Manipal Entrance Test (MET) 2025 Syllabus

Program	Institute
MSc. Cardiac Catheterization & Interventional Technology MSc. Echocardiography	Manipal College Of Health Professions (MCHP), Manipal Kasturba Medical College (KMC), Mangaluru Manipal Hospital, Bengaluru

MET 2025 Details

- Test Duration: **120 minutes**
- Total Questions: **200 MCQs**
  - Cardiac anatomy (10), Cardiac Physiology(15) , Embryology (5), Circulatory system (5), ECG (20), TMT (10), Ischemic Heart Disease (10), Echocardiography (30), Clinical Cardiology (20), Congenital Heart Disease (10), Valvular Heart Disease (10) , Miscellaneous heart diseases (10), Cardiomyopathies (10), Cardiac Catheterization (30), Basics of Biostatistics and Research Methodologies (5)
- Max Marks: **800**
- Marking Scheme: **+4 for every correct answer, -1 for every wrong answer, 0 for every unanswered question**
- No. of Attempts: **1**
- Schedule & Mode: Refer https://manipal.edu/met for updates

CARDIAC ANATOMY

Cardiac Anatomy: Anatomy of Endocardium, myocardium. Anatomy of Valves: Mitral valve, aortic valve, tricuspid valve and pulmonary valve. Conduction system of the heart: conduction system of SA node, AV node, Bundle of his, bundle branches, Purkinje fibres. Chamber identification and anatomic variance of right atrium, left atrium, right ventricle and left ventricle.

CARDIAC PHYSIOLOGY

Cardiac cycle: Phases of systole, diastole and event timings - Stroke volume/cardiac output. Blood Pressure: systolic and diastolic blood pressure. Direct/ indirect measurement, Brachial artery pressure, lower extremity pressure and Ambulatory BP monitoring.
Techniques of palpation: techniques of palpations in Arterial pulse: central aortic and peripheral, Morphology of pulse, pulse pressure, mean arterial pressure and Examination of arterial pulse: rate/rhythm/character/volume/vessel wall. Abnormal arterial pulse: Pulses Magnus/ pulses tarsus/ bounding pulse and Parvus et tardus, collapsing/ water hammer pulse, pulse alternans, dicrotic pulse, bisferience pulse, pulses paradoxus, pulses bigeminy, apex pulse deficit. Heart sounds like S1, S2, S3, S4 and murmurs like Diastolic and systolic murmurs

EMBRYOLOGY

Early development of embryo: the stages of cell division Mitosis and Meiosis, the stages of spermatogenesis and oogenesis, stages of fertilization, formation of Germ layers and the development of placenta.
Development of the heart: formation of heart tube, formation of cardiac looping and development of sinus venosus.
Formation of Atria: formation of atria, development of Right atrium, formation of Left atrium and the stages in formation of Inter atrial septum.
Formation of Cardiac Valves: formation of AV valves and Semilunar valves. Formation of Ventricles: development of Ventricles and the stages in formation of Inter ventricular septum.
Fate of truncus arteriosus: development of Pharyngeal arch arteries and their fate and Anomalous development of pharyngeal arch arteries.
Formation of great cardiac veins: development of great cardiac veins, fate of cardinal veins, the fate of vitelline veins, umbilical veins and the fate of Ductus venosus, Superior vena cava, Inferior vena cava. Formation of Pericardium.

CIRCULATORY SYSTEM

Circulation: Systemic and pulmonary circulation.
Circulatory system of the body: branch anatomy of Arterial supply of the heart, aorta and its branches, Peripheral anatomy and anatomy of Vena cava and its branches

ECG

Conduction system of the heart, Lead system in ECG, Interpretation of normal ECG, ECG in Dextrocardia, ECG in Chamber enlargement and Hypertrophy, LBBB, RBBB, ECG in Sinus Node dysfunction, ECG in AV Blocks ECG in MI, ECGs of premature beats/bigeminy/trigeminy, Narrow complex arrhythmias, Broad complex arrhythmias, ECG in miscellaneous conditions like Pulmonary thrombo-embolism, electrolyte imbalance, Brugada syndrome, Myocarditis, Cardiomyopathies

TMT

Cardiovascular and pulmonary responses to exercise, maximum oxygen uptake, Heart rate and BP response to exercise, indications (coronary and non-coronary) and contraindications of Exercise stress test.
Patient preparation and procedure of TMT, stress protocol and test supervision, equipment used for stress test, Interpreting stress ECG, complications of exercise stress test and four levels of angina scale for exercise tolerance test.
Interpretation and uses of exercise stress test: clinical response, symptoms, subject appearance and exercise capacity during stress test.
To Interpret normal and abnormal ECG responses to exercise stress test, uses of exercise stress test and uses of various drugs in exercise stress test like beta blockers, vasodilators, ACE inhibitors, calcium antagonists, digitalis and other drugs

