

POST GRADUATE DIPLOMA IN CLINICAL  
CARDIOLOGY (PGDCC)

01821

Term-End Examination

June, 2013

MCC- 002 : FUNDAMENTALS OF CARDIOVASCULAR SYSTEM - II

Time : 2 hours

Maximum Marks : 60

Note :

- (i) There will be multiple choice type of questions in this examination which are to be answered in OMR Answer Sheets.
- (ii) All questions are compulsory.
- (iii) Each question will have four options and only **one** of them is correct. Answers have to be marked in figures in the appropriate rectangular boxes corresponding to what is the correct answer and then blacken the circle for the same number in that column by using HB or lead pencil and not by ball pen in OMR Answer Sheets.
- (iv) If any candidate marks more than one option, it will be taken as the wrong answer and no marks will be awarded for this.
- (v) There will be 90 questions in this paper and each question carries equal marks.
- (vi) There will be no negative marking for wrong answers.
- (vii) No candidate shall leave the examination hall at least for one hour after the commencement of the examination.

1. A new born baby has a congenital heart disease, which of the following transducer is ideal ?  
 (1) 2MHz                      (2) 5MHz                      (3) 7.5MHz                      (4) 10MHz
  
2. For assessment of chamber dimension and endocardial motion which mode of echo - Doppler examination is more useful ?  
 (1) M - mode echo                      (2) 2 - D echo  
 (3) Colour Doppler                      (4) Pulse Doppler
  
3. In transthoracic echo - best visualization of interatrial septum (IAS) :  
 (1) Apical 5 chamber view                      (2) Parasternal short axis view  
 (3) Subcostal view                      (4) Suprasternal view
  
4. Find the wrong statement :  
 (1) Doppler effect states that sound frequency increases as the sound source moves towards the observer  
 (2) For Doppler analysis, sound beam should be near parallel to flow of blood to get accurate information  
 (3) Changes of frequency between transmitted and reflected sound is called frequency shift or Doppler shift  
 (4) In Doppler study, sound frequency increases as the source of sound moves away from the observer
  
5. Find out wrong statement :  
 (1) Maximal measurable velocity without aliasing in PW Doppler is usually  $< 2\text{m/sec}$ .  
 (2) CW Doppler is used to measure the gradient in severe PS  
 (3) Mitral valve flow pattern is measured by P.W. Doppler  
 (4) Mitral annular velocity (DTI) is done by C.W Doppler
  
6. Which is correct statement in regards to 2 - D echo ?  
 (1) Higher the frequency, higher the penetration  
 (2) In obese adult high frequency transducer is used  
 (3) Higher the frequency, better is the resolution  
 (4) In young children 2MHz transducer is best for 2 - D echo
  
7. Which is not true in Bernoulli's principle ?  
 (1) It relates to pressure, velocity and height for a non viscous fluid with steady flow  
 (2) As the speed of a fluid increases the pressure it exerts decreases  
 (3) Bernoulli was a distinguished Scottish mathematician  
 (4)  $P = 4v^2$  if peak velocity proximal to obstruction is 3m/sec

8. LV free wall thickness increases with systole in comparison to diastole. Which value is wrong ?
- (1) increase > 1.5 times - dyskinesia.
  - (2) increase - 1.2 - 1.5 times - hypokinesia
  - (3) increase < 1.2 - akinesia
  - (4) increase > 1.5 times - normal
9. In case of ventricular pseudoaneurysm which of the following statement is wrong ?
- (1) Genesis is as a result of myocardial perforation.
  - (2) It is commoner in anterior wall myocardial infraction
  - (3) Colour Doppler can show flow in and out of the pseudoaneurysm
  - (4) Pseudoaneurysm is lined by pericardium
10. Which is the most specific echo feature of cardiac tamponade ?
- (1) Late diastolic RA collapse
  - (2) Abnormal IVS motion
  - (3) Early diastolic RV collapse
  - (4) IVC diameter > 2cm and inspiratory collapse < 50%
11. Find the incorrect statement :
- (1) Normal respiratory variation of velocity across MV is more than 25% and across TV is more than 40%
  - (2) Pericardial effusion should be measured in diastole
  - (3) Most sensitive sign of cardiac tamponade is late diastolic RA collapse
  - (4) If fluid ends anterior to the descending aorta on 2D echo it points to pericardial effusion rather than pleural effusion
12. For diagnosis of mitral stenosis which procedure is considered to be gold standard :
- (1) Angiography
  - (2) C.T. angio
  - (3) MRI study
  - (4) Echo - Doppler study
13. In case of Aortic valve echo Doppler, which statement is correct ?
- (1) Systolic flutter of aortic leaflet is not a normal finding.
  - (2) In bicuspid A.V -closer line is central.
  - (3) Gradient across A.V determines severity of AS with LV systolic dysfunction.
  - (4) Pulmonary hypertension in aortic stenosis is a grave sign.

