

POST GRADUATE DIPLOMA IN CLINICAL
CARDIOLOGY (PGDCC) 01866

Term-End Examination

June, 2013

MCC-001 : FUNDAMENTALS OF CARDIOVASCULAR SYSTEM - I

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. PR interval is measured from :
 - (1) Beginning of P wave to beginning of QRS
 - (2) Beginning of P wave to end of QRS
 - (3) End of P wave to beginning of QRS
 - (4) End of P wave to end of QRS

2. The normal value of corrected QT interval is usually :
 - (1) Less than 340 ms
 - (2) Less than 440 ms
 - (3) Less than 540 ms
 - (4) Less than 640 ms

3. Left atrial enlargement is suggested by all of the following EXCEPT :
 - (1) Rightward shift of mean P wave axis
 - (2) Increased depth and duration of terminal negative portion of P wave in lead V1
 - (3) Ratio between duration of P wave and duration of PR segment in lead II more than 1.6
 - (4) Prominent notching of P wave in lead II with interval between the peaks more than 40 ms.

4. LBBB is diagnosed when all of the following are present EXCEPT :
 - (1) Broad notched R wave in lateral precordial leads (V5, V6) and usually leads I and aVL
 - (2) Absent septal q in left sided leads
 - (3) Tall or wide initial r wave in right precordial leads (V1, V2) followed by deep S wave
 - (4) QRS duration > 120 ms

5. ST elevation in lead II exceeding that of lead III with ST depression in V1 to V3 indicates MI in which territory ?
 - (1) LAD territory
 - (2) RCA territory in a non dominant RCA
 - (3) Diagonal territory
 - (4) Left circumflex territory

6. All the following lead to ST segment elevation EXCEPT :
- (1) Hyper acute myocardial infarction
 - (2) Pericarditis
 - (3) LV aneurysm
 - (4) LV Hypertrophy with strain pattern
7. Normal sequence of evolution in ECG in a case of myocardial infarction is :
- (1) Tall peaked T wave, ST elevation, Development of Q, ST returning to base line
 - (2) ST elevation, Tall peaked T wave, ST returning to base line, Development of Q
 - (3) Tall peaked T wave, Development of Q, ST elevation, ST returning to base line
 - (4) ST elevation, Development of Q, Tall Peaked T wave, ST returning to base line
8. ECG changes due to hyperkalemia are all EXCEPT :
- (1) Tall peaked T wave
 - (2) Long QT interval
 - (3) Bundle branch block pattern
 - (4) Decreased P wave amplitude and PR prolongation
9. Vein of Marshall is a remnant of :
- (1) Vitelline vein
 - (2) Right umbilical vein
 - (3) Right anterior cardinal vein
 - (4) Left superior venacava
10. The following parameters during treadmill testing are associated with adverse prognosis EXCEPT :
- (1) Duration of symptom limiting exercise < 5 METs
 - (2) Angina pectoris at low exercise workload
 - (3) Failure to increase systolic BP more than 120 mm Hg, or sustained decrease of BP by more than 10 mm Hg during exercise
 - (4) Development of BP > 200 mm Hg systolic or > 110 mm Hg diastolic

11. Which of the following fact is true about fourth heart sound "S4" ?
- (1) Can be heard by unaided ear
 - (2) Frequency is greater than 20 Hz
 - (3) Heard during ventricular filling phase
 - (4) Heard during ventricular ejection phase
12. About heart muscle the following features are true EXCEPT :
- (1) Act as syncitium
 - (2) Has multiple nuclei
 - (3) Has gap junction
 - (4) Has branching
13. All of the following factors normally increase the length of ventricular cardiac muscle fibers EXCEPT :
- (1) Increased venous tone
 - (2) Increased total blood volume
 - (3) Increased negative intrathoracic pressure
 - (4) Change in posture from lying to standing
14. Which of the following is not a cause of long QT ?
- (1) Amitryptaline
 - (2) Erythromicin
 - (3) Bradycardia
 - (4) Hyperkalemia
15. Which of the following fact is not true about right atrium ?
- (1) Sinus venorum is smooth part
 - (2) The opening of superior vena cava situated in upper and anterior part
 - (3) All the large vein open into sinus venorum
 - (4) Crista terminalis is junction of sinus venorum and atrium proper
16. Which of the following is not correct in normal individuals ?
- (1) Pulmonary artery diastolic pressure almost equals RV diastolic pressure
 - (2) Pulmonary artery diastolic pressure almost equals LV diastolic pressure
 - (3) Mean RA pressure equals IVC pressure
 - (4) LV peak systolic pressure equals systolic blood pressure

