

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

Term-End Examination

00655

June, 2011

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) *Erase completely any error or unintended marks.*
- (vi) *There will be 90 questions in this paper and each question carries equal marks.*
- (vii) *There will be no negative marking for wrong answers.*
- (viii) *No candidate shall leave the examination hall at least for one hour after the commencement of the examination.*

1. Comparing right and left atrial pressures, the following statement is false :
 - (1) RA mean is less than LA mean.
 - (2) RA mean and LA mean are near equal in cases of nonrestrictive ASD.
 - (3) V wave is more prominent than A wave in LA pressure trace.
 - (4) V wave is more prominent than A wave in RA pressure trace.

2. Invasive methods of assessing left ventricular function include :
 - (1) contrast left ventriculography.
 - (2) radionuclide scintigraphy.
 - (3) MRI.
 - (4) echocardiography.

3. Following statement regarding left to right shunt is incorrect :
 - (1) O₂ stepup > 7% at atrial level is indicative of ASD.
 - (2) A O₂ stepup of > 5% at ventricular or pulmonary artery level is indicative of VSD & PDA respectively.
 - (3) O₂ stepup is specific for ASD, VSD & PDA only.
 - (4) Shunt is quantified based a ratio of Q_p/Q_s as small (< 1.5) moderate (1.5 - 2.0) or large (> 2.0).

4. Regarding coronary anatomy, following statement is incorrect :
 - (1) Left coronary dominance (determined by origin of posterior descending artery) is more common in general population.
 - (2) Septal & diagonal arteries are branches of left anterior descending artery.
 - (3) Sinus node artery, conus branch, posterior descending artery & right ventricular arteries are branches of dominant right coronary artery.
 - (4) Obtuse marginal artery is branch of left circumflex artery.

5. Regarding coronary angiography, following statement is incorrect :
 - (1) It can be performed by radial or femoral approach.
 - (2) Angiographic assessment of severity of stenosis is visual & is subject to interobserver variation.
 - (3) Physiological assessment of severity may be occasionally required in borderline lesions.
 - (4) Intervention is required if diameter stenosis exceeds 30%.

6. Regarding coronary angioplasty, following statement is incorrect :
 - (1) Drug eluting stents have more restenosis than bare metal stents.
 - (2) Drug eluting stents are associated with higher incidence of late stent thrombosis compared to bare metal stents.
 - (3) Dual antiplatelets are to be continued for a longer period following drug eluting stents than bare metal stents.
 - (4) Long term results of bare metal stenting in diabetics is inferior to nondiabetics.

7. Regarding cardiac catheterization, following statement is incorrect :
- (1) Valve area is calculated by Gorlin's formula.
 - (2) Hakki's formula is an alternative to Gorlin's formula in aortic stenosis.
 - (3) For a given severity of stenosis, the gradients across right sided valves are lesser than those of left sided valves.
 - (4) Seller's grading is used for quantifying valvular stenosis.
8. Absolute contraindications to percutaneous mitral balloon valvuloplasty includes all except
- (1) Left atrial thrombus.
 - (2) More than grade 2 mitral regurgitation.
 - (3) Severe pulmonary arterial hypertension.
 - (4) Concomitant Aortic Valve disease.
9. Regarding radionuclide scintigraphy, following statement is incorrect.
- (1) PET does not help in viability assessment.
 - (2) Thallium or technetium labeled tracers are used for myocardial perfusion scintigraphy.
 - (3) Radionuclide imaging provides functional information.
 - (4) Myocardial metabolic imaging is done with 18 fluorodeoxyglucose and C11 fatty acids.
10. Regarding myocardial perfusion imaging, the following statement is incorrect :
- (1) Exercise or pharmacological stress test can be used.
 - (2) Sensitivity is about 90% and specificity is about 80%.
 - (3) Adenosine, dipyradamole or dobutamine is used during pharmacological stress for MPI.
 - (4) Does not give very useful prognostic information.
11. Regarding mitral balloon valvuloplasty, following statement is correct :
- (1) Commonly, Wilkin's scoring system is used for assessing suitability.
 - (2) Maximum score is 18.
 - (3) Commissural morphology is used in Wilkin's scoring.
 - (4) Greater the score, more likely a better result.
12. Regarding fundamentals of echocardiography, following is incorrect :
- (1) Echo uses Piezoelectric crystals in transducers.
 - (2) Greater the frequency, higher the penetration and lesser the resolution.
 - (3) Frequency used for paediatrics is higher than for adults.
 - (4) Emitted ultrasound image from the transducer is displayed on the monitor.