14. Mitral valve scoring on echo is done to assess the outcome of BMV. For scoring system the following points are assessed except :
- (1) Thickness of each leaflets.
  - (2) Calcification in commissural fission and in the leaflets.
  - (3) Degree of chordal involvement.
  - (4) Perimeter of mitral annulus.
15. Select the wrong statement :
- (1) Moderate MS if MV area is  $1.5 - 2.0\text{cm}^2$ .
  - (2) Severe MS if MV area is  $< 1.0\text{cm}^2$ .
  - (3) Mild MS if resting mean gradient is  $< 5\text{mmHg}$ .
  - (4) Severe MS if resting mean gradient is  $> 10\text{mmHg}$ .
16. Following points on echo Doppler suggest severe MR expect :
- (1) MR jet reaching posterior wall of LA.
  - (2) Pulmonary vein systolic flow reversal.
  - (3) Area of mitral valve annulus  $> 6\text{cm}^2$ .
  - (4) MR regurgitant volume  $> 60\text{ml}$
17. For values of aortic valve Doppler which statement is correct ?
- (1) Severe AS means - velocity more than  $4\text{m/sec}$ .
  - (2) In AS with LVF - peak and mean gradient overestimate severity of AS.
  - (3) In bicuspid aortic stenosis - Doppler study is not appropriate to assess severity.
  - (4) Moderate AS means - peak gradient  $< 40\text{mmHg}$  and mean gradient  $< 20\text{mmHg}$ .
18. Which is not the feature of significant AR ?
- (1) AML flutter
  - (2) Diastolic retrograde flow across descending aorta
  - (3) Regurgitant fraction of 30%
  - (4) Pressure half time  $< 250\text{msec}$
19. Find the wrong statement :
- (1) Normal T.V. inflow velocity  $< 1\text{m/sec}$  with mean  $\text{PG} < 2\text{mmHg}$ .
  - (2) Tricuspid mean  $\text{PG} > 2.5\text{mmHg}$  indicates T.S. in absence of TR
  - (3) In presence of severe TR, mean  $\text{PG}$  will be less than  $2.5\text{mmHg}$  suggest TS.
  - (4) Doppler velocity should be measured in T.V. while patient holds breath in expiration
20. In severe TR - which of the following statement is not correct :
- (1) Colour flow regurgitant jet area  $> 30\%$  of RA area
  - (2) Tricuspid inflow velocity  $< 1\text{m/sec}$ .
  - (3) Holosystolic flow reversal in hepatic vein
  - (4) Cuspal non - coaptation

