

Total No. of Questions : 90]

[Total No. of Printed Pages : 16

**POST GRADUATE DIPLOMA IN CLINICAL
CARDIOLOGY (PGDCC)**

Term-End Examination

June, 2014

**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. Which of the following statements is **wrong** ?
 - (1) 7.5 to 10 MHz probes are used to examine children
 - (2) As probe frequency increases penetration improves
 - (3) As probe frequency decreases resolution also decreases
 - (4) Low frequency probes are used in obese subjects

2. Which of the following is **wrong** about Pulse wave doppler ?
 - (1) Can determine blood flow velocity across valve orifices
 - (2) Cannot measure high velocity flows
 - (3) Can assess diastolic function of ventricles
 - (4) Can estimate pulmonary venous flow

3. Which of the following statements about M mode echocardiogram is **wrong** ?
 - (1) Measurements are reliable and reproducible
 - (2) Has high temporal resolution
 - (3) Planimetry of values can be done
 - (4) Can evaluate rapidly moving structures

4. Which of the following statements is **incorrect** ?
 - (1) LVOT is well visualised in Parasternal long axis view
 - (2) RVOT is well visualised in Parasternal short axis view
 - (3) Mitral valve orifice and aortic valve orifice areas can be estimated in parasternal long axis view
 - (4) Mitral and tricuspid valve septal insertion is well seen in apical view

5. Which of the following is **incorrect** about doppler ?
 - (1) Doppler is useful to assess moving targets
 - (2) Doppler shift is a change in frequency between transmitted and reflected sound
 - (3) Sound frequency decreases as the source moves towards the observer
 - (4) Ultrasound beam should be parallel to the direction of movement of the target

6. Which of the following regarding Pulse Wave Doppler is **not correct** ?
- (1) Pulse wave transducer has one doppler crystal
 - (2) Depth of sampling influences aliasing
 - (3) Nyquist limit denotes the minimum measurable velocity
 - (4) The frequency of emitted waves by the transducer is called as pulse repetition frequency
7. Which of the following is **correct** regarding continuous wave doppler ?
- (1) Single doppler crystal transmits as well as receives ultrasound waves
 - (2) Not affected by pulse repetition frequency
 - (3) Samples velocity at different levels in the direction of the wave
 - (4) Due to Nyquist Phenomenon cannot measure high velocity jets
8. Which of the following is **incorrect** regarding normal transvalvular velocities in adults ?
- (1) LV inflow 0.3–0.5 m/sec
 - (2) RV inflow 0.3–0.7 m/sec
 - (3) LV outflow 1–1.5 m/sec
 - (4) RV outflow 0.6–0.9 m/sec
9. Which of the following statements is **wrong** ?
- (1) Pulmonary artery diastolic pressure can be determined by measuring the end diastolic velocity of pulmonary regurgitant flow
 - (2) IVC size correlates to right atrial pressure
 - (3) Dilated IVC with less than 25% collapse on inspiration denotes Right atrial pressure of 10 mmHg
 - (4) IVC diameter of less than 2 cm with complete collapse on inspiration indicates right atrial pressure of less than 5 mmHg
10. Calculate the cardiac output in a patient with the following details :
- | | |
|--------------------------------|------------|
| Aortic annulus area | 7 sq. cms. |
| Flow velocity integral of LVOT | 10 cms |
| Heart Rate | 70/min. |
- (1) 4.5 l/min
 - (2) 4.9 l/min
 - (3) 5.4 l/min
 - (4) 5.9 l/min

11. Which of the following is **incorrect** regarding normal LV filling ?
- (1) Deceleration time 160–240 m sec
 - (2) E/A more than 1
 - (3) Isovolumetric Relaxation Time : 70–90 m sec
 - (4) Mitral A duration is less than PVa duration
12. Which of the following **differentiates** normal filling from pseudonormal filling ?
- (1) Deceleration Time
 - (2) E/A ratio
 - (3) Pulmonary vein 'a' (PVa) velocity
 - (4) Isovolumetric Relaxation Time
13. Which of the following LV segment is **not** supplied by LAD ?
- | | |
|---------------------------|---------------------------|
| (1) Basal Anterior | (2) Basal anterior septal |
| (3) Basal inferior septal | (4) Mid anterior septal |
14. Which of the following LV segment is **not** supplied by posterior descending artery ?
- | | |
|---------------------------|--------------------|
| (1) Basal inferior septal | (2) Basal inferior |
| (3) Mid inferior septal | (4) Basal lateral |
15. In a 17 segment echocardiographic analysis, hypokinesia of basal anterior and basal anteroseptal segments, akinesia of mid anterior and mid anteroseptal segments and dyskinesia of apical septal, apical anterior and apical segments are seen. Which is the LV wall motion score index ?
- | | |
|---------|---------|
| (1) 1.3 | (2) 1.5 |
| (3) 1.7 | (4) 1.9 |
16. False echo drop out in interatrial septum **can** occur in :
- (1) Parasternal long axis view
 - (2) Parasternal short axis view
 - (3) Right parasternal short axis view
 - (4) Apical 4 chamber view

