



CHAPTER 6 REVIEW TEST

Directions: Each of the numbered items or incomplete statements in this section is followed by answers or by completions of the statement. Select the one lettered answer or completion that is best in each case.

- A 68-year-old woman with uterine carcinoma undergoes surgical resection. This cancer can spread directly to the labia majora in lymphatics that follow which of the following structures?

 - Pubic arcuate ligament
 - Suspensory ligament of the ovary
 - Cardinal (transverse cervical) ligament
 - Suspensory ligament of the clitoris
 - Round ligament of the uterus
- A 17-year-old boy suffers a traumatic groin injury during a soccer match. The urologist notices tenderness and swelling of the boy's left testicle that may be produced by thrombosis in which of the following veins?

 - Left internal pudendal vein
 - Left renal vein
 - Inferior vena cava
 - Left inferior epigastric vein
 - Left external pudendal vein
- On a busy Saturday night in Chicago, a 16-year-old boy presents to the emergency room with a stab wound from a knife that enters the pelvis above the piriformis muscle. Which of the following structures is most likely to be damaged?

 - Sciatic nerve
 - Internal pudendal artery
 - Superior gluteal nerve
 - Inferior gluteal artery
 - Posterior femoral cutaneous nerve
- A 22-year-old woman receives a deep cut in the inguinal canal 1 inch lateral to the pubic tubercle. Which of the following ligaments is lacerated within the inguinal canal?

 - Suspensory ligament of the ovary
 - Ovarian ligament
 - Mesosalpinx
 - Round ligament of the uterus
 - Rectouterine ligament
- A 29-year-old carpenter sustains severe injuries of the pelvic splanchnic nerve by a deep puncture wound, which has become contaminated. The injured parasympathetic preganglionic fibers in the splanchnic nerve are most likely to synapse in which of the following ganglia?

 - Ganglia in or near the viscera or pelvic plexus
 - Sympathetic chain ganglia
 - Collateral ganglia
 - Dorsal root ganglia
 - Ganglion impar
- A 59-year-old woman comes to a local hospital for uterine cancer surgery. As the uterine artery passes from the internal iliac artery to the uterus, it crosses superior to which of the following structures that is sometimes mistakenly ligated during such surgery?

 - Ovarian artery
 - Ovarian ligament
 - Uterine tube
 - Ureter
 - Round ligament of the uterus
- A 29-year-old woman is admitted to a hospital because the birth of her child is several days overdue. Tearing of the pelvic diaphragm during childbirth leads to paralysis of which of the following muscles?

 - Piriformis
 - Sphincter urethrae
 - Obturator internus
 - Levator ani
 - Sphincter ani externus
- A 37-year-old small business manager receives a gunshot wound in the pelvic cavity, resulting in a lesion of the sacral splanchnic nerves. Which of the following nerve fibers would primarily be damaged?

 - Postganglionic parasympathetic fibers
 - Postganglionic sympathetic fibers
 - Preganglionic sympathetic fibers
 - Preganglionic parasympathetic fibers
 - Postganglionic sympathetic and parasympathetic fibers

9. A young couple is having difficulty conceiving a child. Their physician at a reproduction and fertility clinic explains to them that:
- (A) The ovary lies within the broad ligament
 - (B) The glans clitoris is formed from the corpus spongiosum
 - (C) Erection of the penis is a sympathetic response
 - (D) Ejaculation follows parasympathetic stimulation
 - (E) Fertilization occurs in the infundibulum or ampulla of the uterine tube.
10. A 46-year-old woman has a history of infection in her perineal region. A comprehensive examination reveals a tear of the superior boundary of the superficial perineal space. Which of the following structures would most likely be injured?
- (A) Pelvic diaphragm
 - (B) Colles' fascia
 - (C) Superficial perineal fascia
 - (D) Deep perineal fascia
 - (E) Perineal membrane
11. A 58-year-old man is diagnosed as having a slowly growing tumor in the deep perineal space. Which of the following structures would most likely be injured?
- (A) Bulbourethral glands
 - (B) Crus of penis
 - (C) Bulb of vestibule
 - (D) Spongy urethra
 - (E) Great vestibular gland
12. An elderly man with benign enlargement of his prostate experiences difficulty in urination, urinary frequency, and urgency. Which of the following lobes of the prostate gland is commonly involved in benign hypertrophy that obstructs the prostatic urethra?
- (A) Anterior lobe
 - (B) Middle lobe
 - (C) Right lateral lobe
 - (D) Left lateral lobe
 - (E) Posterior lobe
13. A 59-year-old man is diagnosed with prostate cancer following a digital rectal examination. For the resection of prostate cancer, it is important to know that the prostatic ducts open into or on which of the following structures?
- (A) Membranous part of the urethra
 - (B) Seminal colliculus
 - (C) Spongy urethra
 - (D) Prostatic sinus
 - (E) Prostatic utricle
14. A 29-year-old woman with a ruptured ectopic pregnancy is admitted to a hospital for culdocentesis. A long needle on the syringe is most efficiently inserted through which of the following structures?
- (A) Anterior fornix of the vagina
 - (B) Posterior fornix of the vagina
 - (C) Anterior wall of the rectum
 - (D) Posterior wall of the uterine body
 - (E) Posterior wall of the bladder
15. A 37-year-old man is suffering from carcinoma of the skin of the glans penis. Cancer cells are likely to metastasize directly to which of the following lymph nodes?
- (A) External iliac nodes
 - (B) Internal iliac nodes
 - (C) Superficial inguinal nodes
 - (D) Aortic (lumbar) nodes
 - (E) Common iliac nodes
16. A 42-year-old woman who has had six children develops a weakness of the urogenital diaphragm. Paralysis of which of the following muscles would cause such a symptom?
- (A) Sphincter urethrae
 - (B) Coccygeus
 - (C) Superficial transversus perinei
 - (D) Levator ani
 - (E) Obturator internus
17. A 43-year-old man has a benign tumor located near a gap between the arcuate pubic ligament and the transverse perineal ligament. Which of the following structures is most likely compressed by this tumor?
- (A) Perineal nerve
 - (B) Deep dorsal vein of the penis
 - (C) Superficial dorsal vein
 - (D) Posterior scrotal nerve
 - (E) Deep artery of the penis
18. An obstetrician performs a median episiotomy on a woman before parturition to prevent uncontrolled tearing. If the perineal body is damaged, the function of which of the following muscles might be impaired?
- (A) Ischiocavernosus and sphincter urethrae
 - (B) Deep transverse perineal and obturator internus