17. Which of the following is an incorrect statement about cardiac plexuses ?
- (1) The vagus gives one superior and one inferior cervical cardiac branch in mediastinum
 - (2) The superficial cardiac plexus is located just behind the arch of aorta
 - (3) The deep cardiac plexus is situated just below the bifurcation of trachea
 - (4) All of the above are incorrect
18. Which of the following statement about cardiac lymphatic drainage is correct ?
- (1) Brachio-cephalic nodes receive lymphatics from heart
 - (2) Inferior tracheo-bronchial nodes receive lymphatics from heart
 - (3) Both of the above are correct
 - (4) None of the above are correct
19. Which statement is incorrect regarding surface marking of heart ?
- (1) Mitral valve is at the sternal margin of 4th left costal cartilage
 - (2) Aortic valve is at sternal margin of 3rd left costal cartilage
 - (3) Pulmonary valve is at sternal end of 3rd left costal cartilage
 - (4) Tricuspid valve is at midsternum opposite the 4th intercostal space
20. Which of the following statement about JVP waveform is incorrect ?
- (1) 'a' wave is due to atrial contraction
 - (2) 'c' wave is due to downward movement of the mitral cusps
 - (3) 'v' wave is due to atrial filling in latter part of ventricular systole with mitral valve closed
 - (4) 'y' descent follows the flow into the ventricle in diastole
21. Conduction velocity is most rapid in which tissue ?
- | | |
|------------------|-----------------|
| (1) Atrial | (2) AV node |
| (3) His-Purkinje | (4) Ventricular |
22. Cardiogenic plate is derived from which of the following :
- (1) splanchnoplueric mesoderm
 - (2) splanchnoplueric endoderm
 - (3) splanchnoplueric ectoderm
 - (4) none of the above

23. Septum primum appears at about :
- (1) 38th day (2) 28th day (3) 18th day (4) 12th week
24. All of the following are associated with raised LV end-diastolic pressure EXCEPT :
- (1) Mitral stenosis late stages
(2) Aortic regurgitation late stages
(3) Mitral regurgitation late stages
(4) Aortic stenosis late stages
25. Which of the following statement is incorrect regarding pathogenesis of VSD ?
- (1) Deficient development of the proximal conus swelling
(2) Failure of muscular portion of IVS to fuse with the free edge of the conus septum
(3) Failure of endocardial cushions to fuse
(4) Decreased diverticulation of the muscular septum - perforations in the muscular IVS
26. Which of the following is a correct statement for cardiothoracic ratio (CTR) ?
- (1) CTR more than 50% is normal in adults
(2) It may be upto 60% in neonates
(3) It may be upto 60% in blacks
(4) All are correct
27. Hoffman Rigler sign is seen on chest X-ray in :
- (1) LV enlargement in PA view
(2) LV enlargement in Lateral view
(3) RV enlargement in PA view
(4) RV enlargement in Lateral view
28. Which of the following is not a feature of tetralogy of Fallot ?
- (1) Ventricular septal defect
(2) Atrial septal defect
(3) Hypertrophy of right ventricle
(4) Pulmonary stenosis

29. A young hypertensive patient present to your hospital with severe substernal chest pain with radiation to back. On examination you find pulse volume difference in upper and lower limb. Which of the following sign may be present ?
- (1) Ring sign
 - (2) Hampton hump
 - (3) Fleischner's sign
 - (4) Westermark sign
30. The sinus node is predominantly characterized by depolarization in which phase of the action potential ?
- (1) Phase 1
 - (2) Phase 2
 - (3) Phase 3
 - (4) Phase 4
31. The underlying arrhythmia mechanism most likely present in digitalis toxicity is :
- (1) Reentry
 - (2) Delayed after depolarizations
 - (3) Enhanced automaticity
 - (4) Early after depolarizations
32. Patients with the Wolff-Parkinson- White syndrome typically show all of the following features EXCEPT :
- (1) A wide QRS complex during normal sinus rhythm
 - (2) A narrow complex SVT
 - (3) A delta wave on the surface QRS
 - (4) A long H-V interval on the His-bundle recording
33. All of the following statements about Romano- Ward syndrome are true, EXCEPT :
- (1) It is a heterogeneous disorder involving mutations in different ion channels
 - (2) It is inherited as an autosomal recessive disorder
 - (3) It is associated with sudden cardiac death in young patients
 - (4) It is not associated with congenital deafness
34. Adequate heart rate control in a patient with atrial fibrillation is defined as :
- (1) Resting HR of 80 bpm, maximal HR of 110 bpm during a 6-minute walk
 - (2) Resting HR of 60 bpm, maximal HR of 110 bpm during a 6-minute walk
 - (3) Resting HR of 80 bpm, maximal HR of 140 bpm during a 6-minute walk
 - (4) Resting HR of 60 bpm, maximal HR of 140 bpm during a 6-minute walk