17. The earlier abnormality to occur with prolonged ischaemia :
- (1) Impaired relaxation
 - (2) E/A more than 1
 - (3) Impaired contraction
 - (4) Pulmonary hypertension
18. Which of the following is **wrong** regarding pericardial effusion ?
- (1) Ends posterior to descending aorta
 - (2) Almost never overlaps LA
 - (3) IVC will be dilated
 - (4) Swinging movements of heart present
19. Which of the following is **not** a feature of cardiac tamponade ?
- (1) Dilated IVC with less than 50% inspiratory collapse
 - (2) Abnormal ventricular septal movement
 - (3) RV diastolic collapse
 - (4) RA collapse in late systole
20. Which of the following is **indicative** of severe mitral stenosis ?
- (1) Pressure half time of more than 220 ms
 - (2) Calcifications of mitral leaflet
 - (3) Resting mean gradient of less than 10 mmHg
 - (4) Mitral valve area of 1.5 sq. cm
21. Which of the following about aortic stenosis is **wrong** ?
- (1) Mean gradient of less than 20 indicates moderate stenosis
 - (2) Orifice area of less than 0.6 by continuity equation indicates severe stenosis
 - (3) Peak gradient of less than 40 mmHg indicates mild stenosis
 - (4) Peak aortic valve velocity of more than 4m/sec occurs in severe stenosis
22. Which of the following is **not indicative** of severe aortic regurgitation ?
- (1) Pressure half time of AR jet of more than 500 m sec
 - (2) Holodiastolic flow reversal in descending aorta
 - (3) Ratio of jet width/LV outflow tract diameter is more than 60%
 - (4) Effective regurgitant orifice area of more than 0.3 sq. cm

23. Which of the following statements is **wrong** ?
- (1) Right atria is identified by attachment of caval veins
 - (2) Mitral valve has chordal attachment to interventricular septum
 - (3) Left ventricle shows mitral and aortic valve continuity
 - (4) Aorta is recognised by origin of coronary arteries
24. Which of the following is **incorrect** regarding left ventriculography ?
- (1) Assesses segmental and global LV function
 - (2) Detects ventricular septal defect
 - (3) Done with Cournard catheter
 - (4) Evaluates hypertrophic obstructive cardiomyopathy
25. The following situations have higher risk for pulmonary angiogram **except** :
- (1) Pulmonary hypertension
 - (2) Pulmonary embolism
 - (3) Chronic amiodarone use
 - (4) Left bundle branch block
26. Pulmonary angiogram is useful in evaluation of the following **except** :
- (1) Pulmonary valvular stenosis
 - (2) Pulmonary artery stenosis
 - (3) Evaluation of hemoptysis
 - (4) Pulmonary arteriovenous communications
27. In atrial pressure recording which of the following is **correct** :
- (1) Downward pulling of AV valve causes x descent
 - (2) LA pressure is higher than RA pressure
 - (3) In LA pressure recording 'a' wave is taller than 'v' wave
 - (4) 'v' wave represents systole
28. Arterial desaturation is **not** a feature of :
- (1) Alveolar hypoventilation
 - (2) Right to left intracardiac shunt
 - (3) Left to right intracardiac shunt
 - (4) Pulmonary AV fistula