ISCHEMIC HEART DISEASE

Coronary artery disease: Clinical presentations, Risk factors and Pathophysiology and treatment strategy. Types of Acute coronary syndrome, Differentiating Typical and atypical angina, Cardiac biomarkers in Acute coronary syndrome, Detection and quantification of wall motion abnormalities, Regional and global wall motion analysis methods, Role of echocardiography in angina Pectoris, Role of echocardiography in Acute Myocardial Infarction, Explaining Chronic coronary artery disease, Mechanical complications of myocardial infarction.

ECHOCARDIOGRAPHY

Physical properties of ultrasound, Types of ultrasound transducers and its clinical applications, Different types of resolution - Spatial resolution, Contrast resolution, Temporal resolution, Tissue harmonic imaging physics.
Doppler echocardiography Principles - Pulsed wave Doppler, continuous wave Doppler and colour flow imaging, Aliasing, Billiard Ball effect, Doppler artefacts.
2D cardiac chamber examination – Diagnosing Situs, Identifying the Veno-atrial connection, Anatomy of Atria, Ventricle and valves, Identifying Atrio-ventricular and ventriculo-arterial connections.
Hemodynamic assessment by Doppler – Stroke volume and Cardiac output calculation. Continuity equation – Formula, uses and limitations. Bernoulli's equation– Formula, uses and limitations. Pressure half time and its application. PISA – Formula, uses and limitations. Tissue Doppler imaging (TDI) – Uses and limitations. M- mode echocardiography – Normal and abnormal M-mode patterns at Left ventricular, Mitral valve and aortic valve level. Applications of color M-mode.
Transesophageal echocardiography (TEE) – Indications, Contraindications and complications. Contrast Echocardiography – contrast agents, Indications and applications. Clinical applications of 3D Echocardiography.
Echocardiography in Pulmonary hypertension – M-mode findings and Doppler assessment, Methods to measure Right atrial pressure. Methods to analyse Strain and strain rate.

CLINICAL CARDIOLOGY

NYHA functional classification, Chest pain – Etiology, Cardiovascular causes and non-cardiac causes, duration, radiation, location and character, differentiating chest pain in Chronic stable angina and Unstable angina.
Palpitation - Cardiac etiology and evaluation. Fatigue - etiology and evaluation. Syncope - Cardiac etiology and evaluation, Indications of HUTT.
Dyspnoea - etiology, Cardiovascular causes and non-cardiac causes.
Arterial pulse - Definition, Genesis and Pulse wave pattern, characteristic features of pulse in cardiac conditions. Jugular venous pulse - waves of JVP in normal and abnormal conditions.
Heart sound – Normal and in different cardiac conditions, Heart murmur in various disease and conditions.

Haemoptysis - etiology and evaluation. Hoarseness of voice - etiology and evaluation.
Cyanosis – Definition, Evaluation and types. Systemic and pulmonary hypertension – Etiology and diagnosis. Basic life support in Adults and Infants.

CONGENITAL HEART DISEASES

Cardiac malposition: normal and abnormal visceral and cardiac situs, association between cardiac malposition and possible congenital heart disease, ASD, VSD, PDA, APW, TAPVC, PAPVC, Ebsteins anomaly, Atrioventricular canal defect,
Coarctation of aorta: prevalence and types, Explaining the embryology, classification and pathophysiology, clinical presentation, Clinical evaluation, ECG, X ray, echo findings and cath findings, natural history, prognosis and management.
Congenital semilunar valve stenosis: prevalence, pathophysiology, classification, diagnosis and management of Congenital aortic stenosis (AS), Supra valvular AS, Valvular AS, Sub valvular AS, Congenital pulmonary stenosis(PS), Supra valvular PS, Valvular PS, Sub valvular PS.
Tetralogy of Fallot (TOF) and its variants: prevalence and types, embryology, classification and pathophysiology, clinical presentation, Clinical evaluation, ECG, X ray, echo findings, cath findings, natural history, prognosis and management, MAPCA classification
Pulmonary atresia with intact ventricular septum (PAIVS): prevalence and types, embryology, classification (Unipartite, bipartite, tripartite RV) and pathophysiology, Clinical evaluation, ECG, X ray, echo findings and cath findings, natural history, prognosis and management,
Double outlet right ventricle (DORV), Complete transposition of great artery (DTGA), Congenitally corrected transposition of great artery (CCTGA / LTGA), Tricuspid atresia: prevalence and types, embryology, classification and pathophysiology, clinical presentation, Clinical evaluation, ECG, X ray, echo findings and cath findings, natural history, prognosis and management, Hypoplastic left heart syndrome (HLHS)
Single ventricle/ Univentricular heart: brief anatomy, embryology, classification/ variants, clinical presentation, diagnosis and management, Truncus arteriosus, Aortic arch anomalies.
Coronary anomalies: prevalence, pathophysiology, classification, diagnosis and management