35. Which of the following is not a cause of nonspecific intraventricular conduction defects ?
- (1) LVH
 - (2) Hypokalaemia
 - (3) Myocardial infarction
 - (4) Myocarditis
36. A 46 years old diabetic male comes to your hospital for comprehensive cardiac checkup. During TMT he suddenly develops sustained VT. His ECG tracing did not showed any significant ST-T changes. Which of the following interpretation is correct ?
- (1) Patient had significant coronary artery disease
 - (2) Patient had possibility of RVOT tachycardia
 - (3) Both of the above are correct
 - (4) None of the above are correct
37. All of the following favor VT over SVT with aberrancy EXCEPT :
- (1) AV dissociation
 - (2) Fusion beats
 - (3) Precordial non concordance
 - (4) Lead V1 showing RBBB with larger left peak (Rsr')
38. Electrophysiology study and radio frequency ablation is a standard mode of therapy in all of the following patients EXCEPT :
- (1) AV nodal reentrant tachycardia
 - (2) Accessory pathway mediated reciprocating tachycardia
 - (3) Atrial flutter
 - (4) Ventricular fibrillation
39. Sinus venosus receives venous blood from which of the following vein ?
- (1) Vitelline vein
 - (2) Umbilical vein
 - (3) Common cardinal vein
 - (4) All of the above
40. Prominent main pulmonary artery is seen in all EXCEPT :
- (1) Idiopathic dilatation of pulmonary artery
 - (2) Pulmonary valvular stenosis
 - (3) Patent ductus arteriosus with left to right shunt
 - (4) Tetralogy of fallot

41. Indication for terminating the exercise during treadmill testing is all EXCEPT :
- (1) Moderate to severe angina
 - (2) Sustained ventricular tachycardia
 - (3) ST elevation by more than 1 mm in leads without Q wave
 - (4) BP rising to 180/100 mm Hg
42. Abnormal ST depression during exercise protocol is :
- (1) 1 mm or more J point depression with relatively flat ST depressed by 0.10 mV or more 80 ms after J point
 - (2) 2 mm or more J point depression with relatively flat ST depressed by 0.01 mV or more 80 ms after J point
 - (3) 1 mm or more J point depression with relatively flat ST depressed by 0.01 mV or more 40 ms after J point
 - (4) 1 mm or more J point depression with relatively flat ST depressed by 0.01 mV or more 120 ms after J point
43. Ventricular preexcitation is characterized by all EXCEPT :
- (1) Presence of delta wave (initial slurring of QRS)
 - (2) Prolonged QRS duration ($> 100\text{ms}$)
 - (3) Secondary ST-T changes due to altered ventricular activation sequence
 - (4) Long PR interval ($> 200\text{ ms}$)
44. All of the following ECG changes may be seen in isolated mitral stenosis EXCEPT :
- (1) Prominent negative deflection of terminal portion of P in V1
 - (2) R in V1 more than 1.0 mV
 - (3) Right axis deviation
 - (4) $SV1 + (RV5 \text{ or } RV6) > 3.5\text{ mV}$
45. Right coronary artery is called dominant when ?
- (1) It falls short of crux
 - (2) It gives rise to PDA but does not give rise to any postero lateral branches
 - (3) It gives rise to at least one postero lateral branch in addition to PDA
 - (4) It gives rise to a large RV branch

46. A, B, C and D had their ECGs done. In A's ECG, the R-R distance is 1 and $\frac{1}{2}$ large squares. B : 2 large squares, C : 4 squares, D : 6 squares. Their heart rates are :
- (1) 240, 150, 80, 52
 - (2) 200, 150, 75, and 50
 - (3) 240, 175, 80, 52
 - (4) 200, 125, 75, 60
47. Which of the following is not an ECG feature of hypokalemia ?
- (1) Shortened QT interval
 - (2) Flattening of T waves
 - (3) Prominence of U waves
 - (4) ST depression
48. Posterior wall M1 is best seen in leads
- (1) aVL, V₅ - V₆
 - (2) II, III, aVF
 - (3) V₁, V₂
 - (4) V_{3R} and V_{4R}
49. Which of the following is a classical ECG finding in ostium primum ASD ?
- (1) Right axis deviation of QRS
 - (2) Left axis deviation of QRS
 - (3) A - V dissociation
 - (4) Early repolarization pattern
50. The P wave in the ECG is 3 squares tall and 4 squares wide. All the following are true EXCEPT :
- (1) The PR interval is 0.16 seconds
 - (2) The voltage is 0.3 mV
 - (3) There is probably left atrial hypertrophy
 - (4) The P axis is expected to be normal
51. The heart rate is 70, the PR interval is 0.15 seconds, and the QT is 0.40. The patient develops sinus tachycardia, and the heart rate becomes 150. The expected findings are :
- (1) PR 0.11, RR 8 small squares, QT 0.38
 - (2) PR 0.12, RR 10 small squares, QT 0.40
 - (3) PR 0.11, RR 8 small squares, QT 0.33
 - (4) PR 0.11, RR 10 small squares, QT 0.23