- (C) Bulbospongiosus and superficial transverse perineal
 (D) External anal sphincter and sphincter urethrae
 (E) Bulbospongiosus and ischiocavernosus
19. A 22-year-old man has a gonorrheal infection that has infiltrated the space between the inferior fascia of the urogenital diaphragm and the superficial perineal fascia. Which of the following structures might be inflamed?
- (A) Greater vestibular gland
 (B) Bulbourethral gland
 (C) Membranous part of the male urethra
 (D) Deep transverse perineal muscle
 (E) Sphincter urethrae
20. A 39-year-old man is unable to expel the last drops of urine from the urethra at the end of micturition because of paralysis of the external urethral sphincter and bulbospongiosus muscles. This condition may occur as a result of injury to which of the following nervous structures?
- (A) Pelvic plexus
 (B) Prostatic plexus
 (C) Pudendal nerve
 (D) Pelvic splanchnic nerve
 (E) Sacral splanchnic nerve
21. A 21-year-old marine biologist asks about her first bimanual examination and it is explained to her that the normal position of the uterus is:
- (A) Anteflexed and anteverted
 (B) Retroflexed and anteverted
 (C) Anteflexed and retroverted
 (D) Retroverted and retroflexed
 (E) Anteverted and retroverted
22. After his bath, but before getting dressed, a 4-year-old boy was playing with his puppy. The boy's penis was bitten by the puppy and the deep dorsal vein was injured. The damaged vein:
- (A) Lies deep to Buck's fascia
 (B) Drains into the prostatic venous plexus
 (C) Lies lateral to the dorsal artery of the penis
 (D) Is found in the corpus spongiosum
 (E) Is dilated during erection
23. A 62-year-old man is incapable of penile erection after rectal surgery with prostatectomy. The patient most likely has a lesion of which of the following nerves?
- (A) Dorsal nerve of the penis
 (B) Perineal nerve
 (C) Hypogastric nerve
 (D) Sacral splanchnic nerve
 (E) Pelvic splanchnic nerve
24. A 23-year-old massage therapist who specializes in women's health attends a lecture at an annual conference on techniques of massage. She asks which of the following structures is drained by the lumbar (aortic) lymph nodes?
- (A) Perineum
 (B) Lower part of the vagina
 (C) External genitalia
 (D) Ovary
 (E) Lower part of the anterior abdominal wall
25. A sexually active adolescent presents with an infection within the ischioanal fossa. Which of the following structures is most likely injured?
- (A) Vestibular bulb
 (B) Seminal vesicle
 (C) Greater vestibular gland
 (D) Inferior rectal nerve
 (E) Internal pudendal artery
26. A first-year resident in the urology department reviews pelvic anatomy before seeing patients. Which of the following statements is correct?
- (A) The dorsal artery of the penis supplies the glans penis
 (B) The seminal vesicles store spermatozoa
 (C) The duct of the bulbourethral gland opens into the membranous urethra
 (D) The duct of the greater vestibular gland opens into the vagina
 (E) The anterior lobe of the prostate gland is prone to carcinomatous transformation
27. A 43-year-old woman presents with a prolapsed uterus. Repair of a prolapsed uterus requires knowledge of the supporting structures of the uterus. Which of the following structures plays the most important role in the support of the uterus?
- (A) Levator ani
 (B) Sphincter urethrae
 (C) Uterosacral ligament
 (D) Ovarian ligament
 (E) Arcuate pubic ligament
28. A 16-year-old boy presents to the emergency department with rupture of the penile

urethra. Extravasated urine from this injury can spread into which of the following structures?

