1. A 45-year-old man was injured in a serious car crash. During surgery to repair his injuries, a clamp was placed at the origin of the internal iliac artery to momentarily stop blood flow. All of the following arteries would have reduced blood flow EXCEPT for the
   A. middle rectal artery.
   B. inferior gluteal artery.
   C. inferior vesical artery.
   D. inferior epigastric artery.
   E. internal pudendal artery.

2. The aponeurosis of the external oblique muscle contributes to the formation of all of the following EXCEPT for the
   A. inguinal ligament.
   B. anterior wall of the rectus sheath.
   C. conjoint tendon.
   D. linea alba.
   E. external spermatic fascia.

3. During a laparoscopic procedure, it is possible to observe the median umbilical ligament extending from the
   A. umbilical artery.
   B. external iliac artery.
   C. urinary bladder.
   D. common iliac artery.
   E. inferior epigastric artery.

4. A tumor compressing structures passing through the lesser sciatic foramen could cause a partial loss of innervation to all of the following EXCEPT for the
   A. external anal sphincter.
   B. skin lining the vestibule of the vagina.
   C. ischiocavernosus muscles.
   D. detrusor muscle of the bladder.
   E. deep transverse perineus muscle.
5. A 50-year-old man went to his physician complaining of difficulty when swallowing food. A barium swallow demonstrated a narrowing of the abdominal esophagus due to a tumor. A biopsy performed endoscopically indicated that the tumor was cancerous. During surgery to remove the tumor, the surgeon also removed all of the lymph nodes associated with the

A. right gastric artery.
B. left gastric artery.
C. right gastroepiploic artery.
D. left gastroepiploic artery.
E. short gastric arteries.

6. A 60-year-old man with a direct inguinal hernia is found to have a portion of small intestine in a hernial sac emerging from the superficial inguinal ring. The hernial sac is compressing a nerve usually found on the lateral aspect of the spermatic cord. Which of the following functions would be affected?

A. Motor innervation to the transversus abdominis muscle
B. Sensation from the dorsum of the penis
C. Motor innervation to the cremaster muscle
D. Sensation from the anterior surface of the scrotum
E. Motor innervation to the lower portion of the rectus abdominis muscle

7. The surgeon ligated the patient’s gastroduodenal artery because it had been eroded by a duodenal ulcer. Postoperatively, the head of the pancreas still received an adequate blood supply from branches of the

A. proper hepatic artery.
B. common hepatic artery.
C. right suprarenal arteries.
D. superior mesenteric artery
E. left gastric artery.

8. In order to drain fluid from a testicular hydrocele, you pass a needle through the skin of the anterior wall of the scrotum. The needle passes through all of the following structures EXCEPT for the

A. dartos fascia/tunic.
B. tunica albuginea.
C. internal spermatic fascia.
D. parietal layer of the tunica vaginalis.
E. external spermatic fascia.
9. During resection of the distal portion of the ileum, the cecum, the ascending colon and the proximal two-thirds of the transverse colon, arteries supplying these structures were ligated. The remaining portion of the transverse colon could still receive an adequate blood supply from branches of the

   A. right colic artery.
   B. left colic artery.
   C. middle colic artery.
   D. ileocolic artery.
   E. sigmoidal arteries.

10. The left kidney of a 15-year-old boy was removed and used as a transplant for his identical twin brother. The boy’s suprarenal gland was left intact, including its direct venous drainage into the

   A. renal vein.
   B. inferior vena cava.
   C. inferior phrenic vein.
   D. testicular vein.
   E. lumbar vein.

11. Which of the following pairs of ligaments are formed from obliterated fetal blood vessels?

   A. Medial and lateral umbilical
   B. Falciform and median umbilical
   C. Hepatoduodenal and hepatogastric
   D. Coronary and falciform
   E. Ligamentum teres hepatis and medial umbilical

12. An aneurysm ballooning anteriorly at the origin of the superior mesenteric artery would most likely compress the

   A. portal vein.
   B. pancreas.
   C. third part of the duodenum.
   D. second part of the duodenum.
   E. quadrate lobe of the liver.
13. An inebriated 65-year-old man wandered into the emergency department with fresh bloodstains on his shirt. His companion explained that his friend had been coughing up blood. A preliminary examination revealed that the liver was enlarged. You suspect that the man was bleeding from esophageal varices. These varices are engorged veins in the esophageal mucosa forming anastomoses between the

   A. right and left gastric veins.
   B. right gastric vein and splenic vein.
   C. left gastric vein and the azygos system of veins.
   D. short gastric veins and the azygos system of veins.
   E. short gastric veins and the left gastric vein.

