



## THE COLLEGES OF MEDICINE OF SOUTH AFRICA

Incorporated Association not for gain  
Reg No 1955/000003/08

Examination for the Subspecialty Certificate in Cardiology of the  
College of Physicians of South Africa



27 July 2017

Paper 1

(3 hours)

*All questions are to be answered. Each question to be answered in a separate book (or books if more than one is required for the one answer)*

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- 1 a) Tabulate the differences between the right ventricle and the left ventricle with regard to anatomical and physiological characteristics. (8)
- b) i) Describe the PISA method for assessing mitral regurgitation. (5)  
ii) Briefly discuss the limitations with regard to the feasibility and accuracy of this technique. (5)
- c) List the key mechanisms proposed that contribute to the pathophysiology of HIV induced coronary artery disease. (7)
- [25]
- 2 a) i) Discuss the intrinsic and extrinsic apoptotic pathways in heart failure. An annotated diagram may be used. (7)  
ii) Discuss the novel therapies that target the extrinsic and intrinsic factors of heart failure. (3)
- b) Many patients presenting with chest pain may have a raised high-sensitivity cardiac troponin (hs-cTn) assay. Discuss the value and pitfalls of the highly sensitive cardiac troponin (hs-cTn) assay in a patient presenting with chest pain and a possible acute myocardial infarction. Also discuss how this assay may be incorporated into a diagnostic algorithm. (7)
- c) List the drugs and discuss the mechanisms of action and safety profile of positive inotropic agents that may be used in patients with heart failure and reduced ejection fraction (HFrEF). (8)
- [25]
- 3 a) i) Define microvascular angina. List the cardiovascular conditions associated with microvascular angina. (5)  
ii) Discuss the pathophysiological aspects related to microvascular angina. You may use annotated diagrams or tables. (5)
- b) Beneficial therapeutic cardiovascular protective effects have been demonstrated with the newer treatments for type 2 diabetes mellitus. Name the drugs and corresponding clinical trials substantiating these therapeutic benefits and discuss their postulated mechanisms of action to control the blood sugar and cardiovascular protective effects. (10)
- c) Briefly discuss the predisposing factors and the CV benefits and risks related to the J shaped/U shaped curve of exercise and the heart. (5)
- [25]

**Please answer question 4 a) in 1 book**

- 4 a) Discuss the mechanisms and resultant adverse effects of cardiac fibrosis. (7)

**Please answer question 4b), 4c) and 4d) in 1 book**

- b) Briefly discuss more recently described risk factors for atrial fibrillation and how they cause AF. (6)
- c) Briefly discuss the genetics of arrhythmogenic cardiomyopathy. (5)
- d) Discuss the anatomy of the coronary sinus with particular reference to cardiac resynchronization therapy. (7)

[25]



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Paper 2

(3 hours)

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- 1 An 80-year-old female patient presents to the hospital within one hour with her first episode of acute ischaemic stroke and first syncopal episode lasting 3 minutes. Clinical examination confirms significant aortic valve stenosis with LV ejection fraction of 53% and echocardiographic mean aortic doppler valve gradient of 55mmHg. ECG confirms rapid atrial fibrillation. CT brain scan reveals a small right-sided internal capsular infarct. Intravenous thrombolytic TPA is administered. Paralysis of the left arm recovers within one hour of presentation. Bridging intravenous heparin is given. An acute headache ensues. Repeat CT brain scan confirms a small haemorrhage into the internal capsular infarct
- a) Discuss, critically, the above acute management approach of this patient at the time of presentation summarising the important clinical issues. Outline your preferred choice of anticoagulation regimen considering the benefits and risks of this with secondary stroke prevention management based on current evidence based medicine. (15)
  - b) Discuss your approach to the further investigative interventional and surgical procedures that may be required including the management of the underlying aortic valve stenosis in the presence of the atrial fibrillation and the above neurological complication. (10)
- [25]

**Please answer question 2 a) in one book**

- 2 a) A 50-year-old obese asymptomatic man with known severe aortic stenosis secondary to a bicuspid valve presents for a routine assessment. His last check-up was 2 years ago. Briefly outline the key issues in the assessment and management of this patient. (8)

**Please answer question 2 b) in one book**

- b) When evaluating myocardial viability in patients with ischaemic cardiomyopathy
    - i) Describe the condition known as “stunned” myocardium and its effect on contractility, perfusion and metabolism. (5)
    - ii) Describe the condition known as “hibernating” myocardium and its effect on contractility, perfusion and metabolism. (5)
    - iii) What are the available imaging modalities used to demonstrate myocardial viability and briefly explain the mechanism on which each modality is based. (7)
- [25]

- 3 a) Describe the phenomenon of post CABG Stroke and Neurocognitive dysfunction. (5)  
b) Is there a proven survival benefit for patients with coronary artery disease and severe left ventricular systolic dysfunction (EF less than 35%) with CABG? Include relevant trials. (5)  
c) Describe the Culotte technique for coronary artery bifurcation stenting in a stepwise fashion. Briefly discuss the pros and cons of this technique. (8)  
d) Describe the mechanism of functional mitral regurgitation (FMR) with reference to closing and tethering forces. (7)  
[25]

**Please answer question 4 a) in one book**

- 4 a) A 35-year-old man presented for a second opinion and was found to have clinical features of congestive heart failure. He has previously had a biventricular pacemaker inserted for non-ischaemic cardiomyopathy with an EF that was documented at 32%. Currently he is NYHA class 3 and according to the patient, his status was unchanged post implantation of the biventricular pacemaker. Briefly outline what possible reasons may account for this patient's current clinical status and what potential options may be considered. (8)

**Please answer question 4 b), 4 c) and 4 d) in one book**

- b) Discuss the importance of asymptomatic atrial fibrillation detected by cardiac implantable electronic devices. (5)  
c) Discuss the timing of insertion and the controversy around the use of implantable cardioverter defibrillators as primary prophylaxis in idiopathic dilated cardiomyopathy and what assessments other than ejection fraction may be useful. (7)  
d) Briefly discuss an approach to the selection of direct oral anticoagulants in an individual patient. (5)  
[25]