- (A) Scrotum
- (B) Ischiorectal fossa
- (C) Pelvic cavity
- (D) Testis
- (E) Thigh

29. A 23-year-old woman visits her obstetrician for an annual checkup. During vaginal examination, which of the following structures may be palpated?

- (A) Apex of the urinary bladder
- (B) Fundus of the uterus
- (C) Terminal part of the round ligament of the uterus
- (D) Body of the clitoris
- (E) Uterine cervix

30. A 53-year-old bank teller is admitted to a local hospital for surgical removal of a benign pelvic tumor confined within the broad ligament. There is a risk of injuring which of the following structures that lies in this ligament?

- (A) Ovary
- (B) Proximal part of the pelvic ureter
- (C) Terminal part of the round ligament of the uterus
- (D) Uterine tube
- (E) Suspensory ligament of the ovary

31. A 72-year-old man comes to his physician for an annual check-up. Which of the following structures is most readily palpated during rectal examination?

- (A) Prostate gland
- (B) Epididymis
- (C) Ejaculatory duct
- (D) Ureter
- (E) Testis

32. A 48-year-old college football coach undergoes a radical prostatectomy for a malignant tumor in his prostate. Following surgery, he is incapable of achieving an erection. Which of the following nerves is most likely damaged during the surgery?

- (A) Sacral splanchnic nerve
- (B) Pelvic splanchnic nerve
- (C) Pudendal nerve
- (D) Dorsal nerve of the penis
- (E) Posterior scrotal nerve

33. While performing a pelvic exenteration, the surgical oncologist notices a fractured or ruptured boundary of the pelvic inlet. Which of the following structures is most likely damaged?

- (A) Promontory of the sacrum
- (B) Anterior-inferior iliac spine
- (C) Inguinal ligament
- (D) Iliac crest
- (E) Arcuate pubic ligament

34. A 32-year-old patient with multiple fractures of the pelvis has no cutaneous sensation in the urogenital triangle. The function of which of the following nerves is most likely to be spared?

- (A) Ilioinguinal nerve
- (B) Iliohypogastric nerve
- (C) Posterior cutaneous nerve of the thigh
- (D) Pudendal nerve
- (E) Genitofemoral nerve

35. A 22-year-old victim of an automobile accident has received destructive damage to structures that form the boundary of the perineum. Which of the following structures is spared?

- (A) Pubic arcuate ligament
- (B) Tip of the coccyx
- (C) Ischial tuberosities
- (D) Sacrospinous ligament
- (E) Sacrotuberous ligament

36. A 32-year-old man undergoes vasectomy as a permanent birth control. A physician performing the vasectomy by making an incision on each side of the scrotum should remember which of the following statements is most applicable to the scrotum?

- (A) It is innervated by the ilioinguinal and genitofemoral nerves
- (B) It receives blood primarily from the testicular artery
- (C) Its venous blood drains primarily into the renal vein on the left
- (D) Its lymphatic drainage is primarily into upper lumbar nodes
- (E) Its dartos tunic is continuous with the perineal membrane

37. A 37-year-old woman complains of a bearing-down sensation in her womb and an increased frequency of and burning sensation on urination. On examination by her gynecologist, she is diagnosed with the uterine

prolapse. Which of the following structures provides the primary support for the cervix of the uterus?

- (A) External anal sphincter
- (B) Broad ligament of the uterus
- (C) Cardinal (transverse cervical) ligament
- (D) Round ligament of the uterus
- (E) Suspensory ligament of the ovary

38. A woman is delivering a breech baby. The obstetrician decides it is best to perform a mediolateral episiotomy. Which of the following structures, should the obstetrician avoid incising?

- (A) Vaginal wall
- (B) Superficial transverse perineal muscle
- (C) Bulbospongiosus
- (D) Levator ani
- (E) Perineal membrane

39. During pelvic surgery, a surgeon notices severe bleeding from the artery that remains within the true pelvis. Which of the following arteries is most likely to be injured?

- (A) Iliolumbar artery
- (B) Obturator artery
- (C) Uterine artery
- (D) Internal pudendal artery
- (E) Inferior gluteal artery

40. A neurosurgeon performs surgical resection of a rare meningeal tumor in the sacral region. He tries to avoid an injury of the nerve that arises from the lumbosacral plexus and remains within the abdominal or pelvic cavity. To which of the following nerves should he pay particular attention?

- (A) Ilioinguinal nerve
- (B) Genitofemoral nerve
- (C) Lumbosacral trunk
- (D) Femoral nerve
- (E) Lateral femoral cutaneous nerve

41. After repair of a ruptured diverticulum, a 31-year-old patient begins to spike with fever and complains of abdominal pain. An infection in the deep perineal space would most likely damage which of the following structures?

- (A) Ischiocavernosus muscles
- (B) Superficial transverse perineal muscles
- (C) Levator ani
- (D) Sphincter urethrae
- (E) Bulbospongiosus

42. A radiologist interprets a lymphangiogram for a 29-year-old patient with metastatic carcinoma. Upper lumbar nodes most likely receive lymph from which of the following structures?