13. Regarding M mode echo, what is untrue :
- (1) Has high temporal resolution.
 - (2) Gives accurate and reproducible measurement of dimensions & wall thickness.
 - (3) Has good lateral resolution.
 - (4) M Mode EF measurement is unreliable in presence of regional wall motion abnormality.
14. Regarding Doppler echocardiography following is incorrect :
- (1) Frequency of reflection will be lesser than transmitted frequency if blood is moving towards transducer.
 - (2) Maximum frequency shift occurs when ultrasound beam is parallel to direction of blood flow.
 - (3) Single crystal emits and receives signals in pulsed wave Doppler and two separate crystal transmit and receive signals simultaneously in CW Doppler.
 - (4) Maximum frequency measured by PW Doppler is determined by Nyquist limit.
15. Regarding Doppler, following is incorrect :
- (1) Nyquist limit equals half of pulse frequency.
 - (2) Modified Bernoulli equation relates velocity to pressure gradient with a formula pressure difference equals $4V^2$.
 - (3) Mitral valve area can be calculated by pressures half time & continuity equation methods.
 - (4) Aortic valve area is calculated by continuity equation method does not correlate well with cath derived valve area by Gorlin's formula.
16. Regarding Doppler, what is untrue :
- (1) Colour Doppler is a form of pulse wave Doppler.
 - (2) Cardiac output & shunt calculation by Doppler is reliable.
 - (3) Estimation of PA pressures in presence of TR by Doppler is reliable.
 - (4) We can estimate PA pressures in the presence of VSD without associated AS and PS accurately.
17. A 70 year old lady, a known hypertensive presented with history of FC III dyspnea. She had sinus rhythm. Echo finding that are in favour of diastolic heart failure are :
- (1) Thickness IVS & LV posterior wall of 1.7mm, LVESD of 20mm, LVEF of 60%, mitral E/A ratio of 2.5, E deceleration time of 100 ms and IVRT of 60ms.
 - (2) IVS and LVPW thickness of 11mm, LVESD of 46mm, LVEF of 35%, mitral flow of E=A, E deceleration time of 250ms, IVRT of 100ms.
 - (3) IVS & LVPW thickness of 7 mm, LVESD of 35mm, LVEF of 50%, mitral flow of E/A ratio of 1.5, DT of 200ms, IVRT of 80ms.
 - (4) None of the above.

