For the following questions, indicate the letter that corresponds to the SINGLE MOST APPROPRIATE ANSWER.

1. During thoracic surgery, the left greater splanchnic nerve was damaged. In your discussions with a classmate, the two of you decide that all of the following statements concerning the greater splanchnic nerve are correct EXCEPT that it
   A. arises from neurons whose cell bodies are in spinal cord levels T5-9.
   B. contains preganglionic sympathetic fibers and general visceral afferent fibers.
   C. contains sympathetic fibers that innervate the abdominal viscera.
   D. sends fibers into spinal nerves via the gray rami communicantes.

2. A total loss of BOTH motor and sensory innervation in the anterior thoracic wall could result from an injury to the
   A. dorsal root ganglia.
   B. white rami communicantes.
   C. dorsal primary rami.
   D. ventral roots of spinal nerves.
   E. ventral primary rami.

3. A marble-sized tumor located just superior to the root of the right lung would directly compress the
   A. hemiazygos vein.
   B. azygos vein.
   C. right subclavian vein.
   D. right brachiocephalic vein.
   E. accessory hemiazygos vein.

4. If a blood clot blocks the circumflex branch of the left coronary artery in a patient with typical coronary circulation, which area of heart musculature is most likely to be ischemic?
   A. Posterior part of the right ventricle
   B. Anterior interventricular region
   C. Posterior part of the left ventricle
   D. Posterior interventricular region
   E. Anterior part of the right ventricle
5. A 40-year-old man is admitted to the emergency department after a motor vehicle accident. During the accident, he was thrown against the steering wheel. This blunt force trauma caused direct branches of the descending aorta to be torn. These branches could include all of the following vessels EXCEPT for the

A. pericardial arteries.
B. posterior intercostal arteries.
C. left common carotid artery.
D. left bronchial arteries.
E. esophageal arteries.

6. During repair of a heart defect, the surgeon was careful to avoid suturing the blood vessel that in most cases supplies the sinuatrial (SA) node. This vessel usually originates from a branch of the

A. left coronary artery.
B. circumflex branch of the left coronary artery.
C. anterior interventricular artery (LAD).
D. right coronary artery.
E. right marginal artery.

7. A 50-year-old man was admitted to the hospital after he had a heart attack. The thoracic surgeon determined that this patient needed triple-bypass surgery. One of the occluded vessels was the posterior interventricular artery. Which of the following venous structures is associated with this artery?

A. Small cardiac vein
B. Great cardiac vein
C. Coronary sinus
D. Anterior cardiac vein
E. Middle cardiac vein

8. A patient is admitted to the emergency department with life-threatening complications resulting from a large embolus in a branch of the right pulmonary artery. This embolus could have traveled in the

A. right pulmonary vein.
B. right coronary artery.
C. left brachiocephalic vein.
D. left ventricle.
E. left atrium.
9. During surgery involving the coronary arteries, the surgeon will usually locate the right coronary artery in the

A. anterior interventricular groove.
B. posterior interventricular groove.
C. right atrioventricular (coronary) sulcus.
D. left atrioventricular (coronary) sulcus.
E. sulcus terminalis.

10. It was the first time that a third-year UC medical student was assisting in an open-heart surgical procedure to repair an interventricular septal defect. He recognized some cord-like structures as chordae tendinae and recalled that these are associated with which of the following pairs of valves?

A. Pulmonary and aortic
B. Right and left atrioventricular
C. Right atrioventricular and pulmonary
D. Left atrioventricular and aortic
E. Valves of the coronary sinus and inferior vena cava

11. In an automobile accident, the victim was hurled against the steering wheel, fracturing the manubrium. The first structure pierced by the sharp bony fragments would most likely be the

A. pericardial sac.
B. esophagus.
C. trachea.
D. left brachiocephalic vein.
E. right common carotid artery.

12. A 47-year-old woman was diagnosed with pneumonia. Her physician knew that all of the following statements about both lungs or both pleural cavities are correct EXCEPT that

A. a bronchopulmonary segment is a region of lung supplied by a segmental (tertiary) bronchus and artery.
B. intercostal nerves contain pain fibers from costal pleura.
C. the apex of each lung lies in the neck.
D. the cardiac notch is a deep indentation on the superior lobes.
E. in the costodiaphragmatic recess, two layers of parietal pleura are separated by a thin film of serous fluid.
13. A radiology resident examined an MR image that was a transverse (horizontal) slice through the trunk at the level of the T6 vertebral body. Structures that are normally present at this level include all of the following EXCEPT the

A. carina of the trachea.
B. right atrium.
C. thoracic duct.
D. lower lobe of the right lung.
E. esophagus.

14. Metastatic tumors spread throughout the pleural cavity and infiltrated the parietal pleura of a 72-year-old woman. Her oncologist knew that all of the following statements about the parietal pleura are correct EXCEPT that the

A. parietal pleura receives sensory innervation from intercostal and phrenic nerves.
B. pulmonary ligament extends inferiorly from the hilum of the lung.
C. pleural recesses are formed between two layers of the parietal pleura.
D. parietal pleura in the right pleural cavity is continuous with parietal pleura in the left pleural cavity.
E. parietal pleura extends into the neck.
Please answer questions 15 and 16 using the picture below.