- (A) Lower part of the anal canal
- (B) Labium majus
- (C) Clitoris
- (D) Testis
- (E) Scrotum

43. A 49-year-old woman has a large mass on the pelvic brim. Which of the following structures was most likely compressed by this mass when crossing the pelvic brim?

- (A) Deep dorsal vein of the penis
- (B) Uterine tube
- (C) Ovarian ligament
- (D) Uterine artery
- (E) Lumbosacral trunk

44. A 26-year-old man comes to a hospital with fever, nausea, pain, and itching in the perineal region. On examination by an urologist, he is diagnosed as having infected bulbourethral (Cowper's) glands. Which of the following structures is affected by this infection?

- (A) Superficial perineal space.
- (B) Sphincter urethrae.
- (C) Production of sperm.
- (D) Testis
- (E) Seminal vesicles

45. A 21-year-old man is involved in a high-speed motor vehicle accident. As a result, he has extensive damage to his sphincter urethrae. Which of the following statements best explains the injured sphincter urethrae?

- (A) Smooth muscle
- (B) Innervated by the perineal nerve
- (C) Lying between the perineal membrane and Colles' fascia
- (D) Enclosed in the pelvic fascia
- (E) Part of the pelvic diaphragm

46. An obstetrician is about to perform a pudendal block so a woman can experience less pain when she delivers her child. He recalls what he learned in medical school about this nerve:

- (A) It passes superficial to the sacrotuberous ligament
- (B) It innervates the testis and epididymis in a male

- (C) It provides motor fibers to the coccygeus
- (D) It can be blocked by injecting an anesthetic near the inferior margin of the ischial spine
- (E) It arises from the lumbar plexus

47. A trauma surgeon in the emergency room at a local center examines a 14-year-old boy with extensive pelvic injuries after a hit and run accident. The surgeon inspects the ischiorectal fossa because it:

- (A) Accumulates urine leaking from rupture of the bulb of the penis
- (B) Contains the inferior rectal vessels
- (C) Has a pudendal canal along its medial wall
- (D) Is bounded anteriorly by the sacrotuberous ligament
- (E) Contains a perineal branch of the fifth lumbar nerve

48. An elderly man with prostatitis is seen at an internal medicine clinic. The seminal colliculus of his prostate gland is infected, and its fine openings are closed. Which of the following structures is most likely to be disturbed?

- (A) Ducts of the prostate gland
- (B) Prostatic utricle
- (C) Ducts of the bulbourethral glands
- (D) Ejaculatory ducts
- (E) Duct of the seminal vesicles

49. A general surgeon is giving a lecture to a team of surgery residents. She describes characteristics of structures above the pectinate line of the anal canal, which include

- (A) Stratified squamous epithelium
- (B) Venous drainage into the caval system

- (C) Lymphatic drainage into the superficial inguinal nodes
- (D) Visceral sensory innervation
- (E) External hemorrhoids

50. A 78-year-old man has carcinoma of the rectum. The cancer is likely to metastasize via the veins into which of the following structures?

- (A) Spleen
- (B) Kidney
- (C) Liver
- (D) Duodenum
- (E) Suprarenal gland

Questions 51–55: Choose the appropriate lettered structure in this computed tomography (CT) scan (see bottom of page) of the female perineum and pelvis.

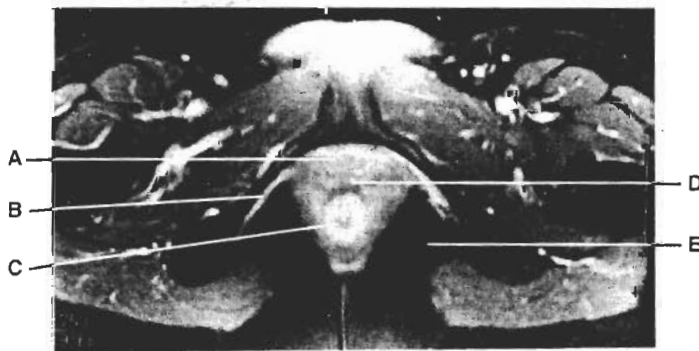
51. Which structure extends between the vestibule and the cervix of the uterus and serves as the excretory channel for the products of menstruation?

52. Which structure in the female that is much shorter than that in the male?

53. Into which structure does hemorrhage occur after injury to the inferior rectal vessels?

54. Which structure has Houston's valve or fold, with its venous blood drained by the portal venous system?

55. Which structure is innervated by the nerve passing through both the greater and lesser sciatic foramina?





Questions 56–60: Choose the appropriate lettered structure in this computed tomography (CT) scan (see above) of the male perineum and pelvis.

56. Which structure, when fractured, results in paralysis of the obturator internus muscles?

57. Which structure secretes fluid containing fructose, which allows for forensic determination of rape?

58. In which structure would ligation of the external iliac artery reduce blood pressure?

59. A knife wound to the obturator foramen might injure which structure?

60. A stab wound immediately superior to the pubic symphysis on the anterior pelvic wall would most likely injure which visceral organ first?



