupus Erythymatosis and heart.
10. Newer oral anticoagulant drugs.

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**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND  
INTERVENTION**

*Q.P.Code: 161423*

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Discuss the pathophysiology and hemodynamics of cardiogenic shock. Discuss the treatment options available.
2. Discuss in detail about ventricular interdependence in various clinical settings.

**II. Write notes on:**

**(10 x 7 = 70)**

1. Post myocardial infarction risk stratification.
2. Rebound ischemia.
3. Cardiac allograft vasculopathy.
4. Stress and strain rate imaging.
5. Diastolic stress echo.
6. Conduits in cardiovascular surgery.
7. Optical Coherence Tomography (OCT) in imaging.
8. Radiation safety and protection.
9. Leadless pacemakers.
10. FONTAN repair – principles.

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**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND INTERVENTION**

*Q.P.Code: 161423*

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Hemodynamic changes occurring in pregnancy, its effect on the mother with cardiac disease and management strategies through pregnancy, labour and puerperium.
2. Regional wall motion segments and wall motion scoring system.

**II. Write notes on:**

**(10 x 7 = 70)**

1. Pulmonary Venous Doppler Flow Patterns.
2. Electromagnetic Interference after ICD and pacemakers.
3. Pitfalls of coronary arteriography.
4. Cardiopulmonary exercise testing.
5. Classification of antiarrhythmic drugs.
6. Assessment of cardiac dyssynchrony by echocardiography.
7. The TIMI Frame Count.
8. Circulatory assist device in Heart failure.
9. Tenecteplase.
10. Proarrhythmia.

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(LO 010)

FEBRUARY 2019

Sub. Code: 1423

**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND INTERVENTION**

*Q.P. Code: 161423*

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Chronic Atrial Fibrillation: Pharmacologic and non pharmacologic therapy.
2. Interventional management of congenital heart disease.

**II. Write notes on:**

**(10 x 7 = 70)**

1. Ebstein anomaly: Surgical therapy and Indications.
2. Fetal catheter interventions.
3. Percutaneous therapies for mitral valve.
4. Write briefly on  
(a) Short QT Syndrome (b) Timothy Syndrome
5. VDD pacing.
6. Facilitated PCI vs Pharmaco invasive strategy.
7. Gene therapy in heart failure.
8. Culture negative endocarditis and management.
9. Bivaluridin: Data from clinical trials and Current role.
10. Open artery vs closed artery. Discuss with relevance to coronary occlusions.

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**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND INTERVENTION**

*Q.P. Code: 161423*

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:** (2 x 15 = 30)

1. Sudden cardiac death: Epidemiology, Aetiology and Device therapy.
2. Peripheral arterial disease: Pathophysiology, Clinical features, diagnosis and management.

**II. Write notes on:** (10 x 7 = 70)

1. Role of Niacin in dyslipidaemia. Discuss HPS2 - Thrive Study.
2. Management of asymptomatic Severe Aortic stenosis.
3. Write briefly on
  - (a) Impella device.
  - (b) Extracorporeal membrane oxygenator – ECMO.
4. Hardware for Chronic Total Occlusion.
5. Prehospital care in ST elevation Myocardial Infarction.
6. Radiofrequency catheter ablation in Ventricular Tachycardia.
7. Management of Cardiac arrhythmia in pregnancy.
8. Management of VSD following Acute MI.
9. One and a half ventricular repair.
10. Role of intra-cardiac echocardiography in interventional cardiology.

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(LQ 010)

FEBRUARY 2020

Sub. Code: 1423

**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND  
INTERVENTION**

*Q.P. Code: 161423*

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:** **(2 x 15 = 30)**

1. Diagnosis and management of pacemaker malfunction.
2. What are the mechanical complications in Myocardial Infarction and describe their management.

**II. Write notes on:** **(10 x 7 = 70)**

1. Assessment of left ventricular diastolic function by echocardiography.
2. Implantable cardiovertor-defibrillators (ICDs) – follow up and trouble shooting.
3. High-Sensitivity C-Reactive Protein.
4. Advantages and Disadvantages of Transesophageal Echocardiography Relative to Transthoracic Echocardiography.
5. Estimation of Infarct size.
6. Drug-Induced Torsades de Pointes.
7. The DASH Diet Pattern.
8. Diagnostic Criteria for Preeclampsia.
9. Focal Atrial Tachycardia.
10. Bisoprolol.

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(LR 010)

NOVEMBER 2020  
(AUGUST 2020 SESSION)

Sub. Code: 1423

**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND  
INTERVENTION**

*Q.P. Code: 161423*

**Time: Three Hours  
Marks**

**Maximum: 100**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Discuss in detail the etiology, clinical presentation, hemodynamics & management of restrictive cardiomyopathy.
2. Discuss in detail the hemodynamic assessment by echocardiogram and its implication in management.

**II. Write notes on:**

**(10 x 7 = 70)**

1. Macitentan.
2. Sildenafil citrate .
3. Lysis for prosthetic valve thrombosis.
4. Non surgical closure of PDA.
5. Endovascular stenting in dissection of aorta.
6. Third generation coronary stents.
7. Event recorders.
8. Neprilysin inhibitors.
9. His bundle pacing.
10. Twiddler's syndrome.

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(DM 0221)

FEBRUARY 2021

Sub. Code: 1423

**D.M. – CARDIOLOGY**  
**Paper III – HEOMODYNAMICS THERAPEUTICS AND**  
**INTERVENTION**

*Q.P. Code: 161423*

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Discuss hemodynamic changes in normal pregnancy & in heart disease.
2. Discuss various Pacing Modes and its application in clinical practice.