18. A 60 yr old woman presented with evolved anterior MI of 5 day duration and did not receive thrombolytic therapy. Which of the following are true ?
- (1) Echocardiography is useful in assessment of left ventricular function, mechanical complications, regional wall motion abnormalities & presence of mural thrombus.
 - (2) TEE is needed to assess mechanical complications.
 - (3) Echo is not very reliable in evaluating mechanical complications.
 - (4) Echo is very useful in assessing coronary perfusion on a routine basis.
19. Echocardiographic methods of left ventricular Ejection fraction include all except :
- (1) M mode.
 - (2) Eye ball method.
 - (3) Modified Simpson's formula.
 - (4) Calculation using the formula $\frac{LVED-LVSD}{LVED} \times 100$.
20. A 30 year old labourer presented to emergency room with functional class 3 effort intolerance and fever of 1 week duration. A echocardiogram revealed fluid in the pericardial space. The following statement is incorrect regarding pericardial effusion :
- (1) Right ventricular diastolic collapse is very specific of cardiac tamponade.
 - (2) Right atrial diastolic collapse is very specific for tamponade.
 - (3) Dilated inferior vena cava with less than 50% inspiratory collapse favours tamponade.
 - (4) Mitral Doppler E variation of > 25% and tricuspid E>40% is in favour of tamponade.
21. Mitral Doppler paradoxus can also be seen in :
- (1) Acute pulmonary embolism.
 - (2) Right ventricular infarction.
 - (3) Severe COPD.
 - (4) Acute pneumonia.
22. Regarding echo of mitral stenosis, the following statement is incorrect :
- (1) Mitral valve area can be calculated by planimetry, pressure half time and continuity equation methods.
 - (2) Valve area less than 2 sq cm indicates mitral stenosis.
 - (3) In the presence of tricuspid regurgitation PA pressure can be estimated.
 - (4) TTE can diagnose or rule out LA appendage clot with 100% accuracy.
23. Echocardiographic assessment of MR severity include all except :
- (1) MR jet area relative to LA area.
 - (2) Venacontracta of <3mm indicated mild MR.
 - (3) Regurgitant volume, fraction and orifice area calculated by volumetric or PISA method are used for quantifying severity of MR.
 - (4) Even in presence of eccentric jet MR echo grading is reliable.

24. Criteria for severity of MR include all except :
- (1) $ERO \geq 4 \text{sq cm}$.
 - (2) Regurgitant volume of $>60 \text{ml}$.
 - (3) MR jet area $> 40\%$ of LA area.
 - (4) Vena contracta $> 4 \text{mm}$.
25. Regarding echo of aortic stenosis following statement is incorrect :
- (1) Valve area is calculated by continuity equation or TEE planimetry.
 - (2) In presence of severe AS and LV dysfunction, gradients can be misleadingly low.
 - (3) Valve area $< 1.5 \text{sq cm}$ indicates severe AS.
 - (4) Presence of significant PAH in AS in the absence of mitral valve indicates grave prognosis.
26. Presence of severe AR can be corroborated with echo with following findings, except :
- (1) Ratio of AR jet width by LVOT greater than 60% .
 - (2) Pressure half time of AR $< 250 \text{ms}$.
 - (3) Holodiastolic flow reversal in descending aorta.
 - (4) Vena contracta of AR > 0.4 .
27. Echocardiography of tricuspid stenosis, the following statement is incorrect :
- (1) Mean gradient of $>2.5 \text{mmHg}$ across tricuspid valve in the presence of severe TR indicates tricuspid stenosis.
 - (2) Mean gradient $> 7 \text{mmHg}$ indicates severe TS.
 - (3) A constant of 190 is proposed for calculation of tricuspid valve area by PHT method.
 - (4) PHT >190 indicates severe TS.
28. Assessment of tricuspid regurgitation by echocardiography, following statement is incorrect :
- (1) TR can be caused by organic disease or secondary to pulmonary hypertension.
 - (2) Organic causes of TR include rheumatic heart disease, carcinoid, trauma, infective endocarditis and tricuspid valve prolapse.
 - (3) In organic TR we get low pressure TR.
 - (4) In severe TR tricuspid inflow velocity will be $<1.0 \text{m/sec}$