ANSWERS AND EXPLANATIONS

1. The answer is E. The round ligament of the uterus runs laterally from the uterus through the deep inguinal ring, inguinal canal, and superficial inguinal ring and becomes lost in the subcutaneous tissues of the labium majus. Thus, carcinoma of the uterus can spread directly to the labium majus by traveling in lymphatics that follow the ligament. The pubic arcuate ligament attaches across the inferior aspect of the pubic symphysis and attaches to the medial borders of the inferior pubic rami. The suspensory ligament of the ovary runs from the ovary to the pelvic wall and transmits the ovarian vessels. The cardinal (transverse cervical) ligament runs from the cervix and the vagina to the pelvic walls. The suspensory ligament of the clitoris runs from the pubic symphysis and the arcuate pubic ligament to the deep fascia of the body of the clitoris.
2. The answer is B. A tender swollen left testis may be produced by thrombosis in the left renal vein, because the left testicular vein drains into the left renal vein. The right testicular vein drains into the inferior vena cava. The left internal pudendal vein empties into the left internal iliac vein. The left inferior epigastric drains into the left external iliac vein and the left external pudendal vein empties into the femoral vein.
3. The answer is C. The superior gluteal nerve leaves the pelvis through the greater sciatic foramen, above the piriformis. The sciatic nerve, internal pudendal vessels, inferior gluteal vessels and nerve, and posterior femoral cutaneous nerve leave the pelvis below the piriformis.
4. The answer is D. The round ligament of the uterus is found in the inguinal canal along its course. Other ligaments are not passing through the inguinal canal.
5. The answer is A. The pelvic splanchnic nerves carry preganglionic parasympathetic general visceral efferent (GVE) fibers that synapse in the ganglia of the inferior hypogastric plexus and in terminal ganglia in the muscular walls of the pelvic organs. The sympathetic preganglionic fibers synapse in the sympathetic chain (paravertebral) ganglia or in the collateral (prevertebral) ganglia. The dorsal root ganglia contains cell bodies of general somatic afferent (GSA) and general visceral afferent (GVA) fibers and have no synapsis. The two sympathetic trunks unite and terminate in the ganglion impar (coccygeal ganglion), which is the most inferior, unpaired ganglion located in front of the coccyx.
6. The answer is D. The ureter runs under the uterine artery near the cervix; thus, the ureter is sometimes mistakenly ligated during pelvic surgery. The other structures mentioned are not closely related to the uterine artery near the uterine cervix.
7. The answer is D. The pelvic diaphragm is formed by the levator ani and coccygeus, whereas the urogenital diaphragm consists of the sphincter urethrae and deep transverse perinei muscles. The piriformis passes through the greater sciatic notch and inserts on the greater trochanter of the femur. The obturator internus forms the lateral wall of the ischiorectal fossa. The sphincter ani externus is composed of three layers, including the subcutaneous (corrugator cutis ani), superficial, and deep portions and maintains a voluntary tonic contracture.
8. The answer is C. The sacral splanchnic nerves consist primarily of preganglionic sympathetic neurons and also contain general visceral afferent (GVA) fibers. None of the other fibers listed are contained in these nerves.
9. The answer is E. Fertilization takes place in the infundibulum or ampulla of the uterine tube. The glans clitoris is derived from the corpora cavernosa, whereas the glans penis is the expanded terminal part of the corpus spongiosum. Erection of the penis is caused by parasympathetic stimulation, whereas ejaculation is mediated via the sympathetic nerve. The ovaries are not enclosed in the broad ligament, but their anterior surface is attached to the posterior surface of the broad ligament.

