Q.1 A 70 year old male with history of diabetes mellitus, hypertension controlled on medication, presented with dyspnea and palpitation for 36 hours. On examination the pulse was 130/min irregular, BP 140/80 mmHg, RR 32/min. There was a systolic murmur of 2/6 at the left sternal border with S4. Patient gave history of transient weakness of left half of the body in the past. ECG showed atrial fibrillation with fast ventricular rate. Echo showed normal study.

a) What should be your immediate management plan?
b) How will you stratify risk for prevention of thromboembolism in this case?
c) What treatment will you prescribe to the patient, if atrial fibrillation persists after the initial management according to current recommendations?

Q.2 A 38 year old male with history of diabetes mellitus, hypertension, smoking and family history of ischaemic heart disease (IHD), developed typical chest pain with sweating while exerting for defecation which contained blood. He was advised surgical treatment for hemorrhoids in the past. Ischemic time to hospital is 90 minutes. On examination pulse is 60/min regular, BP 190/110 mmHg, JVP is raised, lungs are clear. His ECG (attach) reveals:

a) What is ECG diagnosis and what reperfusion strategy you offer to this patient and why?
b) Which culprit artery is involved and why?
c) What secondary prevention will you advise the patient?
Q.11 A 62 year old female with history of hypertension and stable ischemic heart disease in the recent past has increased episodes of angina. She underwent coronary angiography which showed 3 vessel disease. She refused for any intervention. Patient’s BP is 135 / 80 mmHg and pulse of 54/min regular. At present she is on atenolol 100 mg once a day and amlodipine 10 mg a day. She develops severe headache with nitrates.

a) According to the new ACC guidelines which new oral antianginal medication can be added to decrease her frequency of angina and functional class?
b) What is the mode of action of this drug?
c) What could be the effects of this drug on the ECG
d) Which other drugs are contraindicated with this new antianginal?
Q.14 A 20 year old farmer admitted with persistant fever, dyspnea at rest for the last one month. He went to a dentist a couple of weeks back before his illness. On examination the pulse is 102/min regular, BP 130/50 mmHg. JVP is raised, apex beat is displaced with early diastolic murmur at the left sternal border of grade 3/6 intensity with bilateral crepitations. His ECG shows LVH with strain. Echo shows severe aortic and moderate mitral regurgitation.

a) How will you manage this patient?
b) A repeat echocardiography at 2 weeks shows para valvular abscess inspite of antibiotic treatment. What next step will you take?
c) What counselling will you do when you discharge the patient?

Q.15 An 18 years old girl comes to your clinic with her family. She complains of palpitations that are infrequent and lasting for a few seconds only. She has never fainted but feels lightheaded during the episodes. She had 8 siblings but two died at ages 14 and 16. Her parents are first cousins. Her pulse is 88-bpm regular, BP-110/70 mmHg and the rest of the physical examination is unremarkable. One sibling died suddenly while playing and the other while playing with the mobile phone. Her ECG shows sinus rhythm, PR interval 140 msec, QRS 80 msec, QTc interval 500 msec. You get an upright ECG and the QTc interval changes to 520 msec. Her echocardiogram reveals mild scalloping of the anterior mitral leaflet without any mitral regurgitation. The diastolic function is normal and the estimated pulmonary artery systolic pressure is 20 mmHg.

a) What is the likely diagnosis?
b) What other tests would you like to order for her?
c) Mention in points the preventive precautions that you would suggest for her?
d) What treatment would you prescribe for her? Give points with justification.
Q.16 A 32 year old male nurse arrested in the hospital while on duty. His initial rhythm showed ventricular fibrillation and he was successfully defibrillated with one shock. There was no neurological deficit after the event. His ECG after defibrillation is shown below. There is no family history of sudden death and he has no major cardiac risk factors. He remembers one brief syncopal episode 2 years ago but no history of palpitation. His echo showed normal left ventricular function with no wall motion or valvular abnormalities. He underwent coronary angiography which was normal.

![ECG Image]

a) What is your ECG diagnosis?
b) Give two ECG criteria to support your diagnosis.
c) What will be your further recommendation in this patient?