52. 2 days after PCI to mid LAD, a large 2nd diagonal occludes, producing severe chest pain. The expected ECG findings are :
- (1) ST depression in the lateral leads
 - (2) ST elevation in inferior leads
 - (3) ST depression in anterior leads
 - (4) ST elevation in anterior leads
53. RV infarction will show all the following EXCEPT :
- (1) Reciprocal changes in inferior leads
 - (2) JVP elevation
 - (3) ST elevation in right chest leads
 - (4) Low pulmonary capillary wedge pressures
54. The resting cardiac index is :
- | | |
|-----------------------------------|-----------------------------------|
| (1) 4.3 to 5 l/min/m ² | (2) 3.3 to 4 l/min/m ² |
| (3) 2.3 to 3 l/min/m ² | (4) 1.3 to 2 l/min/m ² |
55. Which of the following are not included in the Laplace equation ?
- | | |
|---------------------------|---------------------|
| (1) Wall tension | (2) Wall thickness |
| (3) Intra cavity pressure | (4) Blood viscosity |
56. Severe pulmonary venous hypertension is defined when pulmonary venous pressure is more than :
- | | |
|----------------|----------------|
| (1) > 15 mm Hg | (2) > 18 mm Hg |
| (3) > 24 mm Hg | (4) > 30 mm Hg |
57. The normal PA pressures are :
- | | | | |
|-----------------|-----------------|-----------------|-----------------|
| (1) 20/04 mm Hg | (2) 30/08 mm Hg | (3) 40/12 mm Hg | (4) 50/16 mm Hg |
|-----------------|-----------------|-----------------|-----------------|
58. The normal pulmonary wedge pressures are :
- | | | | |
|---------------|----------------|-----------------|-----------------|
| (1) 0-5 mm Hg | (2) 5-10 mm Hg | (3) 10-15 mm Hg | (4) 15-20 mm Hg |
|---------------|----------------|-----------------|-----------------|

59. Which of the following will not result in irregular pulse ?
- (1) Atrial fibrillation
 - (2) 2 : 1 AV block
 - (3) Mobitz type I AV block
 - (4) Ventricular trigeminy
60. Oedema formation is affected by all the following EXCEPT :
- (1) Venular pressure
 - (2) Capillary permeability
 - (3) Osmolarity
 - (4) Arterial pressure
61. The normal coronary venous saturation is :
- (1) 25 %
 - (2) 35 %
 - (3) 45 %
 - (4) 55 %
62. The venous ABG gives no indication of arterial.
- (1) pO_2
 - (2) pH
 - (3) pCO_2
 - (4) all of the above
63. The normal pCO_2 of the alveolar air is :
- (1) 20 mm Hg
 - (2) 30 mm Hg
 - (3) 40 mm Hg
 - (4) 50 mm Hg
64. The pO_2 of room air is
- (1) 100 mmHg
 - (2) 130 mmHg
 - (3) 160 mmHg
 - (4) 192 mmHg
65. Which of the following is not a JVP finding in patients with constrictive pericarditis ?
- (1) Rapid 'y' descent
 - (2) Prominent 'a' waves
 - (3) Raised JVP
 - (4) Kussmaul's sign
66. The QT interval is 0.5, and the heart rate is 48, the corrected QTc will be approx. :
- (1) 0.41 seconds
 - (2) 0.45 seconds
 - (3) 0.53 seconds
 - (4) 0.56 seconds
67. Enlargement of the superior mediastinum is common in all the following EXCEPT :
- (1) Lymphoma
 - (2) Newborns
 - (3) TAPVC
 - (4) Dissection of descending aorta