10. **The answer is E.** The superior (deep) boundary of the superficial perineal space is the perineal membrane (inferior fascia of the urogenital diaphragm). Colles' fascia is the deep membranous layer of the superficial perineal fascia. The deep perineal fascia essentially divides the superficial perineal space into a superficial and deep compartment. The pelvic diaphragm consists of the levator ani and coccygeus muscles.
11. **The answer is A.** The deep perineal space contains the bulbourethral (Cowper's) glands. The crus of the penis, bulb of the vestibule, spongy urethra, and great vestibular gland are found in the superficial perineal space.
12. **The answer is B.** The middle lobe of the prostate gland is commonly involved in benign prostatic hypertrophy, resulting in obstruction of the prostatic urethra, whereas the posterior lobe is commonly involved in carcinomatous transformation. The anterior lobe contains little glandular tissue, and the two lateral lobes on either side of the urethra form the major part of the gland.
13. **The answer is D.** Ducts from the prostate gland open into the prostatic sinus, which is a groove on either side of the urethral crest. The prostate gland receives the ejaculatory duct, which opens into the prostatic urethra on the seminal colliculus (a prominent elevation of the urethral crest) just lateral to the prostatic utricle, which is a small blind pouch. The bulbourethral gland lies on the lateral side of the membranous urethra within the deep perineal space, but its duct opens into the bulbous portion of the spongy (penile) urethra.
14. **The answer is B.** A needle should be inserted through the posterior fornix, just below the posterior lip of the cervix while the patient is in supine position, to aspirate abnormal fluid in the cul-de-sac of Douglas (rectouterine pouch). Rectouterine excavation is not most efficiently aspirated by puncture of other structures.
15. **The answer is C.** The superficial inguinal nodes receive lymph from the penis, scrotum, buttocks, labium majus, and the lower parts of the vagina and anal canal. These nodes have efferent vessels that drain primarily into the external iliac and common iliac nodes and ultimately to the lumbar (aortic) nodes. The internal iliac nodes receive lymph from the upper part of the rectum, vagina, uterus, and other pelvic organs, and they drain into the common iliac and then to the lumbar (aortic) nodes.
16. **The answer is A.** The urogenital diaphragm consists of the sphincter urethrae and deep transverse perineal muscles. Weakness of the muscles, ligaments, and fasciae of the pelvic floor such as the pelvic diaphragm, urogenital diaphragm, and cardinal (transverse cervical) ligaments occurs as result of multiple child delivery, advancing age, and menopause. The pelvic diaphragm is composed of the levator ani and coccygeus muscles. The superficial transverses perinei is one of the superficial perineal muscles and the obturator internus forms the lateral wall of the ischio-rectal fossa.
17. **The answer is B.** The deep dorsal vein, dorsal artery, and dorsal nerve of the penis pass through a gap between the arcuate pubic ligament and the transverse perineal ligament. The perineal nerve divides into a deep branch, which supplies all of the perineal muscles, and superficial branches as posterior scrotal nerves that supply the scrotum. The superficial dorsal vein of the penis empties into the greater saphenous vein. The deep artery of the penis runs in the corpus cavernosum penis.
18. **The answer is C.** The perineal body (central tendon of the perineum) is a fibromuscular node at the center of the perineum. It provides attachment for the bulbospongiosus, the superficial and deep transverse perineal muscles, and the sphincter ani externus muscles. Other muscles (ischio-cavernosus, sphincter urethrae, and obturator internus) are not attached to the perineal body.
19. **The answer is A.** The greater vestibular gland is located in the superficial perineal space between the inferior fascia of the urogenital diaphragm and the membranous layer of the superficial perineal fascia (Colles' fascia). All of the other structures are found in the deep perineal pouch.

20. The answer is C. The perineal branch of the pudendal nerve supplies the external urethral sphincter and bulbospongiosus muscles in the male. All other nervous structures do not supply skeletal muscles but supply smooth muscles in the perineal and pelvic organs. The pelvic and prostatic plexuses contain both sympathetic and parasympathetic nerve fibers. The pelvic splanchnic nerve carries preganglionic parasympathetic fibers, whereas the sacral splanchnic nerve transmits preganglionic sympathetic fibers.
21. The answer is A. The normal position of the uterus is anteverted (i.e., angle of 90 degrees at the junction of the vagina and cervical canal) and anteflexed (i.e., angle of 160 to 170 degrees at the junction of the cervix and body).
22. The answer is B. The deep dorsal vein of the penis lies medial to the dorsal artery of the penis on the dorsum of the penis and superficial to Buck's fascia, drains into the prostatic plexus of veins, and is compressed against the underlying deep fascia of the penis during erection.
23. The answer is E. The pelvic splanchnic nerve contains preganglionic parasympathetic fibers, whereas the sacral splanchnic nerve contains preganglionic sympathetic fibers. Parasympathetic fibers are responsible for erection, whereas sympathetic fibers are involved with ejaculation. The right and left hypogastric nerves contain primarily sympathetic fibers and visceral sensory fibers. The dorsal nerve of the penis and the perineal nerve provide sensory nerve fibers.
24. The answer is D. The lymphatic vessels from the ovary ascend with the ovarian vessels in the suspensory ligament and terminate in the lumbar (aortic) nodes. Lymphatic vessels from the perineum, external genitalia, and lower part of the anterior abdominal wall drain into the superficial inguinal nodes.
25. The answer is D. The ischiorectal fossa contains the inferior rectal nerves and vessels and adipose tissue. The bulb of the vestibule and the great vestibular gland are located in the superficial perineal space, whereas the bulbourethral gland is found in the deep perineal space. The internal pudendal artery runs in the pudendal canal, but its branches pass through the superficial and deep perineal spaces.
26. The answer is A. The dorsal artery of the penis supplies the glans penis. The seminal vesicles store no spermatozoa. The duct of the bulbourethral gland opens into the bulbous portion of the spongy urethra, whereas the greater vestibular gland opens into the vestibule between the labium minora and the hymen. The anterior lobe of the prostate is devoid of glandular substance, the middle lobe is prone to benign hypertrophy, and the posterior lobe is prone to carcinomatous transformation.
27. The answer is A. The pelvic diaphragm, particularly the levator ani, provides the most important support for the uterus, although the urogenital diaphragm and the uterosacral and ovarian ligaments support the uterus. The arcuate pubic ligament arches across the inferior aspect of the pubic symphysis.
28. The answer is A. Extravasated urine from the penile urethra below the perineal membrane spreads into the superficial perineal space, scrotum, penis, and anterior abdominal wall. However, it does not spread into the testis, ischiorectal fossa, pelvic cavity, and thigh because Scarpa's fascia ends by firm attachment to the fascia lata of the thigh.
29. The answer is E. In addition to the uterine cervix, the uterus, uterine tubes, ovaries, and ureters can be palpated. The apex of the urinary bladder is the anterior end of the bladder; thus, it cannot be palpated. The fundus of the uterus is anterosuperior part of the uterus. The terminal part of the round ligament of the uterus emerges from the superficial inguinal ring and becomes lost in the subcutaneous tissue of the labium majus.
30. The answer is D. The uterine tubes lie in the broad ligament. The anterior surface of the ovary is attached to the posterior surface of the broad ligament of the uterus. The ureter