Q.17 A 30 years old woman comes to the ER in the 24th week of pregnancy. Her BP is 150/90 mmHg. She does not have any cardiac risk factors. This is her first pregnancy and during the previous visits BP has remained normal. She is active and takes care of her diet. Examination reveals an ejection systolic murmur in the pulmonic area 2/6 in intensity. The ECG is normal and the urine detailed report is negative for proteins. Hemoglobin is 13 g/dL and creatinine 0.8 mg/dL. An echocardiogram reveals normal LV systolic and diastolic function.

a) How would you classify her hypertension? Name the types.
b) How will you manage this patient with regard to medical management?
Q.18 A 65 years old woman, who is hypertensive, is on Amlodipine 5 mg and hydrochlorothiazide 12.5 mg once a day. She presents to the ER with elevated blood pressures (240/130 mmHg). She also complains of shortness of breath. Chest examination reveals crackles up to the mid zones bilaterally. CVS reveals loud A2 and a 4\textsuperscript{th} heart sound. JVP is not elevated. The ECG reveals sinus tachycardia with LVH and strain pattern. Echocardiogram shows a preserved LV systolic and grade II LV diastolic dysfunction. The first troponin I test is mildly elevated.

a) What is the diagnosis?
b) What further investigations will you ask for?
c) How will you treat this condition Emergency Room?
d) What further management will you do?

Q.19 A 59 years old man comes to the ER with chest pain of 8-hours duration that settles spontaneously. In the ER his examination is unremarkable. The ECG shows Q waves in the anterior chest leads with T wave inversions. An echocardiogram reveals akinesia of the anterolateral and apical segments with LVEF of 25\%. A cardiac MRI examination is done, which shows no viability in the infarcted segments. On the 4\textsuperscript{th} day he undergoes a symptom-limited stress test where he Achieves 80\% of maximum predicted heart rate at 8 minutes without chest pain. Test is stopped for fatigue. He is continued on Aspirin, beta-blockers, ACE inhibitors and statin. His pulse is 56 bpm and BP 110/70 mmHg. He is planned for discharge.

a) Is there a role of additional therapy at the time of discharge that will give him mortality benefit?
b) When will you reassess his heart function?
c) If his heart function does not improve what else would you recommend?
Q.20 A 35 years old airline pilot undergoes a routine exercise stress test for annual screening. He is a known smoker and has smoked a packet a day for 20 years. He leads a sedentary life and his BMI is 30 kg/meter square. He exercises on a full Bruce protocol for 7 minutes, achieving target heart rate of 85% of maximum predicted heart rate. At peak exercise he experiences central chest discomfort and there are 3 mm horizontal ST depressions noted in leads V3 to V6. The recovery is uneventful.

a) What is the Duke Treadmill score for this patient?
b) Which arterial territory is involved?
c) What is his risk as per the Duke Treadmill score?
d) What will you next prescribe for him?

The End
Q.12 A 26 years old female presented in the emergency department with palpitation. She is tachycardiac but hemodynamically stable, she has history of heart murmur since childhood. She has recurrent palpitation on and off for the last 6 years. On cardiac examination II/VI ejection systolic murmur over the pulmonary area with no variability with inspiration. Her ECG during murmur palpitations (figure 1) and after treatment is (figure 2).

Figure 1

Figure 2

a) What will be your drug of choice to terminate this tachycardia (figure 1)?
b) What is the ECG diagnosis after treatment (figure 2)?
c) Can oral beta blockers or non-hydropyridine calcium channel blocker be prescribed as an outpatient? Justify your answer.
d) What other cardiac disease this patient has?
Q.13 A 20 year old male student presented in the outpatient department with palpitations, dyspnea on exertion since childhood, now worsening. He gives history of fever, which is intermittent. On examination pulse is 70/min, BP 120/80, temp 98.6°F, apex beat is not displaced, ejection systolic murmur of 3/6 at left sternal border. Second heart sound is loud. His ECG shows incomplete RBBB. Right heart catheterization performed shows following oxymetry run.

![Oxymetry Diagram]

a) What is your diagnosis?
b) According to the data what is the direction and severity of the shunt provided O₂ consumption is 260 ml/min and hemoglobin is 15 g%.
c) How will you manage this case?
Q.3 A 34 years old man comes with shortness of breath with mild cough. He gives history of fever off and on for the past one month. Fever was intermittent with night sweats and evening rise in temperature. He smokes but does not have any other cardiac risk factors. Examination reveals a pulse of 110 bpm, BP-140/90mmHg. There is a respiratory variation to the pulse and BP. The JVP is elevated with (prominent Y descent) with rise noted in inspiration, the chest is clear; CVS reveals an extra heart sound after the second heart sound. The liver is palpable (span 19 cm), shifting dullness is positive and there is ankle edema. ESR 110 in the 1st hour, CRP 20, sputum smear positive for acid-fast bacilli.

a) What would you expect on the echocardiogram? List 5 findings
b) What sign would you look for in the pressure tracing during cardiac catheterization?
c) How will you treat this condition?
d) What is the respiratory variation in the pulse and what will you check?