29. In oximetry significant oxygen step up occurs in atrial level in the following **except** :
- (1) Atrial septal defect
 - (2) Sinus of valsalva aneurysm rupturing into right atrium
 - (3) Ventricular septal defect with tricuspid regurgitation
 - (4) Coronary artery anomalously arising from pulmonary artery
30. Which of the following statements is **wrong** regarding QP/QS ratio ?
- (1) Less than 1.5 can be managed medically
 - (2) 1.5–2 requires surgical correction
 - (3) Less than 1 indicates irreversible pulmonary vascular disease in ventricular septal defect
 - (4) Less than 1 occurs in right to left intracardiac shunts
31. Coronary angiogram is not indicated in the following conditions **except** :
- (1) as a screening test for coronary artery disease
 - (2) normal coronary angiogram within past 5 years
 - (3) recurrent angina within one year of coronary artery bypass surgery
 - (4) patients who do not prefer revascularisation
32. Which of the following is **wrong** ?
- (1) Normal coronary bed has flow reserve of 3–4 times
 - (2) 50% diameter stenosis reduces cross-sectional area by 70%
 - (3) 70% diameter stenosis causes 99% reduction in cross-sectional area
 - (4) A stenosis which reduces lumen diameter by 50% is hemodynamically significant
33. Which of the following is **not** considered as complex coronary angioplasty ?
- (1) bifurcation lesion
 - (2) discrete proximal LAD lesion
 - (3) chronic total occlusion
 - (4) multivessel stenosis
34. In Wilkins echocardiographic scoring system of mitral valve, which of the following is **incorrect** ?
- (1) maximum possible score is 16
 - (2) minimum score is 0
 - (3) does not include commissural calcification
 - (4) score of less than 8 is acceptable for balloon valvuloplasty

35. Right heart study was done in a patient, who had acute myocardial infarction a few days ago, Oximetry showed pulmonary artery saturation of 85%. What is the **likely cause** ?
- (1) Acquired ventricular septal defect
 - (2) Papillary muscle rupture
 - (3) Pulmonary embolism
 - (4) Cardiac tamponade
36. Severity of Mitral regurgitation by LV angiogram is estimated by :
- (1) left ventricular dysfunction
 - (2) reflux of contrast in to pulmonary vein
 - (3) presence of contrast in LA
 - (4) density of contrast opacification between the left atrium and left ventricle
37. Which of the following is **not correct** for balloon aortic valvuloplasty ?
- (1) can be performed in children below 10 years
 - (2) indicated for peak systolic pressure gradient at rest of more than 65 mmHg
 - (3) to be done in low cardiac output regardless of the gradient
 - (4) balloon diameter should be 10% more than the aortic annulus
38. The following agents can be used for pharmacological stress **except** :
- | | |
|----------------|------------------|
| (1) Adenosine | (2) Dipyridamole |
| (3) Dobutamine | (4) Digoxin |
39. Bernoulli's equation is used to calculate :
- (1) extent of valvular regurgitation
 - (2) cardiac output
 - (3) cardiac reserve
 - (4) pressure gradient across stenotic valve
40. Which of the following is **incorrect** regarding echocardiographic equipment ?
- (1) Frame rate falls as sector width increases
 - (2) Frame rate decreases as sector depth increases
 - (3) Sector width and sector depth can be altered independently
 - (4) Frame rate is independent of sector width and depth

41. Which of the following regarding perfusion scan is **incorrect** ?
- (1) ^{99m}Tc can be easily generated onsite
 - (2) Gamma ray emitted by Technetium is optimal for gamma camera imaging
 - (3) half-life of Technetium is many times longer than that of Thallium 201
 - (4) Imaging time of Technetium is shorter because of higher dose of tracer administered
42. Which of the following is **incorrect** regarding perfusion scan ?
- (1) reversible defect indicates ischaemia
 - (2) myocardial infarct causes fixed defects
 - (3) normally stress and rest images will not be identical
 - (4) Gated SPECT can assess viability of a region of myocardium
43. Which of the following is **incorrect** about hibernating myocardium ?
- (1) it is a dysfunctional but viable myocardium
 - (2) function is reversible with revascularisation
 - (3) in a GSPECT scan appears to thicken during systole
 - (4) PET scan will show decreased metabolism with poor perfusion in hibernating myocardium
44. Myocardial perfusion imaging with pharmacological stress is indicated for the following **except** :
- (1) Severe aortic stenosis
 - (2) Left bundle branch block
 - (3) Peripheral arterial disease
 - (4) Orthopedic problem preventing exercise
45. In successful revascularisation, GSPECT scan in a post CABG patient will **show** :
- (1) increase in left ventricular ejection fraction
 - (2) decrease in end systolic volume
 - (3) improve regional contractile function
 - (4) all of these