descends retroperitoneally on the lateral pelvic wall but is crossed by the uterine artery in the base (in the inferomedial part) of the broad ligament. The terminal part of the round ligament of the uterus becomes lost in the subcutaneous tissue of the labium majus. The suspensory ligament of the ovary is a band of peritoneum that extends superiorly from the ovary to the pelvic wall.

31. **The answer is A.** The prostate gland may be palpated on rectal examination. The ejaculatory duct runs within the prostate gland and cannot be felt. In the male, the pelvic part of the ureter lies lateral to the ductus deferens and enters the posterosuperior angle of the bladder, where it is situated anterior to the upper end of the seminal vesicle, and thus cannot be palpated during rectal examination. However, in the female the ureter can be palpated during vaginal examination because it runs near the uterine cervix and the lateral fornix of the vagina to enter the posterosuperior angle of the bladder. The testis are examined during a routine annual check-up but obviously not during a rectal examination.

32. **The answer is B.** Parasympathetic preganglionic fibers in the pelvic splanchnic nerve are responsible for erection of the penis. Sympathetic preganglionic fibers in the sacral splanchnic nerve are responsible for ejaculation. The pudendal nerve supplies the external anal sphincter and perineal muscles and supplies general somatic afferent (GSA) fibers to the perineal region. The dorsal nerve of the penis is a terminal branch of the pudendal nerve and supplies sensation of the penis. The posterior scrotal nerves are superficial branches of the perineal nerve and supply sensory fibers to the scrotum.

33. **The answer is A.** The pelvic inlet (pelvic brim) is bounded by the promontory and the anterior border of the ala of the sacrum, the arcuate line of the ilium, the pectineal line, the pubic crest, and the superior margin of the pubic symphysis.

34. **The answer is B.** The iliohypogastric nerve innervates the skin above the pubis. The skin of the urogenital triangle is innervated by the pudendal nerve, perineal branches of the posterior femoral cutaneous nerve, anterior scrotal or labial branches of the ilioinguinal nerve, and the genital branch of the genitofemoral nerve.

35. **The answer is D.** The sacrospinous ligament forms a boundary of the lesser sciatic foramen. The pubic arcuate ligament, tip of the coccyx, ischial tuberosities, and sacrotuberous ligament all form part of the boundary of the perineum.

36. **The answer is A.** The scrotum is innervated by branches of the ilioinguinal, genitofemoral, pudendal, and posterior femoral cutaneous nerves. The scrotum receives blood from the posterior scrotal branches of the internal pudendal arteries and the anterior scrotal branches of the external pudendal arteries, but it does not receive blood from the testicular artery. Similarly, the scrotum is drained by the posterior scrotal veins into the internal pudendal vein. The lymph vessels from the scrotum drain into the superficial inguinal nodes, whereas the lymph vessels from the testis drain into the upper lumbar nodes. The dartos tunic is continuous with the membranous layer of the superficial perineal fascia (Colles' fascia).

37. **The answer is C.** The cardinal (transverse cervical) ligament provides the major ligamentous support for the uterus. The sphincter ani externus does not support the uterus. The broad and round ligaments of the uterus provide minor supports for the uterus. The suspensory ligament of the ovary does not support the uterus.

38. **The answer is D.** An obstetrician should avoid incising the levator ani and the external anal sphincter. The levator ani is the major part of the pelvic diaphragm, which forms the pelvic floor and supports all of the pelvic organs. None of the other choices applies here.

39. **The answer is C.** Of all the arteries listed, the uterine artery remains within the pelvic cavity.