14. A tumor compressing the superior hypogastric plexus could affect all of the following EXCEPT for

   A. preganglionic sympathetic fibers.
   B. postganglionic sympathetic fibers.
   C. parasympathetic fibers from the vagus nerves.
   D. visceral afferent fibers.
   E. fibers from the lumbar splanchnic nerves.

15. Pain associated with pathology of the pylorus of the stomach is carried by GVA fibers traveling in

   A. the lumbar splanchnic nerves.
   B. nerves from spinal cord levels T-10 and T-11.
   C. the greater splanchnic nerves.
   D. nerves from spinal cord levels L-1 and L-2.
   E. the superior mesenteric plexus.

16. A 40-year-old man is being treated as he passes a kidney stone. The physician believes that the stone is probably lodged in the right ureter as it enters the bladder. He knows this because the patient is complaining of severe pain in the

   A. epigastric region.
   B. umbilical region.
   C. right upper quadrant.
   D. right inguinal region.
   E. right hypochondriac region.
17. After her third laparoscopic procedure, a 26-year-old woman complained of a “pins and needles” sensation localized to the skin just superior to her pubic crest. What nerve has most likely been irritated by the laparoscopic procedure and is responsible for her problem?

A. Ilioinguinal nerve  
B. Iliohypogastric nerve  
C. Genitofemoral nerve  
D. 10th intercostal nerve  
E. 8th intercostal nerve

18. A total vagotomy (sectioning of the anterior and posterior vagal trunks) was performed to treat a 64-year-old man suffering from chronic gastric and duodenal ulcers that were unresponsive to pharmacological treatment. All of the following portions of the gastrointestinal tract would have decreased peristaltic activity EXCEPT for the

A. stomach.  
B. descending colon.  
C. ascending colon.  
D. duodenum.  
E. ileum.

19. A feminizing, estrogen-producing adrenocortical carcinoma of the left suprarenal gland was diagnosed in a 47-year-old man with gynecomastia (breast enlargement). Compression of the adjacent celiac ganglion and plexus by the tumor could affect all of the following types of nerves EXCEPT for

A. postganglionic sympathetic fibers.  
B. preganglionic sympathetic fibers.  
C. preganglionic parasympathetic fibers.  
D. postganglionic parasympathetic fibers.  
E. visceral afferent fibers from the stomach.

20. Blood flow in the internal pudendal artery could be decreased as a result of a tumor located in all of the following areas EXCEPT for the

A. pudendal canal.  
B. lesser sciatic foramen.  
C. pelvic inlet.  
D. greater sciatic foramen.  
E. obturator canal.
21. A physician elicits the cremasteric reflex during the physical examination of a 10-year-old boy. This reflex

A. involves cutaneous nerves that innervate the area of the skin around the umbilicus.
B. involves elevation of the scrotum through contraction of the dartos muscle.
C. involves muscle fibers from the internal oblique muscle.
D. is used to test the integrity of spinal nerves L4-L5.
E. involves sympathetic fibers.

22. While reviewing abdominal vasculature, a second-year medical student remembered that the inferior vena cava receives blood directly from veins that drain all of the following structures EXCEPT for the

A. right ovary.
B. left lobe of the liver.
C. right suprarenal gland.
D. right psoas major muscle.
E. tail of the pancreas.

23. A 45-year-old man visited his physician complaining of a “pain in the gut”. This has been a problem for several months, especially after eating. He tried to self-medicate, but found no relief from taking antacids or eating a low-fat diet. His physician asked him to point to the “painful” region, which is outlined in the picture below. Based on the limited information provided here, of the following pathologies, the most likely cause of his pain is

A. an inflamed appendix.
B. kidney stones lodged in a ureter.
C. a chronic inflammation of the sigmoid colon.
D. a gastric ulcer.
E. carcinoma of the distal jejunum.
24. As the result of an argument in a bar, a 19-year-old man was stabbed in the chest. The tip of the knife entered the area marked by the arrowhead in the picture below, and traveled parallel to the ground to a depth of 3 inches. He was brought to an Emergency Department. During the examination, the clinician tested for a possible laceration of the

A. gallbladder.
B. stomach.
C. right kidney.
D. liver.
E. descending part of the duodenum.

25. On examination by his pediatrician, a 6-year-old boy had a mass in the lower abdominal area that appeared to be an indirect inguinal hernia. It bulged prominently at the minguinal line. At that level, the herniated mass, would be immediately surrounded by

A. transversalis fascia.
B. aponeurosis of the transversus abdominis muscle.
C. aponeurosis of the internal oblique muscle.
D. muscle fibers derived from the internal oblique muscle.
E. aponeurosis of the external oblique muscle.
26. A 32-year-old man was severely injured during a collision of his motorcycle with a minivan on I-75. On arrival at the Emergency Department of University Hospital, he was in shock and had evidence of abdominal bleeding. He was sent to the operating room for exploratory surgery. A midline incision was made along the black line, shown in the picture below, to enter the peritoneal cavity. In the incision, the scalpel cut through all of the following EXCEPT for the

A. linea alba.
B. rectus abdominis muscle.
C. transversalis fascia.
D. extraperitoneal connective tissue.
E. fibers from the external oblique aponeurosis.