21. Which is more specific for diagnosis of MS ?
- (1) Decrease EF slope on M. mode      (2) Doming of AML on 2-D echo  
(3)  $P_{1/2} < 220$  msec      (4) Dilated LA > 4cm
22. Which is not the correct statement in congenital heart disease ?
- (1) Drainage of pulmonary veins always indicates LA  
(2) IVC if not interrupted, always drains to RA  
(3) Attachment of T.V. is more proximal to apex than MV  
(4) Defining PA is more important to know great vessels relation
23. Which statement is wrong ?
- (1) Qp/Qs value of < 1.5 indicates small L → R shunt  
(2) Qp/Qs value of < 1.0 indicates R → L shunt  
(3) Normal Qp/Qs value is > 1.0  
(4) Qp/Qs value of > 2.0 indicates large L → R shunt
24. Which of the following is false ?
- (1) Ventriculography denotes both right and left ventriculography  
(2) Left ventriculography is done to assess global LV function only  
(3) Ventriculography is only a diagnostic test  
(4) Pigtail, Sones, NIH, Eppendorf - all these catheters are used for ventriculography
25. Which is the correct rate and volume of contrast injection in ventriculography :
- (1) Pressure cutoff of 1000 psi, injection rate 10-16 ml/sec and volume - 30 to 55 ml  
(2) Pressure cutoff of 1000 psi, injection rate - 10-16ml/sec and volume - 10 to 20 ml  
(3) Pressure cutoff of 800 psi, injection rate - 10-12 ml/sec and volume - 15 to 30 ml  
(4) Pressure cutoff of 1500 psi, injection rate - 15-20 ml/sec and volume - 10 to 15 ml
26. All of the following are complications of ventriculography except :
- (1) Fascicular Block      (2) Air Embolism  
(3) Endocardial Staining      (4) Myocardial Perforation
27. Which of the following is not a non invasive imaging modality of imaging the aorta and its branches ?
- (1) DSA      (2) MR angio      (3) CT angio      (4) Aortography
28. Select the right option - in pulmonary angiography it is possible to opacify upto :
- (1) 5<sup>th</sup> order branch      (2) 6<sup>th</sup> order branch  
(3) 7<sup>th</sup> order branch      (4) Upto capillary level

29. Absolute contraindication for pulmonary angiography is :
- (1) Pulmonary Arterial Hypertension
  - (2) Anaphylactoid reaction to I/V contrast
  - (3) Renal dysfunction
  - (4) All of the above
30. Correct statement in relation to pulmonary angiography is :
- (1) Pigtail catheter is commonly used
  - (2) Right heart and pulmonary artery pressures are to be measured after contrast injection
  - (3) Damping of pressure in MPA indicates lodging of the catheter in the wall of the pulmonary artery
  - (4) Balloon floatation catheter is not useful for wedge pressure measurement
31. Regarding JVP which is **not** a correct statement :
- (1) *a* wave is due to atrial systole and follows *p* wave on surface ECG
  - (2) *c* wave is the first positive wave after the *a* wave
  - (3) Mean pressure in the right atrium ranges from 1 to 5mmHg
  - (4) In the left atrium *a* wave is normally more prominent than *v* wave
32. True statement regarding haemodynamic parameter is :
- (1) RV end diastolic pressure ranges from 10 - 20 mmHg
  - (2) Mean pulmonary capillary wedge pressure ranges from 10 - 26 mmHg
  - (3) Total pulmonary resistance ranges from 400 - 600 dynes/sec
  - (4) Systemic Vascular resistance ranges from 700 - 1600 dynes/sec
33. Which is a wrong statement in relation to intracardiac shunt ?
- (1) Significant step up at atrial level in terms of oxygen saturation is  $\leq 5$
  - (2) Unexplained arterial desaturation ( $<95\%$ ) is suggestive of alveolar hypoventilation
  - (3) Pulmonary artery saturation  $>80\%$  is suggestive of left to right shunt
  - (4) Increase in oxygen saturation more than 7 at any level is considered as significant step up
34. Find out the wrong statement :
- (1) Lowest oxygen saturation is found in coronary sinus
  - (2) Sampling for mixed venous blood oxygen saturation should be taken from pulmonary artery
  - (3) In VSD step up of oxygen saturation occurs at pulmonary artery level
  - (4)  $Q_p/Q_s$  ratio less than 1.0 indicates small left to right shunt