46. Which of the following is **incorrect** about Echocardiography ?
- (1) Helps to characterise cardiac masses
 - (2) Not useful to assess viable myocardium
 - (3) Useful to evaluate valvular disease
 - (4) Helpful to detect complications of myocardial infarction
47. Which of the following is **correct** about continuous wave doppler ?
- (1) Continuous wave doppler is limited by Nyquist limit
 - (2) Has ability to sample at different depths
 - (3) Useful to measure high velocity flows
 - (4) Has single large doppler crystals which transmits and receives ultrasound waves
48. Which of the following about 2D Echocardiography is **incorrect** ?
- (1) Useful to assess valve morphology and orifice area
 - (2) Can provide hemodynamic information about blood flow
 - (3) Helps to estimate cardiac size and function
 - (4) Most useful for pericardial diseases
49. Which of the following is **incorrect** ?
- (1) Interatrial septum is well visualised in right parasternal view
 - (2) Right sided aortic arch is detected in suprasternal view
 - (3) Viscero atrial situs is seen in subcostal view
 - (4) In hyperinflated lungs parasternal long axis view is better than in Apical 4 chamber view
50. Which of the following is **incorrect** in spectral analysis of doppler ?
- (1) Indicates the direction of flow at different points of cardiac cycle
 - (2) Estimates velocity at different points of cardiac cycle
 - (3) Amplitude is inversely proportional to the intensity of signal
 - (4) Flow velocity integral can be calculated
51. Which of the following functions **cannot** be done by Pulse Wave Doppler ?
- | | |
|----------------------------|-----------------------------|
| (1) Mitral inflow velocity | (2) Pulmonary vein velocity |
| (3) dp/dt | (4) Mitral annulus velocity |

52. Which of the following **cannot** be measured by continuous wave doppler ?
- (1) Dynamic LVOT gradient (2) Pressure half time
(3) Jet across Ventricular septal defect (4) Diastolic function
53. Which of the following statements is **wrong** ?
- (1) Simplified Bernoulli's Equation is used to assess transvalvular gradients
(2) Pressure half time is useful to assess the mitral stenosis and aortic regurgitation
(3) Aortic valve area is better assessed by continuity equation if there is LV dysfunction
(4) Tricuspid regurgitant jet helps to estimate pulmonary artery diastolic pressure
54. In a patient with Ventricular septal defect, the peak velocity of jet across the defect was 4m/sec. His brachial blood pressure was 110/80 mmHg. Pulmonary valve is normal and not stenosed. His Pulmonary artery systolic pressure is :
- (1) 36 mmHg (2) 46 mmHg
(3) 54 mmHg (4) 64 mmHg
55. Which of the following is **wrong** :
- (1) E/A ratio of less than 1 occurs in impaired LV relaxation
(2) Normally pulmonary venous systolic filling wave velocity is greater than diastolic filling wave velocity
(3) Deceleration time of less than 160 milliseconds occurs in restrictive pattern of filling
(4) In pseudonormal pattern, the mitral valve 'a' wave duration is greater than pulmonary venous 'a' wave duration.
56. Which of the following is **incorrect** regarding impaired relaxation pattern in LV filling ?
- (1) Deceleration Time : 160–240 m sec
(2) E/A less than 1
(3) Isovolumetric relaxation Time : more than 90 m sec
(4) Pulmonary venous systolic wave velocity greater than diastolic wave velocity
57. Which of the following is **incorrect** regarding restrictive filling pattern of LV filling ?
- (1) Deceleration time less than 160 m sec
(2) E/A > 1.5
(3) PV systolic wave velocity (Pvs2) is greater than diastolic velocity (PVd)
(4) Mitral A duration is less than pulmonary vein a (PVa) duration