VALVULAR HEART DISEASE

Rheumatic Fever: pathophysiology, clinical presentation,
Mitral stenosis, Mitral regurgitation, Aortic stenosis, Low flow low gradient in AS, Aortic regurgitation, Pulmonary stenosis, Pulmonary regurgitation, Tricuspid stenosis, Tricuspid Regurgitation: Causes, pathophysiology, clinical presentation, diagnostic methods to assess severity, Differential diagnosis, management
Infective Endocarditis: causes, pathophysiology, diagnosis, differential diagnosis, Prosthetic valve: Indications, types, functioning of valves, assessing the valve functioning by various echo methods

MISCELLANEOUS HEART DISEASES

Systemic Hypertension, Diabetes mellitus, Carcinoid heart disease, Hypo/ Hyperthyroidism: Definition, list the causes, types, secondary structural and functional changes of heart, Systemic Lupus erythematosus, Scleroderma, Marfan syndrome, Chronic Liver disease, Pulmonary Hypertension, Sarcoidosis, Haemochromatosis, Haematological conditions Hypereosiniphilia, Sickle cell anemia
Human immune deficiency virus: Definition, list the causes, types, secondary structural and functional changes of heart, management.
Vascular conditions: Takayasu arteritis, Kawasaki disease, Giant cell arteritis: Definition, pathophysiology, causes, clinical presentation, differential diagnosis, Echo changes, treatment.
Cardiac trauma: Definition, causes, pathophysiology, clinical presentation, classification, ECG and Echo changes, treatment.

CARDIOMYOPATHIES

Hypertrophic Cardiomyopathy: define, list the types, etiology, clinical presentation, ECG changes, echocardiographic evaluation, treatment, differential diagnosis.
Dilated cardiomyopathy: define, list the types, etiology, clinical presentation, ECG changes, echocardiographic evaluation, treatment, differential diagnosis.
Restrictive cardiomyopathy: define, list the types, etiology, clinical presentation, ECG changes, echocardiographic evaluation, treatment, differential diagnosis.
Arrhythmogenic Right Ventricular Dysplasia: clinical manifestations, pathophysiology, echo evaluation, management.

Pericardial diseases: Acute pericarditis, Pericardial effusion, Pericardial tamponade, Constrictive pericarditis: Definition, causes, clinical manifestation, pathophysiology, Echocardiographic evaluation, ECG changes, management.
Diseases of the Aorta: Aortic dilatation and aneurysm, Valsalva sinus aneurysm, Aortic dissection, Aortic pseudo aneurysm: causes, clinical manifestation, pathophysiology, Echocardiographic evaluation, management.

CARDIAC CATHETERIZATION

Radiation Safety & Quality Assurance in Cathlab, Asepsis in Cathlab
Basics in Cardiac Catheterization, Vascular access, Right heart & Left heart catheterization, all hardwares used in Cardiac interventions.
Hemodynamic principles in cathlab: pressure measurement, Cardiac output measurement, Shunt detection, vascular resistance and pitfalls of hemodynamics,
Contrast agents and their complications, Emergency and routine drugs used in cathlab, Cathlab emergencies including ACS management, arrhythmia identification and management, cardiogenic shock, pulmonary edema, anaphylaxis, vascular complications.
Coronary Angiography, Percutaneous coronary intervention, CTO PCI, Bifurcation PCI, Complications and Management of Coronary Interventions.
Adjunct devices: ROTA, cutting and scoring balloon, Intravascular Imaging including IVUS and OCT, FFR, Hemodynamic support devices like IABP, Impella, Structural interventions including all the valvuloplasty procedures, device closure procedures for congenital heart diseases, TAVR, Echo imaging in cathlab
Basic understanding of Cardiac implantable electronic devices, Peripheral interventions including IVC filter placement, Carotid interventions.

BASICS OF BIOSTATISTICS AND RESEARCH METHODOLOGIES

Understanding the fundamental concepts of biostatistics, including types of data, descriptive statistics, and measures of central tendency and dispersion. Introduction to inferential statistics, hypothesis testing, p-values, confidence intervals, designing a research study, including study types, and data collection methods.

♣ Best of Luck ♣

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