35. In regards to coronary angiography, which is not correct :
- (1) Femoral approach is commonly used
  - (2) Judkins catheters are used in femoral approach
  - (3) Left and right coronary catheters are engaged in RAO view
  - (4) Coronary angiography defines only the epicardial arteries
36. Dominant Coronary Circulation is related to :
- (1) Artery, which supplies the inter ventricular septum
  - (2) Artery, which supplies the SA node
  - (3) Artery, which supplies the AV node
  - (4) Artery, which supplies the major part of the left ventricle
37. Correct percentage distribution of dominant circulation is :
- (1) 85% - right dominant, 8% - left dominant, 7% - Co dominant
  - (2) 60% - right dominant, 20% - left dominant, 20% - Co dominant
  - (3) 70% - right dominant, 2% - left dominant, 28% - Co dominant
  - (4) 50% - right dominant, 25% - left dominant, 25% - Co dominant
38. Diameter of the left main coronary artery is :
- (1)  $4.5 \pm 0.5\text{cm}$
  - (2)  $7 \pm 3\text{cm}$
  - (3)  $2 \pm 5\text{cm}$
  - (4)  $5 \pm 3\text{cm}$
39. Find out the wrong option :
- (1) Luminal diameter reduction of 50% is equivalent to cross sectional area reduction of 75%
  - (2) Luminal diameter reduction of 70% is equivalent to cross sectional area reduction of 90%
  - (3) Luminal diameter reduction of 90% is equivalent to cross sectional area reduction of 100%
  - (4) Significant CAD means more than 50% reduction in luminal diameter
40. All the followings stents are balloon mountable except :
- (1) Wire stent
  - (2) Radius stent
  - (3) Slotted tubes
  - (4) Modular stents
41. In relation to grading of regurgitant lesion on aortography, which is the correct option - intense opacification of the receiving chamber becoming equal to that of the distal chamber is termed as :
- (1) Grade I severity
  - (2) Grade II severity
  - (3) Grade III severity
  - (4) Grade IV severity
42. Following are contraindication for Balloon Mitral Valvotomy, except :
- (1) Calcified Valve
  - (2) Grade II MR
  - (3) Significant CAD
  - (4) Severe PAH

43. Find out the wrong statement :
- (1) Gorlin formula was derived for calculation of cardiac valve orifices from flow and pressure gradient data
  - (2) Hakkis formula is an alternative to Gorlin formula
  - (3) In tachycardia - Hakkis formula is not useful
  - (4) 4+ degree of regurgitation is equivalent to more than 50% regurgitant fraction
44. Which is wrong ?
- (1) SPECT (Single Photon Emission Computerized tomography) employs  $^{99m}\text{Tc}$  as radiotracer
  - (2) Gated first pass and equilibrium radionuclide angiography are preferred mode of imaging for RV function
  - (3)  $^{18}\text{F}$  Fluorodeoxy glucose and  $^{11}\text{C}$ -fatty acid are used for studying myocardial metabolism
  - (4) Mismatched defects on V/Q scan is not diagnostic of pulmonary embolism
45. Which is the correct statement ?
- (1) Reversible defect on perfusion scan means persistent defect on stress and rest image
  - (2) LV dilatation and transient lung uptake are suggestive of severe coronary artery disease
  - (3) Patients with normal sestamibi scan have an annualized cardiac event rate of more than 2%
  - (4) Sensitivity and specificity of SPECT  $\text{Tc}$  - Sestamibi and  $\text{Tc}$  - Tetrofosmin in detection of CAD are 80% and 90% respectively
46. In atrial 5 chamber view all are seen except :
- |                     |                      |
|---------------------|----------------------|
| (1) Both atria      | (2) Both ventricles  |
| (3) Ascending aorta | (4) Pulmonary artery |
47. For quantification of valvular regurgitation the following mode is applied :
- |              |                |                |                   |
|--------------|----------------|----------------|-------------------|
| (1) M - mode | (2) PW Doppler | (3) CW Doppler | (4) Color Doppler |
|--------------|----------------|----------------|-------------------|
48. Which is not a usual view for echocardiographic examination ?
- |                  |                           |
|------------------|---------------------------|
| (1) Suprasternal | (2) Sub costal            |
| (3) Apical       | (4) Right Infraclavicular |
49. An apical view can show all except :
- |                    |                     |
|--------------------|---------------------|
| (1) LA appendage   | (2) Aortic valve    |
| (3) Left ventricle | (4) Tricuspid valve |
50. Which measurement are possible with Doppler examination ? Except :
- |                          |                     |
|--------------------------|---------------------|
| (1) Valvar regurgitation | (2) Valvar stenosis |
| (3) Valve planimetry     | (4) Cardiac output  |



