

POST GRADUATE DIPLOMA IN CLINICAL  
CARDIOLOGY (PGDCC)

Term-End Examination

00958

December, 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 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.



12. The peak right ventricular systolic pressure is :  
 (1) 15-30 mm of Hg (2) 10-15 mm of Hg (3) 35-50 mm of Hg (4) 50-60 mm of Hg
13. The systemic vascular resistance is (in dynes-sec cm<sup>2</sup>)  
 (1) 100-300 (2) 700-1600 (3) 500-700 (4) 1800-2100
14. Cardiac metabolism can be studied by :  
 (1) 2 D Echocardiography (2) Stress sestamibi  
 (3) Positron Emission tomography (4) 3 D Echocardiography
15. Inone technique is used in the following :  
 (1) Coronary Angioplasty (2) Balloon mitral valvuloplasty  
 (3) Pulmonary valvuloplasty (4) Aortic valvuloplasty
16. All the following statements regarding continuous wave Doppler are correct except :  
 (1) Transducer has one crystal  
 (2) Transducer has two crystals  
 (3) Depth of interrogation cannot be fixed  
 (4) High velocity signals can be measured
17. Gradient across a valve can be calculated from the formula :  
 (1)  $P = \Delta V$  (2)  $P = \Delta V^3$  (3)  $P = \Delta V^2$  (4)  $P = V^2$
18. Right ventricular systolic pressure can be calculated from :  
 (1) Tricuspid regurgitation jet velocity  
 (2) Mitral regurgitation jet velocity  
 (3) Pulmonary valve velocity  
 (4) Size of right ventricle
19. The gradient across ventricular septal defect with a velocity of  $\Delta$  m/sec will be :  
 (1) 36 mm of Hg (2) 64 mm of Hg (3) 32 mm of Hg (4) 80 mm of Hg
20. If the inferior vena caval size is >2cm and inspiratory collapse is less than 20%, the RA pressure would be :  
 (1) 15-20 mm of Hg (2) 10-15 mm of Hg (3) 0-5 mm of Hg (4) 5-10 mm of Hg
21. The left ventricular diastolic function can be assessed by all the following except :  
 (1) Tissue Doppler at mitral annulus  
 (2) Pulmonary vein atrial systolic reversal  
 (3) Isovolumetric relaxation time  
 (4) Mitral regurgitation jet velocity

22. Normal deceleration time of mitral flow is :  
 (1) 70-90 m sec (2) 160-240 m sec (3) 240-360 m sec (4) 90-160 m sec
23. Regional wall motion abnormality can be detected by :  
 (1) Colour Doppler (2) 2 D Echocardiography  
 (3) Pulse wave Doppler (4) Continuous wave Doppler
24. For the diagnosis of L → R shunt at ventricular level the mean O<sub>2</sub> step up must be :  
 (1) ≥ 5% (2) ≥ 10% (3) ≥ 7.5% (4) ≥ 11%
25. The height of left atrial 'a' wave is :  
 (1) 6-21 mm of Hg (2) 4-16 mm of Hg  
 (3) 2-7 mm of Hg (4) 10-12 mm of Hg
26. In coronary artery, haemodynamically significant luminal diameter loss is :  
 (1) ≥ 40% (2) ≥ 70% (3) ≥ 50% (4) ≥ 90%
27. Echocardiographic scoring system of wilkins et al is useful in assessing suitability for percutaneous procedure of :  
 (1) Aortic valve (2) Pulmonary valve  
 (3) Tricuspid valve (4) Mitral valve
28. The impaired LV diastolic function can be assessed by :  
 (1) Aortic velocity (2) Pulmonary velocity  
 (3) Tissue Doppler at mitral annulus (4) Isovolumetric contraction time
29. During systole the LV wall thickness increases by times of diastolic dimension :  
 (1) No change (2) 1.5 times (3) 2.0 times (4) 2-2.9 times
30. LV aneurysm has the following features :  
 (1) Due to myocardial perforation (2) Narrow neck  
 (3) Common with inferoposterior MI (4) Out pouching and thinning of segments
31. The normal expiratory increase in mitral flow is :  
 (1) 15 % (2) 20 % (3) 25 % (4) 10 %
32. The most specific sign of cardiac tamponade is :  
 (1) Late diastolic RA collapse  
 (2) Distended IVC  
 (3) Early diastolic Rv collapse  
 (4) Respiratory variation in ventricular chamber size