![Incision Picture](image.png)

27. A 53-year-old woman underwent a laparoscopic removal of her gallbladder after repeated episodes of severe pain. On entrance into the peritoneal cavity, the surgeon observed adhesions of the gallbladder to adjacent structures, probably due to repeated inflammation of the organ. To remove the gallbladder, it was necessary to strip away the gallbladder from all of the following EXCEPT for the

A. parietal peritoneum.
B. the liver.
C. the transverse colon.
D. the duodenum.
E. the right kidney.
28. A third-year medical student assisted an obstetrician during a vaginal delivery. To prevent tearing of the tissue between the vagina and the anus, an episiotomy through the perineal body (central tendon of the perineum) was performed. All of the following muscles attach to this structure EXCEPT for the

A. superficial transverse perineus.
B. deep transverse perineus.
C. external anal sphincter.
D. bulbospongiosus.
E. ischiocavernosus.

29. An infection restricted to the deep perineal space of a 56-year-old man could directly damage which of the following structures?

A. Bulbospongiosus muscle
B. Sphincter urethrae muscle
C. Puborectalis muscle
D. Bulb of the penis
E. External anal sphincter

30. A 48-year-old woman visited her gynecologist for a routine yearly checkup. Her doctor found a cervical mass during the examination. A biopsy later confirmed a malignancy of the cervix. Where would cancer cells from this tumor initially metastasize?

A. Aortic (lumbar) lymph nodes
B. Internal iliac lymph nodes
C. Superficial inguinal lymph nodes
D. Deep inguinal lymph nodes
E. Inferior mesenteric lymph nodes

31. A 60-year-old woman went to see her gynecologist because she noticed that, while standing, she sometimes felt like something was “falling out”. Her doctor confirmed that she had a prolapsed uterus and needed surgery. The doctor further explained that this condition was due to weakening of the supportive ligaments of the uterus. Which of the following ligaments was probably involved?

A. Ovarian ligament
B. Transverse cervical (cardinal) ligament
C. Suspensory ligament of the ovary
D. Mesosalpinx
32. You assist a surgeon during a hysterectomy in a 47-year-old woman. The surgeon reminds you that, during this procedure, you have to be careful not to damage the ureters. Which of the following statements regarding the relation of the ureters to the pelvic organs is correct?

A. The ureters are intraperitoneal.
B. The ureters pass posterior to the external iliac arteries as they cross.
C. The ureters pass inferior to the uterine arteries as they cross.
D. The ureters pass inferior to the vaginal arteries as they cross.
E. The ureters enter the anterolateral aspect of the bladder.

33. A 28-year-old woman is administered a pudendal block before the vaginal delivery of her child. This procedure can easily be performed by anesthetizing the pudendal nerve as it passes over the

A. pubic symphysis.
B. posterior superior iliac spine.
C. coccyx.
D. ischial spine.
E. sacrotuberous ligament.

34. The general surgeon was required to enter the lesser sac (omental bursa) during removal of parts of the cancerous pancreas in a 67-year-old man. The surgeon knew that all of the following statements regarding the lesser sac are correct EXCEPT that

A. the lesser omentum forms its anterior wall.
B. it has an inferior recess which usually does not extend inferior to the transverse colon.
C. the pancreas lies in its posterior wall.
D. the quadrate lobe of the liver is a boundary of its superior recess.
E. it can be entered through the epiploic foramen.

35. A 72-year-old man was diagnosed with a tumor located in the porta hepatis. All of the following structures may be directly compressed by the tumor EXCEPT for

A. postganglionic sympathetic fibers.
B. the common hepatic duct.
C. the portal vein.
D. the hepatic veins.
E. the right hepatic artery.
36. Which of the following structures contain fibers conducting pain sensation from the region inferior to the pectinate line of the anal canal?

A. Pelvic splanchnic nerves  
B. Sacral splanchnic nerves  
C. Pudendal nerves  
D. Lumbar splanchnic nerves  
E. Inferior hypogastric plexuses

37. A 55-year-old woman had an obstruction of the second part of her duodenum. Her physician knew that all of the following statements about the second part are correct EXCEPT that it

A. lies anterior to the right kidney.  
B. receives its preganglionic parasympathetic innervation from the vagus nerves.  
C. is secondarily retroperitoneal.  
D. receives the opening of the main pancreatic duct.  
E. passes inferior to the proximal part of the superior mesenteric artery.