51. The theoretical maximum frequency that a sampling system can accurately measure is called as :
- (1) Newton's limit (2) Einstein's limit  
(3) Doppler limit (4) Nyquist limit
52. All the statements are correct except :
- (1) Color flow towards transducer is red  
(2) Color flow away from transducer is brown  
(3) Blue color codes for flow towards the probe  
(4) Mosaic is produced by turbulence
53. Pressure half time is used to calculate :
- (1) Mitral area (2) Aortic area  
(3) Tricuspid area (4) Pulmonary area
54. Pulmonary artery pressure can be estimated using :
- (1) PHT (2) Planimetry (3) M - mode (4) CW Doppler
55. Diastolic function of the ventricles can be assessed using all except :
- (1) Tissue doppler (2) Pulse doppler  
(3) M - Mode (4) Pulmonary vein doppler
56. Normal Isovolumetric Relaxation Time IVRT is :
- (1) 70 - 90 msec (2) 90 - 100 msec (3) 120 - 140 msec (4) < 70 msec
57. Which is not a standard description for regional wall motion abnormality ?
- (1) Hypokinesia (2) Akinesia (3) Dyskinesia (4) Platykinesia
58. Schematically for depicting RWMA the ventricle is divided into :
- (1) 12 segments (2) 16 segments (3) 9 segments (4) 24 segments
59. Following is an accepted method to calculate LVEF :
- (1) Modified Simpson's (2) Doppler method  
(3) PHT (4) Mitral inflow
60. SAM (Systolic Anterior Motion) is seen in all except :
- (1) Restrictive Cardiomyopathy (2) HOCM  
(3) Anaemia (4) Thyrotoxicosis
61. The earliest abnormality to appear with prolonged ischaemia is :
- (1) Delayed relaxation (2) Poor contraction  
(3) Mitral regurgitation (4) Akinesia

62. Pericardial effusion is most commonly seen :  
 (1) Posteriorly      (2) Laterally      (3) Anteriorly      (4) Apically
63. Incorrect statement about cardiac tamponade is :  
 (1) RV collapse is most specific  
 (2) RA collapse is most sensitive  
 (3) IVC is rarely dilated  
 (4) Abnormal septal motion is seen
64. Which is an incorrect statement ?  
 (1) Normal tricuspid respiratory variation is 25%  
 (2) Normal Mitral respiratory variation is 33%  
 (3) In cardiac tamponade variations increase markedly  
 (4) Similar variations are seen in hepatic veins
65. Which of the following is incorrect ?  
 (1) Pericardial thickness can be better measured on TEE  
 (2) CCP shows dilated IVC  
 (3) Septal bounce is seen in CCP  
 (4) Pulmonary valve shows delayed opening
66. Which is not a feature of rheumatic mitral stenosis :  
 (1) Dilated Left atrium      (2) Increased EF slope  
 (3) Hockey - stick appearance      (4) Fish - mouth orifice
67. The correct measure of MUA by PHT is :  
 (1) 220/PHT      (2) 330/PHT      (3) 190/PHT      (4) 290/PHT
68. Following are features of severe MS except :  
 (1) MUA < 1.0 cm<sup>2</sup>  
 (2) Gradient > 20 mmHg  
 (3) PHT of 110 msec (Pressure Half Time)  
 (4) Severe pulmonary Artery Hypertension
69. Wilkin's score is useful for :  
 (1) Assessment of Mitral Regurgitation  
 (2) Assessment of Valve for BMV  
 (3) Assessment of Aortic regurgitation  
 (4) Assessment of R.V. contractility
70. Severity of mitral regurgitation can be assessed by :  
 (1) Area of regurgitant jet      (2) RA size  
 (3) TR jet      (4) PHT