29. In pediatric echocardiography, following statement is incorrect :
- (1) Finger shaped atrial appendage, vena caval drainage, coronary sinus origin identify right atrium.
 - (2) More apical septal leaflet attachment, absence of septal chordal attachment two leaflet, elliptical valve & two papillary muscles identify mitral valve.
 - (3) Tricuspid valve continuous with pulmonary valve, presence of infundibulum and moderator band, coarse septal surface and large apical trabeculations identify right ventricle.
 - (4) Bifurcation identifies pulmonary artery and origin of coronaries and more distal origin of branches identifies aorta.
30. Pediatric echocardiographic examination includes all except :
- (1) Identification of chamber or vessel by own morphological characters & not by relation to adjacent structures.
 - (2) Involves systematic, segmental approach.
 - (3) Subcostal view is useful in making out visceral situs.
 - (4) Frequency of transducer is same as that of adult.
31. Identify the incorrect statement :
- (1) All ASDs, irrespective of location are amenable for device closure.
 - (2) VSDs are classified based on location and degree of shunt across the defect.
 - (3) High parasternal view is useful in interrogation of PDA.
 - (4) Pulmonary artery pressure can be estimated by TR jet OR VSD jet velocity (as systemic BP is known).
32. Differences between two dimensional echo and Doppler include all except,
- (1) Target is tissue in 2D and blood in Doppler.
 - (2) We get anatomical information from 2 D and physiologic data from Doppler.
 - (3) Optimal alignment is perpendicular in 2 DE and parallel in Doppler.
 - (4) Preferred frequency is Low for 2 DE and high in Doppler.
33. Artifacts during echo examination include all except :
- (1) Generation of side lobes is due to edge effect.
 - (2) Reverberations: appear as echo targets at distances which are multiples of true distance.
 - (3) Shadowing: absence of echoes behind a target (opposite of reverberation) eg. behind prosthetic valve.
 - (4) Near field clutter (or ring down artifact) is not a true artifact.

34. Causes of non ischemic regional wall motion abnormality include all except :
- (1) Conduction abnormalities like left bundle branch block or ventricular pacing.
 - (2) Abnormal ventricular interaction like right ventricular pressure or volume overload.
 - (3) After cardiac surgery.
 - (4) Right atrial pacing.
35. Regarding M Mode echocardiographic information regarding cardiac hemodynamics, following statement is incorrect :
- (1) Premature closure of mitral valve is seen in acute severe aortic regurgitation.
 - (2) Early diastolic collapse of Rv free wall indicates cardiac tamponade.
 - (3) Midsystolic notching of pulmonary valve is seen in severe pulmonary hypertension.
 - (4) Midsystolic notching of pulmonary valve is seen in severe pulmonary stenosis.
36. Regarding 2 D echocardiographic insight into cardiac hemodynamics following statement is incorrect :
- (1) Diastolic flattening of IVS is seen in RV volume overload.
 - (2) Systolic IVS flattening is seen in RV volume overload.
 - (3) Dilated IVC with lack of respiratory collapse indicates elevated RA pressures.
 - (4) Exaggerated IVS bounce is seen in RBBB.
37. Doppler derived gradients can be greater than cath derived gradients due to the phenomenon of pressure recovery is seen in following situations except :
- (1) Prosthetic valves.
 - (2) Tapered stenosis like supra-ventricular AS.
 - (3) Coarctation of aorta.
 - (4) In double valve stenosis (eg. mitral and aortic stenosis).
38. Clinical applications of Bernoulli equation include all except :
- (1) Peak gradient across a stenotic valve.
 - (2) Estimate RV systolic pressure in presence of TR.
 - (3) Estimate PA diastolic pressure using end diastolic velocity of PR jet.
 - (4) Estimate PA diastolic pressure using PS jet velocity.
39. Echocardiographic differences between constriction and restriction include all except :
- (1) Dilated atria are seen in restriction.
 - (2) Thickened pericardium favours constriction.
 - (3) Septal bounce favours restriction.
 - (4) Significant PAH favours restriction.