38. One should avoid making a vertical incision through all of the layers of the abdominal wall immediately lateral to the rectus abdominis muscle. A consequence of such an incision would be loss of

A. innervation to the transversus abdominis muscle.  
B. the primary arterial supply to the rectus abdominis muscle.  
C. sensation from the inguinal region.  
D. innervation to the internal oblique muscle.  
E. sensation from the skin around the umbilicus.

39. Congenital pulmonary hypoplasia, due to a diaphragmatic hernia, typically involves failure or incomplete development of the

A. septum transversum.  
B. pleuropitoneal membrane.  
C. pleuropericardial fold.  
D. esophageal mesoderm of the diaphragm.  
E. body wall mesoderm of the diaphragm.
40. During abdominal surgery, you find it necessary to clamp the inferior vena cava just superior to the location where the renal veins drain into it. You do this with confidence, because you recall an anastomosis of the inferior vena cava with a system of veins that drain the body wall and return blood to the superior vena cava. The precursor of this alternate route of venous return was the

A. umbilical system.
B. vitelline system.
C. posterior cardinal system.
D. subcardinal system.
E. supracardinal system.

41. Which of the following pairs of ligaments are derived from the dorsal mesentery of the stomach?

A. Hepatogastric and gastroplenic
B. Splenorenal (lienorenal) and hepatoduodenal
C. Gastroplenic and splenorenal (lienorenal)
D. Gastrosplenic and hepatoduodenal
E. Hepatogastric and splenorenal (lienorenal)

42. A mother brings her newborn daughter into your clinic, complaining that her child vomits everything that she consumes. Examination of the child reveals that she has a constriction of the duodenum, preventing the movement of contrast solution past the point of constriction. You suspect that this patient has a congenital anomaly known as an annular pancreas. You recall that the most likely cause of an annular pancreas is due to

A. a gallbladder that sprouts from the main pancreatic duct.
B. liver bud development that envelops the duodenum.
C. two ventral pancreatic buds that rotate around the duodenum in opposite directions.
D. an enlarged dorsal pancreatic bud that envelops the duodenum.
E. sprouting of the pancreatic bud from the jejunum.

43. As a physician of the mid-21st century, you are using the latest techniques to observe the development of an unborn fetus. The view that you can obtain using this technique is an anterior-posterior one, in which you can visualize the development of the digestive tract. By observing the fetus at different times you are satisfied because, by the end of development, the gut rotated a total of

A. 180° clockwise.
B. 270° clockwise.
C. 90° counterclockwise.
D. 180° counterclockwise.
E. 270° counterclockwise.
44. A Meckel’s diverticulum refers to a structure derived from the

A. vitelline duct.
B. allantois.
C. appendix.
D. greater omentum.
E. ventral mesentery.

45. During development of the urogenital system in a male fetus, the right ureteric bud sprouts as a single duct from the right mesonephric duct. However, this right ureteric bud divides before it reaches the metanephric blastema. The left ureteric bud develops normally. This newborn will likely have

A. Potter’s syndrome.
B. a bifid ureter.
C. an ectopic ureter.
D. oligohydramnios.
E. polycystic kidney disease.

46. The Rathke folds of the urorectal septum fail to develop in a female fetus. However, the paramesonephric ducts develop and migrate properly. This fetus will have a

A. rectovaginal fistula.
B. rectourethral fistula.
C. rectovesical fistula.
D. rectoprostatic fistula.

47. Which of the following conditions results in the leakage of urine from the umbilical cord?

A. Urachal cyst
B. Ectopic ureter
C. Urachal fistula
D. Horseshoe kidney
E. Urachal sinus

48. Which of the following structures is derived from mesoderm?

A. Bladder
B. Seminal vesicles
C. Prostate gland
D. Bulbourethral glands
E. Membranous urethra
49. Which of the following anomalies is **least likely** to occur as a result of fusion of the paramesonephric ducts?

   A. Double uterus and double vagina
   B. Single uterus and double vagina
   C. Single uterus and single vagina
   D. Double uterus and single vagina
   E. Single uterus with two uterine horns and single vagina

50. Formation of the male genital tubercle in the perineal region and improper fusion of the urethral groove may result in (a)

   A. male pseudohermaphrodite.
   B. epispadias.
   C. penile hypospadias.
   D. penoscrotal hypospadias.
   E. testicular hydrocele.

Answers:
1d2c34d5b6d7d8b9b10a11e12b13b14c15c16d17b18b19d20e21c22e23d24d25a26b27e28e29b30b31b32c33d34d35d36c37e38e39b40e41c42c43e44a45b46a47c48b49b50b