71. Correct statement about Aortic stenosis are all except :
- (1) Normal valve area is 3 - 4 cm<sup>2</sup>
  - (2) Normal velocity is < 2.5 m/sec
  - (3) CW Doppler is the easiest method for assessment
  - (4) Echo cannot help in calculating the valve area
72. AR severity is judged by :
- (1) PHT
  - (2) Mitral leaflet flutter
  - (3) LV volume
  - (4) All of the above
73. Incorrect statement about tricuspid stenosis is :
- (1) Almost always occurs with mitral stenosis
  - (2) A gradient > 10 mmHg is necessary
  - (3) Severe TR can produce mild gradient
  - (4) PHT in severe TS is > 190 msec
74. Which of the following is incorrect ?
- (1) RA appendage is finger shaped
  - (2) Tricuspid attachment is more towards the apex
  - (3) Moderator band is a feature of right ventricle
  - (4) Left Nentricle is smoother
75. RV pressure is measured by (in a case of VSD) :
- (1) V.S.D gradient
  - (2) Arm BP - VSD gradient
  - (3) Systolic BP Diastolic BP
  - (4) VSD gradient - Arm BP
76. True about VSD :
- (1) Restrictive VSD have low gradient
  - (2) Muscular VSD are subaortic
  - (3) Non - restrictive VSD developed Eisenmenger
  - (4) Perimembranous VSD are multiple
77. Which is an incorrect statement ?
- (1) Mean RA pressure is 3-4 mmHg
  - (2) Mean PA pressure is 15 mmHg
  - (3) Mean LA pressure is 25 mmHg
  - (4) Vascular resistance is written as wood's units
78. False statement about oximetry study is :
- (1) It helps calculate shunt location
  - (2) Shunt size can be calculated
  - (3) Samples should be studied immediately
  - (4) Aorta is sampled proximal to ductus
79. Which is not a common route for coronary angiography ?
- (1) Radial
  - (2) Brachial
  - (3) femoral
  - (4) Carotid

80. Obtuse marginals are branches of :  
 (1) LAD (2) LCX (3) RCA (4) Left main
81. Left dominant circulation is seen in :  
 (1) 8% (2) 15% (3) 20% (4) 80%
82. Which is not necessary for PTCA ?  
 (1) Guide Catheter (2) Guide wire (3) Balloon (4) IABP
83. Stents are useful because :  
 (1) They cause minor dissections (2) They are biodegradable  
 (3) They are very cheap (4) They reduce restenosis
84. Drug eluting stents are considered superior to base metal stents :  
 (1) Because of superior design  
 (2) Because of low cost  
 (3) Because of easy deliverability  
 (4) Because of reduced TLR(Target lesion revascularisation)
85. Incorrect about PTCA is :  
 (1) Mortality is very high (2) Success rate is 98%  
 (3) Emergency surgery is rare (4) Bleeding can occur
86. PBMU is procedure of choice in all except :  
 (1) Young women (2) Low Wilkin's score  
 (3) Severe MR (4) No LA clot
87. Balloon valvuloplasty is commonly employed for all except :  
 (1) Mitral stenosis (2) Pulmonary stenosis  
 (3) Bicuspid aortic valve (4) Senite aortic sclerosis
88. Which Radio Tracers are useful in cardiology ?  
 (1) Thallium 201 (2) 99 m Technetium  
 (3) Positron emitters (4) all of the above
89. Myocardial viability cannot be tested by :  
 (1) Thallium scan (2) SPECT scan (3) PET scan (4) ERNA scan
90. Ventilation /Perfusion scintigraphy is useful in the diagnosis of :  
 (1) Pulmonary stenosis (2) Community acquired pneumonia  
 (3) Pulmonary embolism (4) Pleural effusion