Q.4 A 45-year-old woman came to your outpatient for intermittent chest pain and progressive shortness of breath for the last 3 days. She was seen last week by her primary physician because of sinusitis and was placed on azithromycin for 5 days without relief.
Exam: Blood pressure 110/80 mm Hg, pulse 110 beats/mm regular, jugular venous pressure 10 cm H2O, bibasilar rales, S3 gallop, 1-2+ pedal edema
Electrocardiogram: Sinus tachycardia, nonspecific T-wave changes
Echocardiography: Left ventricular ejection fraction = 25%, 1-2+ mitral regurgitation

a) What is the most likely diagnosis?
b) What is the appropriate next course of action?
She deteriorated rapidly over the course of the next few days and was found to be in cardiogenic shock, requiring inotropic support.
c) What is her 5-year prognosis if she survives this acute event?
Q.5 A 72 years old man is admitted with fracture of the neck of femur. He is a hypertensive well controlled on a combination pill of perindopril and amlodipine. Prior to the presentation he used to walk daily for 45 minutes without symptoms. His BP is 130/70 mmHg, pulse-72 bpm; the rest of the exam is unremarkable. The ECG shows normal sinus rhythm with LVH and strain pattern. Echocardiogram done 6 months ago showed mild LVH and LV diastolic dysfunction grade I. He has been referred to you for cardiac clearance.

a) What is his risk of having acute coronary event in the perioperative period?
b) What further risk stratification is needed?
c) What would be your recommendation if he had diabetes mellitus?
d) How would your management change if he had been revascularized 4 years ago?
Q.6 A 45 year old man presents to the emergency department after an episode of syncope. He has history of myocardial infarction 3 years ago. His thallium showed fixed defect and echo revealed ejection fraction of 30%. He has recurrent hospitalization for heart failure on optimal medical therapy. His ECG is shown below. He is recommended to have pacemaker implantation.

![ECG Image]

a) What is the ECG diagnosis?
b) What type of pacemaker will you recommend?
c) Does this ECG demonstrate sinus node dysfunction?
d) Give class I indication for such pacemaker implantation.
Q.7 A 52-year-old man presented to the Emergency Department (with an acute anterior wall myocardial infarction and received successful lytic therapy. Physical exam findings were notable for systolic blood pressure of 90 mm Hg, heart rate of 120 beats/mm, and rales at both lung bases.

a) What are the determinants of 30-day mortality in this patient?
b) The patient had an uncomplicated in-hospital course. How would you further proceed with the plan of treatment.
c) The patient has a brief episode of chest pain (less than 1 minute) with transient ST depression on the morning of his scheduled stress test. The pain was relieved with one sublingual nitroglycerin tablet. Now what will be your next step?

Q.8 A 27 years old woman presents to the ER with right-sided weakness that lasted for a few hours but resolved on its own. In the ER power is bilaterally equal and normal. She does not have any cardiac risk factors. Examination reveals pulse-100 bpm (regular), BP-120/80 mmHg. Lungs are clear and the JVP shows an "A" wave equal to "V" wave. CVS reveals a normal first heart sound, wide fixed split of the second heart sound with a loud pulmonary component and a left parasternal heave. The ECG shows inverted P waves, right axis deviation with incomplete right bundle branch block. The chest X-ray reveals cardiomegaly, dilated central pulmonary artery and pulmonary plethora.

a) What is the likely diagnosis?
b) What other tests would you like to order for her?
c) What treatment would you prescribe for her? Give points with justification.
Q.9 A 60 years old male smoker who was all right 6 months ago visits your office with history of palpitations, easy fatigueability and weight loss which he attributes to diarrhea, he also gives history of neck and abdominal fullness and also complains of pedal edema and intermittent wheezing. On examination he shows facial telangiectasia, pulse is irregularly irregular with pulse deficit, blood pressure is 100/70 and a pansystolic murmur at the tricuspid area, which increases with inspiration, JVP is raised with prominent CV waves, marked pedal edema, an abdominal scar of appendicectomy.

a) What is your diagnosis?
b) How will you investigate this patient?
c) How will you manage this patient?

Q.10 A 28 year old female who is 26 weeks pregnant presented in the emergency room with symptoms of headache for the last 30 minutes. She denies any weakness in arm or legs. No complain of chest pain or shortness of breath. On examination her BP is 240/18 mmHg in the right arm and 240/110 mmHg in the left arm and pulse is 110/min regular. The electrolytes, urea and creatinine are within normal limits.

a) Name any two first line intravenous medication for the management of acute onset severe hypertension in this patient.
b) If intravenous medication is not available, which oral anti hypertensive drug may be considered as a first line therapy?
c) Name three other oral antihypertensive drugs which can be given throughout pregnancy.
d) Name two oral antihypertensive which are contraindicated during pregnancy?