**II. Write notes on:**

**(10 x 7 = 70)**

1. Cardiogenic shock management.
2. Myocardial Perfusion Imaging.
3. IVC Filters current status.
4. Watchman device.
5. Fractional Flow Reserve.
6. Non Ionic contrast agents.
7. Sinus Node recovery time.
8. Triple Antiplatelet therapy.
9. Rescue PTCA.
10. Anticoagulation in Atrial Fibrillation.

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(DM 0821)

AUGUST 2021

Sub. Code: 1423

**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND  
INTERVENTION**

***Q.P. Code: 161423***

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Percutaneous treatment for valvular heart disease –discuss.
2. Discuss the hemodynamics of constrictive pericarditis and cardiac tamponade.

**II. Write notes on:**

**(10 x 7 = 70)**

1. Principles of intravascular imaging.
2. PRECISE-DAPT score.
3. Blood pressure variability and its determinants.
4. Complications of ICD therapy.
5. Management of perioperative atrial fibrillation.
6. Late gadolinium enhancement.
7. Stent maloposition.
8. Nonsurgical treatment for coarctation of aorta.
9. COVID and heart failure –causes and approach to treatment.
10. Pathophysiologic mechanisms of stent thrombosis.

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**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY**

**[DM 0822]**

**AUGUST 2022**

**Sub. Code :1423**

**D.M. – CARDIOLOGY**

**Paper III – HEOMODYNAMICS THERAPEUTICS AND INTERVENTIONS**

***Q.P. Code: 161423***

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on: (2 x 15 = 30)**

1. Discuss all the possible catheter based treatment options in the natural history of tetralogy of fallot patients.
2. Hemodynamic evaluation of valvular heart disease.

**II. Write notes on: (10 x 7 = 70)**

1. Timing of Inflation and Deflation of the intra aortic balloon pump.
2. Invasive management of femoral arterial pseudoaneurysm.
3. Hemodynamic signs of restrictive cardiomyopathy versus constrictive Pericarditis.
4. Creating atrial septal defects.
5. Collagen plug device.
6. Switching between oral p2Y12 inhibitors.
7. Medina classification for bifurcation lesions.
8. Multisite stimulation in cardiomyopathy trial.
9. Subcutaneous implantable cardioverter-defibrillators.
10. Optimal Antithrombotic Therapies after TAVR.

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**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY**

**[DM 0124]**

**JANUARY 2024**

**Sub. Code :1423**

**D.M. – CARDIOLOGY**

**PAPER III – HEOMODYNAMICS THERAPEUTICS AND INTERVENTIONS**

***Q.P. Code: 161423***

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Discuss the normal left and right ventricular waveforms and elaborate on valvular hemodynamics of various pathologies.
2. Discuss the present status of bifurcation stenting.

**II. Write notes on:**

**(10 x 7 = 70)**

1. OCT.
2. Myocardial strain imaging.
3. Multisite pacing.
4. Diuretic resistance.
5. CTEPH.
6. Percutaneous management of pulmonary valve disease.
7. Predictors and prevention of stroke in TAVI.
8. Intravascular contrast agents.
9. Complications of radial artery puncture.
10. Assessment of reperfusion after fibrinolysis for STEMI.

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**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY**

**[DM 0824]**

**AUGUST 2024**

**Sub. Code :1423**

**D.M. – CARDIOLOGY**

**PAPER III – HEOMODYNAMICS THERAPEUTICS AND INTERVENTIONS**

***Q.P. Code: 161423***

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Approach to difficult Coronary Stent Delivery Situations.
2. Right heart catheterization in cardiogenic shock states.

**II. Write notes on:**

**(10 x 7 = 70)**

1. Role of Transesophageal Echocardiography in Interventional procedures.
2. Intracoronary drugs used in slow flow situation.
3. Distal coronary protection devices.
4. Describe the steps in deployment of IVC Filter.
5. Catheters used in electrophysiology study.
6. Complications during and after temporary and permanent pacing.
7. Carbondioxide angiography.
8. Trials in thrombus aspiration and its interpretation.
9. Stent designs and its drug coatings.
10. Fontan physiology.

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**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY**

**[DM 0225]**

**FEBRUARY 2025**

**Sub. Code :1423**

**D.M. – CARDIOLOGY**

**PAPER III – HEOMODYNAMICS THERAPEUTICS AND INTERVENTIONS**

***Q.P. Code: 161423***

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Etiology, pathogenesis and management of primary pulmonary hypertension.
2. Definition, etiology and management of stent failure.

**II. Write notes on:**

**(10 x 7 = 70)**

1. Leadless pacemaker.
2. Stem cell therapy in cardiology.
3. Mavacamten.
4. PARTNER trial.
5. ECHO assessment of prosthetic valve function.
6. Cardio metabolic syndrome.
7. Coronary ectasia and aneurysm.
8. Artificial intelligence in cardiac arrhythmia.
9. DCB (Drug Coated Balloon).
10. ECMO.

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**THE TAMIL NADU Dr.M.G.R. MEDICAL UNIVERSITY**

**[DM 0126]**

**JANUARY 2026**

**Sub. Code :1423**

**D.M. – CARDIOLOGY**

**PAPER III – HAEMODYNAMICS THERAPEUTICS AND INTERVENTIONS**

*Q.P. Code: 161423*

**Time: Three Hours**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(2 x 15 = 30)**

1. Write essay on catheter-based treatment of congenital heart disease.
2. Catheterization of patient with restrictive physiology of heart.

**II. Write notes on:**

**(10 x 7 = 70)**

1. Force frequency response.
2. Distal protection device.
3. T wave alternans.
4. Short QT syndrome.
5. Fractional flow reserve.
6. ECHO assessment of valvular regurgitation.
7. Haemodynamics of cardiogenic shock.
8. 3D map in EP study.
9. Stitch phenomenon.
10. Intracoronary thrombolysis.

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