15. Following a session on physical examination of the chest, a medical student listened for sounds of the heart valves in her children. She heard pulmonary valve sounds by placing the receiver of a stethoscope over the area shown in the picture above that is labeled

A. A.
B. B.
C. C.
D. D.
E. E.

16. During a surgical procedure involving the anterior chest wall, an incision was made in the area labeled “B” in the picture above, to a depth that permitted exposure of the parietal pleura. The incision would pass through skin and superficial fascia, followed by which of the following superficial-to-deep sequences?

A. external intercostal membrane, internal intercostal muscle, transversus thoracis muscle, internal thoracic vessels.
B. external intercostal muscle, internal intercostal muscle, transversus thoracis muscle, internal thoracic vessels.
C. external intercostal muscle, internal intercostal membrane, transversus thoracis muscle, internal thoracic vessels.
D. external intercostal membrane, internal intercostal muscle, internal thoracic vessels, transversus thoracis muscle.
E. external intercostal muscle, internal intercostal membrane, internal thoracic vessels, transversus thoracis muscle.
17. In an anterior-posterior X-ray of the chest, the right atrium of the heart is usually located in a region that is marked in the picture above by a black dot that is labeled

A. A  
B. B  
C. C  
D. D  
E. E

18. In order to infuse a local anesthetic a needle was inserted in an anterior to posterior direction into the area marked “1” in the drawing above. If this needle penetrates too deeply, there could be perforation of the

A. arch of the aorta.  
B. right primary bronchus.  
C. mediastinal pleura.  
D. right lung.  
E. right pulmonary vein.
19. During open-heart surgery, a cardiac surgeon slipped her index finger into the transverse pericardial sinus. Her index finger was then located immediately

A. anterior to the ascending aorta.
B. posterior to the right brachiocephalic vein.
C. anterior to the left subclavian artery.
D. posterior to the pulmonary trunk.
E. posterior to the superior vena cava.

20. A 45-year-old man was repeatedly stabbed by an attacker with a knife which had a seven-inch blade. One of the stabs produced a deep horizontal wound through the left 5th intercostal space in the midaxillary line. This stab wound most likely damaged the

A. parietal pericardium.
B. arch of the aorta.
C. middle lobe of the lung.
D. liver.
E. trachea.

21. During surgery in the superior mediastinum, the thoracic surgeon expected to find all of the following structures EXCEPT the

A. arch of the aorta.
B. right brachiocephalic vein.
C. thoracic duct.
D. pulmonary trunk.
E. esophagus.

22. During a review of the radiological examination of a patient’s respiratory passageways, the radiologist knew that

A. the trachea bifurcates into the two main bronchi at the level of the sternal angle.
B. inspired foreign bodies usually lodge in the left main bronchus.
C. the arch of the aorta lies posterior to the terminal part of the trachea.
D. the left main bronchus crosses posterior to the esophagus.
E. the left vagus nerve passes anterior to the left main bronchus.
23. While reviewing your anatomy in preparation for surgery to remove an esophageal tumor, you realize that all of the following statements about the esophagus in its course through the thorax are correct EXCEPT that it

A. is slightly constricted where it is crossed by the left main bronchus.
B. comes into contact with the pericardial sac.
C. is closely related to the thoracic duct.
D. passes posterior to the aorta to go through the diaphragm.
E. is supplied by branches from the descending (thoracic) aorta.

24. A 68-year-old man has difficulty swallowing solids. He has a history of chronic cardiovascular disease. X-ray films of the esophagus with barium contrast show indentation and posterior displacement of the esophagus. Enlargement of which of the following structures is the MOST LIKELY cause?

A. Left lung
B. Right atrium
C. Superior vena cava
D. Right lung
E. Left atrium

25. A 63-year-old man is undergoing surgical removal of a cancerous right lung. Which of the following structures, passing posterior to the root of the lung, is MOST LIKELY to be injured during this procedure?