33. Vena contracta is :
- (1) Venous drainage of left ventricle
  - (2) Narrowest portion of mitral Regurgitation jet downstream from the orifice
  - (3) Systolic flow in pulmonary vein
  - (4) Distended IVC
34. In aortic regurgitation, pressure half time of 200 m sec indicates :
- (1) Mild aortic regurgitation
  - (2) Trivial aortic regurgitation
  - (3) Severe aortic regurgitation
  - (4) Moderate aortic regurgitation
35. A mean pressure gradient of 8 mm of Hg across tricuspid valve indicates :
- (1) Moderate tricuspid stenosis
  - (2) Mild tricuspid stenosis
  - (3) Severe tricuspid stenosis
  - (4) Trivial tricuspid stenosis
36. In echocardiography great vessels are identified by :
- (1) Origin from Lt or Rt ventricle
  - (2) Morphology of semilunar valves
  - (3) Size of the vessel
  - (4) Branching pattern
37. The ventricular septal defects which are amenable to device closure are :
- (1) Inlet and muscular VSDs
  - (2) Inlet and doubly committed VSDs
  - (3) Inlet and perimembranous VSDs
  - (4) Muscular and perimembranous VSDs
38. Device closure is possible in all the following except :
- (1) Perimembranous ventricular septal defect
  - (2) Primum atrial septal defect
  - (3) Patent ductus Arteriosus
  - (4) Fossa ovalis atrial septal defect
39. What is the  $Q_P : Q_S$  ratio in a patient with the following  $O_2$  saturation details PA = 85% PAW = 100% AO = 100% mixed venous = 70%
- (1) 3:1
  - (2) 4:1
  - (3) 1:2
  - (4) 2:1

40. Calculated mixed venous oxygen saturation from the following data will be :  
(SVC = 60% IVC = 64%)  
(1) 60%                      (2) 64%                      (3) 62%                      (4) 61%
41. In 90% of patients posterior descending coronary artery is a branch of :  
(1) Left anterior descending artery  
(2) Left main coronary artery  
(3) Right coronary artery  
(4) Left circumflex coronary artery
42. In 40% of patients sinus nodal artery arises from :  
(1) Left anterior descending artery  
(2) Left circumflex artery  
(3) Right coronary artery  
(4) Left main coronary artery
43. Following is a self expandable stent :  
(1) Wire coils              (2) Slotted tubes              (3) Modular stents              (4) Wall stent
44. The advantage of  $^{99m}\text{Tc}$ - Sestamibi over Thallium is :  
(1) Shorter half life                      (2) Lower energy photons  
(3) Longer half life                      (4) Cyclotron generated
45. Pulmonary embolism can be diagnosed in a ventilation/perfusion scintigraphy by :  
(1) Lack of mismatch                      (2) Normal perfusion  
(3) Mismatched defects                      (4) Abnormal ventilation
46. All the following conditions are causes of organic tricuspid regurgitation except :  
(1) Primary pulmonary hypertension  
(2) Infective endocarditis  
(3) Carcinoid syndrome  
(4) Rheumatic heart disease
47. What is the normal range of fractional shorting ?  
(1) 55-65 %                      (2) 28-44 %                      (3) 66-75 %                      (4) 76-86 %
48. What is the estimated right atrial pressure by ECHO in a patient with inferior vena cava diameter on expiration >2 cm and collapse on inspiration < 25% ?  
(1) 0-5 mmHg              (2) 5-10 mmHg              (3) 10-15 mmHg              (4) 15-20 mmHg

49. Which is **incorrect** statement regarding Doppler findings in a patient with cardiac tamponade ?
- (1) > 40% variation of pulse wave Doppler velocities across tricuspid valve
  - (2) No variation of pulse wave Doppler velocities across mitral valve
  - (3) Expiratory decrease in hepatic vein forward flow
  - (4) Expiratory increase in pulmonary vein diastolic forward flow
50. All the following catheters are used in coronary angiography accept one :
- (1) Judkins catheter
  - (2) NIH catheter
  - (3) Amplatz catheter
  - (4) Sones catheter
51. Johann christian Doppler an inventor of Doppler is a :
- (1) German physician
  - (2) Swedish engineer
  - (3) Austrian physicist
  - (4) American cardiologist
52. Which of the echo method is used for mitral valve area immediately after ballon mitral valvotomy ?
- (1) Pressure half time
  - (2) Planimetry
  - (3) Colour Doppler
  - (4) Pulse wave Doppler
53. Which of the following is used in echo transducer ?
- (1) Electromagnetic waves
  - (2) Piezoelectric crystals
  - (3) Anode and cathode
  - (4) Radio frequency waves
54. Which is **incorrect** statement regarding restrictive filling in diastolic dysfunction ?
- (1) Deceleration time > 160 msec
  - (2) E/A > 1.5
  - (3) Isovolumetric relaxation time < 70 msec
  - (4) Mitral A duration < PVa duration
55. What is the normal range of isovalumetric relaxation time measured by echocardiography ?
- (1) < 90 msec
  - (2) 70-90 msec
  - (3) 90-110 msec
  - (4) 120-150 msec
56. All the following are morphological features of right ventricle seen by echo except :
- (1) Infundibulum
  - (2) Fine apical trabeculations
  - (3) Moderator band
  - (4) Coarse septal surface
57. Which of the following type of ventricular septal defect is suitable for device closure ?
- (1) Inlet VSD
  - (2) Perimembranous VSD
  - (3) Doubly committed VSD
  - (4) VSD with right to left shunt