40. Echocardiographic feature of infective endocarditis include all except :
- (1) Attachment to a valve upstream side.
 - (2) Irregular shape, amorphous.
 - (3) High reflectance.
 - (4) Associated valve regurgitation.
41. Increased Doppler gradients across a prosthetic valve in the absence of prosthetic valve dysfunction include all except :
- (1) Patient-prosthesis mismatch.
 - (2) Associated prosthetic valve regurgitation.
 - (3) High cardiac output.
 - (4) Low cardiac output.
42. Uses of stress echocardiography include all except :
- (1) Preoperative risk assessment.
 - (2) Assessment of viability.
 - (3) In women with positive TMT.
 - (4) In patients with severe AS and good LV function.
43. Echocardiographic poor prognostic markers include all except :
- (1) Very low ejection fraction.
 - (2) Restrictive filling pattern in mitral Doppler.
 - (3) Significant PAH.
 - (4) Non dilated left ventricle.
44. Complications of cardiac catheterization and angiography include all except :
- (1) Allergic reactions.
 - (2) Stroke.
 - (3) Contrast induced respiratory dysfunction.
 - (4) Arrhythmias.
45. With regard to cardiac catheterization, following is untrue :
- (1) Cardiac output is calculated by Fick's oxygen method or thermodilution method.
 - (2) Oxygen consumption is estimated by polarographic method using metabolic rate meter.
 - (3) Vascular resistances are calculated by modified Poiseuille's law.
 - (4) Vascular resistances are calculated using modified Bernouille's equation.

46. If transvalvular Peak Systolic gradient across pulmonary valve is 70 mmHg. This indicates :
- (1) Normal gradient.
 - (2) Mild PS
 - (3) Moderate PS
 - (4) Severe PS
47. Colour Doppler marker for severe MR is :
- (1) Mitral regurgitant volume >100ml.
 - (2) MR jet area of 6 cm².
 - (3) Effective regurgitant orifice of < 4 cm².
 - (4) Pulmonary vein diastolic flow reversal.
48. Normal aortic valve area is :
- | | |
|-------------------------------|-------------------------------|
| (1) 0.8 - 1.6 cm ² | (2) 1.6 - 2.6 cm ² |
| (3) 3 - 4 cm ² | (4) 4 - 6 cm ² |
49. False statement is :
- (1) PW measures flow velocity only at region of interest.
 - (2) CW Doppler has two crystals in transducer.
 - (3) PW is best suited for peak velocities and gradients.
 - (4) CW is used for estimating pressure half time.
50. Intracardiac pressure -TRUE statement is :
- (1) Pulmonary capillary wedge pressure is similar to RA pressure wave form.
 - (2) RV and LV wave form are similar in morphology and magnitude.
 - (3) Pulse pressure reflects volume and compliance of venous system.
 - (4) Mean aortic pressure reflects peripheral resistance.
51. Which of the following is self expanding stent ?
- | | |
|---------------------|--------------------|
| (1) Wire coils. | (2) Slotted tubes. |
| (3) Modular stents. | (4) Wall stent. |
52. Coronary angiogram. All are true except :
- (1) Femoral/brachial/ radial/axillary approaches may be used.
 - (2) Judkins/pigtail catheters are used over a guidewire.
 - (3) Systemic anticoagulation is contra-indicated.
 - (4) 5F/6F size cath are commonly used for adults.

53. Inove technique refers to :
- (1) Balloon Mitral valvuloplastry.
 - (2) ASD closure.
 - (3) LV angiography.
 - (4) Right heart catetherisation.
54. $(EDV-ESV)/EDV \times 100$ gives :
- (1) FS.
 - (2) EF.
 - (3) Regurgitant Volume.
 - (4) Stroke volume.
55. Spot the FALSE statement :
- (1) ^{99m}Tc Macroaggregated albumin is used in V/Q study of pulmonary embolism.
 - (2) ^{99m}Tc DTPA aerosois are used for V/Q study in pulmonary embolism.
 - (3) ^{99m}Tc labelled erythrocytes are used for ERNA. (Equilibrium gated Radionuclide angiography).
 - (4) ^{99m}Tc sestamibi is better choice than Thallium for mild stenosis.
56. Coronary anatomy : FALSE statement is :
- (1) Numeric coding of coronary segments is from 1-29.
 - (2) Numeric coding starts from RCA.
 - (3) Right dominant circulation is more common than left dominant circulation.
 - (4) SA nodal artery arises from left main.
57. In mild AS, jet velocity is :
- (1) $< 3\text{ m/s}$
 - (2) $3 - 4\text{ m/s}$
 - (3) $5 - 6\text{ m/s}$
 - (4) $> 8\text{ m/s}$
58. A large sodium iodide crystal, photomultiplier collimator are parts of :
- (1) 2 D Echo probe.
 - (2) 3 D Echo probe.
 - (3) Sones catheter.
 - (4) gamma camera.
59. Commonest cause for flail mitral valve is :
- (1) Ruptured chordae tendinae.
 - (2) Ruptured papillary muscle.
 - (3) Myxomatous degeneration of valve.
 - (4) Idiopathic.