58. Which of the following LV segments is **not** supplied by left circumflex artery ?
- (1) Basal anterior lateral (2) Mid anterior lateral
 (3) Apical lateral (4) Apical anterior
59. Which of the following LV segments is supplied by LAD ?
- (1) Basal inferior septal (2) Mid inferior septal
 (3) Apical septal (4) Apical lateral
60. In a 17 segment LV wall motion analysis, dyskinesia of basal inferior, basal inferior septal, mid inferior and mid inferior septal segments with hypokinesia of apical inferior and apical segments were noted. What is the LV wall motion score index ?
- (1) 1.3 (2) 1.8
 (3) 2.1 (4) 2.4
61. Which of the following is **incorrect** regarding pulmonary venous flow pattern ?
- (1) One systolic velocity (2) Atrial flow reversal
 (3) One diastolic velocity (4) Done by pulse wave doppler
62. Which of the following is **correct** regarding true ventricular aneurysm ?
- (1) Narrow neck
 (2) Commonly due to inferior wall infarction
 (3) Source of thrombus
 (4) Walled off by pericardium
63. Which of the following is **incorrect** regarding echocardiographic visualisation of coronary arteries ?
- (1) Visualised in small portions in different phases of cardiac cycle
 (2) Left main ostium is visualised in parasternal short axis view at aortic valve level
 (3) Circumflex in AV groove can be visualised in apical view
 (4) Transthoracic echo visualises better than TEE
64. Respiratory variation of more than 25% in trans mitral flow velocity occur in all the following **except** :
- (1) Pulmonary embolism
 (2) Constrictive pericarditis
 (3) Restrictive cardiomyopathy
 (4) Chronic obstructive pulmonary disease

65. Which of the following statements about mitral stenosis is **wrong** ?
- (1) Transthoracic echocardiography is insensitive for detecting LA thrombi
 - (2) Mitral regurgitation more than mild degree precludes balloon valvuloplasty
 - (3) RV failure is an indication for invasive intervention
 - (4) Severe aortic regurgitation prolongs mitral pressure half time
66. Which of the following is **not indicative** of severe mitral regurgitation ?
- (1) Effective regurgitant orifice of >4 sq. cm
 - (2) Pulmonary vein systolic flow reversal
 - (3) Vene contraction of 3 mm of MR jet
 - (4) MR jet area of more than 8 sq. cm
67. Which of the following is **incorrect** ?
- (1) Mean tricuspid gradient of more than 2.5 mm Hg indicates tricuspid stenosis
 - (2) Pressure half time of tricuspid valve of more than 190 m sec indicates severe stenosis
 - (3) Commonest cause is congenital heart disease
 - (4) In severe tricuspid regurgitation, systolic flow reversal occurs in hepatic vein
68. Which of the following statements is **wrong** ?
- (1) The great artery which immediately branches is pulmonary artery
 - (2) Right ventricle is recognised by moderator band
 - (3) Mitral septal attachment is more towards apex than tricuspid
 - (4) Coronary sinus opening indicates right atrium
69. Which of the following is **incorrect** regarding left ventriculography ?
- (1) Done with pigtail catheter
 - (2) Field of view is 9 inches
 - (3) Done in 30° LAO and 60° RAO
 - (4) Pressure cut off of 1,000 PSI
70. In pulmonary angiogram, **incorrect** statement is :
- (1) Contrast medium with high osmolarity is preferred
 - (2) Digital subtraction reduces quantity of contrast
 - (3) Visualised in right and left posterior oblique views
 - (4) Balloon occlusion is useful for segmental angiogram

71. In right atrial pressure wave recording; which of the following is **incorrect** ?
- (1) 'a' wave occurs during systole
 - (2) 'a' wave follows P wave in ECG
 - (3) atrial relaxation causes 'x' descent
 - (4) 'y' descent follows AV valve opening
72. Which of the following is **correct** ?
- (1) RV and LV waveforms are similar in morphology and magnitude
 - (2) Ejection period is shorter in LV than in RV
 - (3) Duration of systole is longer in LV than in RV
 - (4) Presence of incisura helps to recognise aortic pressure from PA pressure
73. Pulmonary artery saturation of more than 80% occurs in :
- (1) Left to right intracardiac shunt
 - (2) Pulmonary hypertension
 - (3) AV fistula
 - (4) Angioma of lung
74. In oximetry significant oxygen step up occurs at Pulmonary artery level in the following conditions **except** :
- (1) Patent ductus arteriosus
 - (2) Anomalous origin of coronary artery
 - (3) Complete endocardial cushion defect
 - (4) Aorto pulmonary window
75. The following are class 1 indications for coronary angiogram **except** :
- (1) Class III or Class IV exertional angina in spite of adequate medical therapy
 - (2) Resuscitated from sudden cardiac death
 - (3) Acute stent closure following PCI
 - (4) Coronary calcifications in CT coronary angiogram
76. Which of the following statements about coronary circulation is **wrong** ?
- (1) 85% of patients have right dominant circulation
 - (2) In balanced codominant circulation, posterior left ventricular branches are given by RCA
 - (3) The artery which crosses the crux is considered as dominant artery
 - (4) SA nodal artery arises either from RCA or from left circumflex artery