58. Supra sternal view of echo is useful to visualize all the following structures except :
- |                            |                               |
|----------------------------|-------------------------------|
| (1) Aortic arch            | (2) LSVC                      |
| (3) Right pulmonary artery | (4) Proximal descending aorta |
59. All the following are morphological features of right atrium except one :
- |                            |                                  |
|----------------------------|----------------------------------|
| (1) Limbus fossa ovalis    | (2) Finger like atrial appendage |
| (3) Coronary sinus opening | (4) Attachment with caval veins  |
60. All the following are etiological causes for aortic regurgitation except :
- |                          |                           |
|--------------------------|---------------------------|
| (1) Rheumatoid arthritis | (2) Syphilis              |
| (3) Carcinoid syndrome   | (4) Bicuspid aortic valve |
61. Which is the best view to visualize mitral valve prolapse ?
- |                              |                                |
|------------------------------|--------------------------------|
| (1) Apical four chamber view | (2) Apical two chamber view    |
| (3) Sub costal view          | (4) Parasternal long axis view |
62. Systolic anterior motion of mitral valve is typically seen in which of the following condition : ?
- |   |
|---|
| (1) Severe aortic regurgitation             |
| (2) Bicuspid aortic valve                   |
| (3) Hypertrophic obstructive cardiomyopathy |
| (4) Left atrial myxoma                      |
63. All the following are the morphological features of mitral valve except :
- |                                       |
|---------------------------------------|
| (1) Attached to two papillary muscles |
| (2) Elliptical orifice                |
| (3) Septal chordal attachment         |
| (4) Two leaflets                      |
64. In severe aortic stenosis what is the mean gradient should be above :
- |              |              |              |              |
|--------------|--------------|--------------|--------------|
| (1) >30 mmHg | (2) >40 mmHg | (3) >50 mmHg | (4) >20 mmHg |
|--------------|--------------|--------------|--------------|
65. Determination of atrial situs is best accomplished by which view.
- |                              |                             |
|------------------------------|-----------------------------|
| (1) Apical four chamber view | (2) Subcostal view          |
| (3) High parasternal view    | (4) Apical two chamber view |
66. Which of the following statement is incorrect regarding severe tricuspid regurgitation ?
- |   |
|---|
| (1) Annular dilatation > 2 cm                         |
| (2) Dilated IVC                                       |
| (3) Colour flow regurgitant jet area > 30% of RA area |
| (4) Increased tricuspid inflow velocity > 1.0 m/sec   |



67. Diastolic fluttering of anterior leaflet of mitral valve is seen in which of the following condition :
- (1) Mitral regurgitation                      (2) Mitral stenosis  
(3) Aortic regurgitation                      (4) Left atrial myxoma
68. In acute aortic regurgitation all the following echo findings are seen except one :
- (1) Prolapse of aortic leaflet in to left ventricle  
(2) Vegetation on the aortic valve  
(3) Premature mitral valve closure  
(4) LV end diastolic volume increased up to 55%
69. "Spade" deformity of the left ventricular cavity in angiogram is seen in which of the following condition :
- (1) Restrictive cardiomyopathy  
(2) Apical hypertrophic cardiomyopathy  
(3) Left ventricular apical aneurysm with thrombus  
(4) Non compaction of left ventricle
70. In Hypertrophic cardiomyopathy heart all the following echo findings are seen except one :
- (1) Decreased thickness with reconditioning  
(2) LV cavity less than < 45 mm  
(3) LA enlargement  
(4) Abnormal LV filling
71. All the following conditions are contraindicated for mitral valvuloplasty except one :
- (1) Severe mitral stenosis with concomitant coronary artery disease  
(2) Moderate mitral regurgitation  
(3) Left atrial thrombus  
(4) Severe mitral stenosis with mild tricuspid regurgitation
72. Pulse repetition frequency (PRF/2) is equal to :
- (1) Acoustic impedance                      (2) Half layer value  
(3) Nyquist limit                              (4) Ultrasound limit
73. Left ventricular hypertrophy is termed pathological if relative wall thickness is more than :
- (1) 0.35                      (2) 0.45                      (3) 0.55                      (4) 0.60
74. Tei index gives information about which function ?
- (1) Systolic function only  
(2) Diastolic function only  
(3) Both systolic and diastolic function  
(4) Valve gradient