60. In 2 D echo evaluation of a case of HOCM, the term SAM systolic anterior motion refers to the motion of :
- (1) IVS.
 - (2) Anterior Mitral leaflet.
 - (3) Aortic valve leaflet.
 - (4) Mitral valve annulus.
61. A E/A ratio of less than 1 suggests :
- (1) Normal filling.
 - (2) impaired relaxation.
 - (3) Pseudonormal pattern.
 - (4) Restrictive filling.
62. Wall motion score index of 1.7 indicates :
- (1) Normally contracting LV.
 - (2) Small infarct.
 - (3) large infarct.
 - (4) perfusion defect > 20%.
63. Mural thrombi are best seen with :
- (1) 2.5 MHz transducer.
 - (2) 5 MHz.
 - (3) 10 MHz.
 - (4) None of the above.
64. Which of the following is used as contrast agent in aortography ?
- (1) Highosmolar agents.
 - (2) CO₂
 - (3) Nitric oxide.
 - (4) Saline.
65. Cardiac output is measured by :
- (1) Ficks method.
 - (2) Simsons method.
 - (3) Wright method.
 - (4) Thompson method.
66. Right dominant coronary circulation is seen in :
- (1) 1% patients
 - (2) 8%
 - (3) 25%
 - (4) 85%
67. SA nodal artery arises from :
- (1) LAD
 - (2) LMCA
 - (3) Coronary sinus
 - (4) RCA
68. A patient with Pure mitral stenosis undergoes cardiac catheterization. The following findings are expected except :
- (1) Left ventricular end-diastolic pressure 20 mmHg.
 - (2) PA wedge pressure 22 mmHg.
 - (3) Pulmonary artery mean pressure 64 mmHg.
 - (4) RA mean pressure 11 mmHg.

69. Mitral valve area can be calculated from all the following parameters except :
- (1) Mitral valve planimetry.
 - (2) Mitral valve pressure $\frac{1}{2}$ time.
 - (3) Continuity equation.
 - (4) Peak mitral valve diastolic gradient.
70. Mosaic colour in colour Doppler indicates :
- (1) High velocity laminar flow.
 - (2) High velocity turbulent flow.
 - (3) Low velocity turbulent flow.
 - (4) Low velocity laminar flow.
71. A 49 year old male was admitted to CCU with chest pain. The ECG showed ST segment depression in anterolateral leads. Which of the following test is appropriate for initial evaluation ?
- (1) Treadmill exercise test.
 - (2) First pass radionuclide angiography.
 - (3) Ventilation perfusion scan.
 - (4) Echocardiography.
72. A 56 year old male is admitted with acute chest pain, dyspnoea and hypotension. The ECG shows anterior myocardial infarction. The following procedures are indicated except :
- (1) Intra - arterial line.
 - (2) Swan-Ganz PA catheter insertion.
 - (3) Ventilation perfusion scan.
 - (4) Early coronary angiography.
73. A step-up in the right atrium on oximetry can be seen in the following conditions except :
- (1) Atrial septal defect.
 - (2) Coronary cameral fistula.
 - (3) Patent foramen ovale.
 - (4) VSD with tricuspid regurgitation.
74. Cardiac output can be measured by the following methods except :
- (1) Doppler echocardiography.
 - (2) Fick's principle using oximetry.
 - (3) Thermodilution method.
 - (4) Tissue Doppler imaging.