68. Chest X-ray PA view, the left atrial appendage area may show fullness in all EXCEPT :
- (1) LVF (2) Atrial septal defect
(3) Mitral regurgitation (4) Lymphadenopathy
69. X-ray features of mitral stenosis includes all EXCEPT :
- (1) Carinal angle $< 90^\circ$
(2) Left atrium forming the right heart border
(3) Pseudo tumors
(4) Redistribution of venous blood
70. Which is not a cause of T wave inversion ?
- (1) Hyperkalemia
(2) Pericarditis
(3) Myocardial infarction
(4) Myocarditis
71. Chest X - ray difference in chamber enlargement between VSD and PDA is :
- (1) LA (2) Aortic
(3) LV (4) Pulmonary artery
72. The sinus venosus gives rise to the :
- (1) coronary sinus (2) IVC
(3) left atrium (4) part of the right atrium
73. If blood pressure is 120/90 mm Hg, central venous pressure is 5 mm Hg and cardiac output is 5 l/mm, what will be the systemic vascular resistance :
- (1) 1900 dynes cm^{-5}sec (2) 1520 dynes cm^{-5}sec
(3) 950 dynes cm^{-5}sec (4) 1140 dynes cm^{-5}sec
74. In PA view chest X-ray, left heart border is formed by all EXCEPT :
- (1) Ascending aorta (2) Pulmonary artery
(3) Left atrial appendage (4) Left ventricle

75. The ramus intermedius occlusion would not cause ischemia :
- (1) In territory of proximal septal
 - (2) In territory of proximal Dx
 - (3) In territory of proximal OM
 - (4) The basal lateral wall
76. The interventricular septum is supplied by :
- (1) Both LAD and RCA
 - (2) Only LAD
 - (3) Only RCA
 - (4) Sometimes LAD, sometimes RCA
77. Chest X-ray findings of Ebsteins anomaly include all the following except :
- (1) Enlarged main pulmonary artery
 - (2) Decreased pulmonary vascular markings
 - (3) Rightward displacement of right heart border
 - (4) Leftward displacement of left heart border
78. Main blood supply for the pericardium comes from the :
- (1) Right coronary
 - (2) Left coronary
 - (3) Vasa-vasorum of the ascending aorta
 - (4) Descending aorta
79. One MET on exercise is equivalent to oxygen consumption of :
- (1) 4.0 ml O₂/min/kg body weight
 - (2) 4.5 ml O₂/min/kg body weight
 - (3) 3.0 ml O₂/min/kg body weight
 - (4) 3.5 ml O₂/min/kg body weight

80. Pressures in the renal vessels are all EXCEPT :
- (1) The afferent arteriolar pressure is 90
 - (2) The glomerular capillary pressure is 50
 - (3) The efferent arteriolar pressure is 25
 - (4) The medullary capillary pressure is 15
81. The heart tube cephalic to caudal has :
- (1) Sinus venosus, endocardial cushions, bulbus cordis
 - (2) Bulbus cordis, endocardial cushions, sinus venosus
 - (3) Endocardial cushion, bulbus cordis, sinus venosus
 - (4) Sinus venosus, bulbus cordis, endocardial cushions
82. Which of the following does not determine cardiac output :
- (1) Heart rate
 - (2) Central venous pressure
 - (3) Left ventricular preload
 - (4) Systemic blood pressure
83. Reverse splitting of S_2 is seen in :
- (1) LBBB
 - (2) RBBB
 - (3) LV paced beats
 - (4) LV ectopic beats
84. Dicrotic notch in normal pulse indicates
- (1) Opening of the mitral valve
 - (2) Closure of the aortic valve
 - (3) Opening of the aortic valve
 - (4) Closure of the mitral valve
85. The fetal heart is completely formed by the :
- (1) 6th week
 - (2) 8th week
 - (3) 10th week
 - (4) 12th week

86. Cornell voltage criterion is :
- (1) $SV_1 + (RV_5 \text{ or } RV_6) > 3.5 \text{ mV}$
 - (2) R in aVL $> 1.1 \text{ mV}$
 - (3) $SV_3 \text{ or } RaVL > 2.8 \text{ mV}$ (in men)
 - (4) $SV_1 \text{ or } Rv_5 > 3.0 \text{ mV}$
87. QRS axis is rightward in all EXCEPT :
- (1) RV VT
 - (2) RBBB
 - (3) left posterior hemiblock
 - (4) hypoplastic LV
88. MI changes in left bundle branch block include :
- (1) Q waves in lateral leads
 - (2) T wave axis similar to QRS axis
 - (3) ST elevation in lateral leads
 - (4) All of the above
89. VT of RBBB morphology will have R wave in :
- (1) V1
 - (2) lead I
 - (3) lead II
 - (4) aVR
90. An ectopic from the RVOT will show the pattern of :
- (1) Inferior axis, LBBB pattern
 - (2) Right axis, RBBB
 - (3) superior axis, RBBB
 - (4) Left axis, LBBB
-