75. Which one of the following statements regarding Doppler velocities in normal individuals is **incorrect** ?
- (1) Peak velocity of mitral inflow varies by 15% with respiration
  - (2) Peak velocity of tricuspid inflow varies by 25% with respiration
  - (3) Peak velocity of aortic flow profile is less than 10%
  - (4) Peak velocity of pulmonary flow profile is more than 10%
76. All the following are qualitative methods of assessing aortic regurgitation except :
- (1) Angiographic grade
  - (2) Regurgitant volume
  - (3) Color Doppler jet width
  - (4) Venacontracta width
77. Which is the most common location of pericardial cyst ?
- (1) Left costophrenic angle
  - (2) Left cardiophrenic angle
  - (3) Right cardiophrenic angle
  - (4) Right costophrenic angle
78. Which of the following area is spared in hypertrophic cardiomyopathy ?
- (1) Left ventricular anteriobasal region
  - (2) Left ventricular inferior basal region
  - (3) Left ventricular posterior basal region
  - (4) Left ventricular apex
79. Tricuspid regurgitation is said to be severe if vena contracta width is more than :
- (1) 5 mm
  - (2) 7 mm
  - (3) 9 mm
  - (4) 9.5 mm
80. The diagnosis of Left ventricular non compaction by echo is made when LV noncompaction/compaction layer ratio is ?
- (1) >1
  - (2) >1.5
  - (3) >2
  - (4) >2.5
81. Annulus Paradoxus is seen in which of the following condition :
- (1) Restrictive cardiomyopathy
  - (2) Hypertrophic cardiomyopathy
  - (3) Pericardial effusion
  - (4) Constrictive pericarditis
82. "C wave" in right atrial pressure waveform is due to which one of the following :
- (1) Passive atrial filling
  - (2) Protrusion of closed tricuspid valve into R.A
  - (3) Ventricular filling
  - (4) Atrial relaxation
83. The step up of oxygen saturation > 8 at ventricular level is seen in all the following conditions :
- (1) Ostium primum atrial septal defect
  - (2) Ventricular septal rupture
  - (3) PDA with pulmonary regurgitation
  - (4) Ebsteins anomaly

84. All the following are positron emitters used in PET scan except :
- (1) 2 Fluoro-2 deoxy D glucose (FDG)
  - (2) Rubidium 82
  - (3) Carbon-11 palmitate
  - (4) <sup>99m</sup>Tc- Sestamibi
85. Which of the following catheter is not used in left ventriculography ?
- (1) Sones catheter
  - (2) NIH catheter
  - (3) Lehman catheter
  - (4) Judkins catheter
86. Which is the best catheter injection site in left ventriculography ?
- (1) AT apex
  - (2) Near mitral valve
  - (3) At mid cavity
  - (4) Just below the aortic valve
87. For routine ventriculography cine angiogram how many frames per second are recommended :
- (1) 10 frames/sec
  - (2) 20 frames/sec
  - (3) 30 frames/sec
  - (4) 60 frames/sec
88. Which of the following statement is **incorrect** regarding radio isotopes ?
- (1) Thallium has short half life - 6 hours
  - (2) Thallium is cyclotron generated
  - (3) <sup>99m</sup>Tc produces gamma rays of 140 keV
  - (4) Tetrofosmin does not redistribute to any degree
89. Ventricular pseudo aneurysm is most common in which type of infarcts ?
- (1) Inferior infarction
  - (2) Posterior infarction
  - (3) Anterior infarction
  - (4) Apical infarction
90. In Ebsteins anomaly all the following findings are seen by echo except one :
- (1) Septal displacement of tricuspid valve > 8 mm
  - (2) ASD is usually present
  - (3) Left ventricular function will always be impaired
  - (4) Low pressure tricuspid regurgitation

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