A. Right phrenic nerve
B. Aorta
C. Inferior vena cava
D. Hemiazygos vein
E. Right vagus nerve

26. Elaboration of the blood vessel network in the developing embryo occurs by all of the following mechanisms EXCEPT

A. formation of new angiocysts and angioblastic cords (de novo formation).
B. longitudinal division of existing vessels.
C. incorporation of mesenchymal cells from the surrounding tissue into the vessel wall.
D. sprouting of new vessels from preexisting ones (angiogenesis).
27. Embryonic folding plays a role in all of the following features of the developing circulatory system EXCEPT
   A. relocation of the heart to a position caudal to the future brain.
   B. relocation of the heart to a position ventral to the foregut.
   C. fusion of the left and right endocardial tubes.
   D. formation of the sixth aortic arches.

28. Using advanced ultrasound technology, you notice that a developing embryo is missing its left 6\textsuperscript{th} aortic arch. If this fetus survives, you expect that he will be missing
   A. portions of the dorsal aorta.
   B. portions of the left subclavian artery.
   C. the aortic arch.
   D. the ligamentum arteriosum.
   E. the left common carotic artery.

29. Lateral branches of the dorsal aorta will vascularize the
   A. digestive tract.
   B. gonads.
   C. heart.
   D. brain.
   E. posterior body wall.

30. All of the following contribute to the formation of the definitive inferior vena cava EXCEPT the
   A. cardinal system.
   B. vitelline system.
   C. subcardinal system.
   D. umbilical system.
   E. supracardinal system.

31. The azygos vein is derived from the
   A. cardinal system.
   B. vitelline system.
   C. subcardinal system.
   D. umbilical system.
   E. supracardinal system.
32. Failure of the right dorsal aorta to regress between the 3rd and 4th aortic arches would result in what anomalous structure?

A. Anastomosis between the right subclavian and right common carotid arteries  
B. Abnormal location of the right recurrent laryngeal nerve to a position near the aortic arch  
C. Retention of the right stapedial artery  
D. Double aortic arch  
E. Absence of the brachiocephalic artery

33. Which of the following is derived from somatopleuric mesoderm?

A. Parietal pericardium  
B. Visceral pericardium  
C. Myocardium  
D. Cardiac jelly  
E. Endocardium

34. The conus cordis gives rise to the

A. right atrium.  
B. left atrium.  
C. right ventricle.  
D. left ventricle.  
E. pulmonary trunk.

35. The primitive atrium contributes to which of the following definitive structures of the right atrium?

A. Pectinate muscles  
B. Sinus venarum  
C. Valve of the coronary sinus  
D. Valve of the inferior vena cava  
E. Sinuatrial node

36. After formation of the atrial septum in the fetus, blood can be shunted from the right atrium to the left atrium by passing through what combination of openings?

A. Foramen ovale and ostium primum  
B. Foramen ovale and ostium secundum  
C. Ostium primum and ostium secundum  
D. Foramen ovale and atroventricular canal  
E. Ostium primum and atroventricular canal
37. Which of the following structures are formed by erosion of preexisting tissue?

A. Muscular interventricular septum
B. Foramen ovale
C. Pulmonary semilunar valve
D. Left atrioventricular valve
E. Septum intermedium

38. Complete separation of the right and left ventricles involves fusion of the truncoconal septum with all of the following structures EXCEPT the

A. right and left endocardial cushions.
B. septum intermedium.
C. muscular interventricular septum.
D. ventricular walls.
E. walls of the inferior portion of the truncus arteriosus.

39. Misalignment of the membranous truncoconal septum, and subsequent failure of that septum to fuse with the muscular interventricular septum, gives rise to an overriding aorta, ventricular septal defect, pulmonary stenosis, right ventricular hypertrophy, and an abnormal origin of the mitral valve from the right ventricle. This abnormality is called

A. Ebstein’s disease.
B. atrial septal defect.
C. tetralogy of Fallot.
D. transposition of the great vessels.
E. dextrocardia.

40. All of the following statements concerning fetal circulation are correct EXCEPT that

A. blood returns to the fetus from the placenta through a derivative of the subcardinal system.
B. blood pressure in the right atrium exceeds blood pressure in the left atrium.
C. a small volume of blood flows through the vessels in the lungs.
D. oxygen-poor blood flows through the ductus arteriosus.
E. oxygen-rich blood flows through the foramen ovale.

Answers: 1d2e3b4c5c6d7e8c9c10b11d12d13a14d15d16d17c18d19d20a21d22a23d24e25e26b27d28d29b30d31e32a33a34c35a36b37d38a39c40a