77. Which of the following statements about the stent is **wrong** ?
- (1) Modular stents are self expandable stents
 - (2) Stents provide scaffolds to keep vascular lumen patent
 - (3) Slotted tube stents are balloon mounted
 - (4) Self expandable stents can be balloon inflated if required
78. When in LV angiogram, LA opacification is equal to that of LV without quick clearance of contrast, the grade of MR is :
- (1) 4+
 - (2) 3+
 - (3) 2+
 - (4) 1+
79. Which of the following catheters can be used for pulmonary wedge pressure monitoring ?
- (1) Swan Ganz
 - (2) Pigtail
 - (3) Sones catheter
 - (4) Lehman catheter
80. Which of the following is **not** a contraindication for mitral balloon valvuloplasty in a patient with tight mitral stenosis ?
- (1) Left atrial body clot
 - (2) Mild mitral regurgitation
 - (3) Mitral commissural calcification
 - (4) Endocarditis
81. Which of the following estimation **cannot** measure cardiac output ?
- (1) Thermodilution
 - (2) FICK method
 - (3) Doppler estimation of left ventricular outflow
 - (4) Transmitral pressure gradient
82. The following radio pharmaceuticals are used for myocardial perfusion study **except** :
- (1) ^{18}F FDG (Fluro deoxyglucose)
 - (2) Tetrofosmin
 - (3) Thallium (Tl_{201})
 - (4) $^{99\text{m}}\text{Tc}$ -Sestamibi
83. Nuclear cardiology is used in the following conditions **except** :
- (1) Diagnosis and prognosis of coronary artery disease
 - (2) Myocardial viability
 - (3) Constrictive pericarditis
 - (4) To image the extent of infarction

84. Transoesophageal echocardiogram is more useful than transthoracic echocardiogram in the following indications **except** :
- (1) detection of left atrial appendage clot
 - (2) minimal pericardial effusion
 - (3) aortic dissection
 - (4) mitral prosthetic valve regurgitation
85. Which of the following regarding perfusion scan is **wrong** ?
- (1) Thallium can be generated onsite easily in every place
 - (2) Thallium emits low energy photons
 - (3) Half-life of Tl 201 is 73 hours
 - (4) Radioactive Thallium dose is usually 1/10th of Technetium
86. Which of the following about Gamma camera is **incorrect** ?
- (1) Detector has a large sodium iodide crystal
 - (2) Gamma rays produce scintillations of the detector
 - (3) Photomultiplier tubes generate electrical signals
 - (4) Collimator is situated between the detector and photomultiplier tube
87. Which of the following statements is **wrong** ?
- (1) Increased tracer uptake of lung on stress indicates severe coronary artery disease
 - (2) Lung to heart ratio of more than 0.33 suggests severe coronary artery disease
 - (3) LV dilatation during stress is indicative of increased risk for cardiac events
 - (4) LV dilatation during stress occurs only with global transmural ischaemia
88. Which of the following is **incorrect** regarding ventilation perfusion scintigraphy ?
- (1) Perfusion defects with adequate ventilation is diagnostic of pulmonary embolism
 - (2) A negative perfusion scan eliminates pulmonary embolism
 - (3) 99 m technetium labelled erythrocytes are injected intravenously to assess perfusion
 - (4) Segmental perfusion defects denote block in pulmonary artery branches
89. Which of the following statements is **incorrect** ?
- (1) First pass radionuclide angiography (FPRNA) can assess RV function
 - (2) Equilibrium gated radionuclide angiography is a good test for LV function
 - (3) GSPECT will assess RV function better than FPRNA
 - (4) GSPECT study users perfusion tracer and not blood-pool agent
90. A fixed perfusion defect in GSPECT can be caused by :
- | | |
|-----------------------|-------------------------|
| (1) <i>Infarction</i> | (2) <i>Left breast</i> |
| (3) <i>Diaphragm</i> | (4) <i>All of these</i> |