75. The left ventricular end diastolic pressure in a normal individual measures :
- (1) 0 - 5 mmHg.
 - (2) 5 - 12 mmHg.
 - (3) 12 - 20 mmHg.
 - (4) 20 - 30 mmHg.
76. To calculate pulmonary vascular resistance you require the following except :
- (1) Pulmonary artery diameter.
 - (2) Pulmonary artery mean pressure.
 - (3) PA wedge mean pressure.
 - (4) Pulmonary blood flow.
77. A large V wave in the PA wedge pressure tracing indicates :
- (1) Acute left ventricular failure.
 - (2) Chronic left ventricular failure.
 - (3) Severe mitral regurgitation.
 - (4) Severe mitral stenosis.
78. Left ventricular end-diastolic pressure of 40 mmHg in the presence of aortic regurgitation indicates :
- (1) Hypertension with aortic regurgitation.
 - (2) Acute onset severe aortic regurgitation.
 - (3) Chronic severe aortic regurgitation.
 - (4) Combined aortic stenosis and aortic regurgitation.
79. Equalisation of pressures in all 4 chambers of the heart occurs in :
- (1) Large septal defects.
 - (2) Post operative state.
 - (3) Constrictive pericarditis.
 - (4) Pneumopericardium.
80. Which view is most preferred for angiographic assessment of left ventricular function ?
- (1) Right anterior oblique.
 - (2) Lateral.
 - (3) Left anterior oblique.
 - (4) Anteroposterior.
81. To profile a VSD the angiogram is commonly performed as follows :
- (1) LV angiogram in RAO view.
 - (2) LV angiogram in LAO view.
 - (3) RV angiogram in RAO view.
 - (4) RV angiogram in LAO view.

82. Subcostal view in echocardiogram is suitable for viewing the following except :
- (1) Secundum ASD.
 - (2) Primum ASD.
 - (3) Pulmonary artery branches.
 - (4) Pericardial effusion.
83. The apical four chamber view in echocardiography is suitable for the following conditions except :
- (1) Pericardial effusion.
 - (2) Mitral valve assessment.
 - (3) Ventricular septal defect.
 - (4) Atrial septal defect.
84. Contrast echocardiography is performed by injection of :
- (1) Iodinated contrast material.
 - (2) Agitated saline.
 - (3) Radionuclide solution.
 - (4) Albumin solution.
85. Contrast echocardiography is commonly used in the diagnosis of the following except :
- (1) Left to right shunt.
 - (2) Patent foramen ovale.
 - (3) Pulmonary A-V fistula.
 - (4) Right to left shunt.
86. Intraoperative TEE is useful to assess the following except :
- (1) Adequacy of valve repair.
 - (2) Adequacy of congenital defect repair.
 - (3) Adequacy of ventricular function.
 - (4) To assess gradients across valves.
87. Retrograde left ventricular angiogram is contraindicated in the following conditions except :
- (1) Suspected regional wall motion abnormality.
 - (2) Severe left ventricular dysfunction with LVEDP>40.
 - (3) Prosthetic aortic valve.
 - (4) Left ventricular thrombus.

88. A significant PA wedge to LVEDP gradient is found in all the following conditions except :
- (1) Left atrial myxoma.
 - (2) Mitral stenosis.
 - (3) Supramitral ring.
 - (4) A-V canal defect.
89. On echocardiography a patent ductus arteriosus can be best seen in :
- (1) Subcostal view.
 - (2) Parasternal long axis view.
 - (3) Apical 4 chamber view.
 - (4) Suprasternal view.
90. On echocardiography severity of pulmonary hypertension can be measured by the following except :
- (1) Mean velocity of PA flow.
 - (2) Peak velocity of tricuspid regurgitation jet.
 - (3) Peak velocity of pulmonary regurgitation jet.
 - (4) End diastolic velocity of pulmonary regurgitation jet.

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