40. The answer is C. The lumbosacral trunk is formed by part of the ventral ramus of the fourth lumbar nerve and the ventral ramus of the fifth lumbar nerve. This trunk contributes to the formation of the sacral plexus by joining the ventral ramus of the first sacral nerve in the pelvic cavity and does not leave the pelvic cavity. All other nerves leave the abdominal and pelvic cavities. The ilioinguinal nerve accompanies the spermatic cord or the round ligament of the uterus, continues through the inguinal canal, and emerges through the superficial inguinal ring. The genitofemoral nerve divides into a genital branch, which enters the inguinal canal through the deep inguinal ring and exits through the superficial inguinal ring and supplies the cremaster muscle and the scrotum or labium majus, and a femoral branch, which passes deep to the inguinal ligament and enters the femoral triangle. The femoral nerve enters the femoral triangle deep to the inguinal ligament and lateral to the femoral vessels and divides into numerous branches. The lateral femoral cutaneous nerve runs in front of the iliacus and behind the inguinal ligament and innervates the skin of the anterior and lateral thigh.
41. The answer is D. The sphincter urethrae is found in the deep perineal space, whereas the other structures are located in the superficial perineal space.
42. The answer is D. Lymphatic vessels from the testis and epididymis ascend along the testicular vessels in the spermatic cord through the inguinal canal and continue upward in the abdomen to drain into the upper lumbar nodes. The lymph from the other structures drains into the superficial inguinal lymph nodes.
43. The answer is E. All of the listed structures do not cross the pelvic brim except the lumbosacral trunk, which arises from L4 and L5, enters the true pelvis by crossing the pelvic brim, and contributes to the formation of the sacral plexus. The deep dorsal vein of the penis enters the pelvic cavity by passing under the symphysis pubis between the arcuate and transverse perineal ligaments.
44. The answer is B. The bulbourethral glands lie on either side of the membranous urethra, embedded in the sphincter urethrae. Their ducts open into the bulbous part of the penile urethra. Semen—a thick, yellowish white, viscous, spermatozoa-containing fluid—is a mixture of the secretions of the testes, seminal vesicles, prostate, and bulbourethral glands. Sperm, or spermatozoa, are produced in the seminiferous tubules of the testis and matured in the head of the epididymis. The seminal vesicles are lobulated glandular structures, produce the alkaline constituent of the seminal fluid that contains fructose and choline, and lie inferior and lateral to the ampullae of the ductus deferens against the fundus (base) of the bladder.
45. The answer is B. The sphincter urethrae is striated muscle that lies in the deep perineal space and forms a part of the urogenital diaphragm but not the pelvic diaphragm. It is not enclosed in the pelvic fascia. It is innervated by a deep (muscular) branch of the perineal nerve.
46. The answer is D. The pudendal nerve, which arises from the sacral plexus, provides sensory innervation to the labium majus (or scrotum in a male). It leaves the pelvis through the greater sciatic foramen and enters the perineum through the lesser sciatic foramen near the inferior margin of the ischial spine. Therefore, it can be blocked by injection of an anesthetic near the inferior margin of the ischial spine.
47. The answer is B. The ischiorectal fossa is bounded posteriorly by the gluteus maximus and the sacrotuberous ligament. It contains fat, the inferior rectal nerve and vessels, and perineal branches of the posterior femoral cutaneous nerve. The pudendal canal runs along its lateral wall. Urine leaking from a ruptured bulb of the penis does not spread into the ischiorectal fossa because Scarpa's fascia ends by firm attachment to the fascia lata of the thigh.
48. The answer is D. The ejaculatory ducts, which open onto the seminal colliculus, may be injured. The prostate ducts open into the urethral sinus, the bulbourethral ducts open into the bulbous part of the penile urethra, and the ducts of the seminal vesicle join the ampulla of the

ductus deferens to form the ejaculatory duct. The prostatic utricle is a minute pouch on the summit of the seminal colliculus.

49. **The answer is D.** The pectinate line is a point of demarcation between visceral and somatic portions of the anal canal. Characteristics above the pectinate line include columnar epithelium, venous drainage into the portal system, lymphatic drainage into the internal iliac nodes, visceral sensory innervation, and internal hemorrhoids.

50. **The answer is C.** Cancer cells from the rectal cancer are likely to metastasize to the liver via the superior rectal, inferior mesenteric, splenic, and portal veins. Cancer cells are not directly spread to the other organs listed. The spleen and duodenum drain their venous blood to the portal venous system and the kidney and suprarenal gland empty into the caval (inferior vena cava) system.

51. **The answer is D.** The vagina is the genital canal in the female, extending from the vestibule to the uterine cervix. The vagina transmits the products of menstruation and receives the penis in copulation.

52. **The answer is A.** In females, the urethra extends from the bladder, runs above the anterior vaginal wall, and pierces the urogenital diaphragm to reach the urethral orifice in the vestibule behind the clitoris. It is about 4 cm long. In males, the urethra is about 20 cm long.

53. **The answer is E.** The ischioanal fossa lies in the anal triangle and is bound laterally by the obturator internus with its fascia and superomedially by the levator ani and external anal sphincter. It contains the inferior rectal vessels. Thus, hemorrhage occurs in the ischioanal fossa when it is ruptured.

54. **The answer is C.** The mucous membrane and the circular smooth muscle layer of the rectum form three transverse folds; the middle one is called Houston's valve. The venous blood returns to the portal venous system via the superior rectal vein.

55. **The answer is B.** The obturator internus muscle and its fascia form the lateral wall of the ischioanal fossa. This muscle is innervated by the nerve to the obturator internus, which passes through the greater and lesser sciatic foramen.

56. **The answer is E.** The greater trochanter provides an insertion site for the obturator internus muscle.

57. **The answer is B.** The seminal vesicle is a lobulated glandular structure and produces the alkaline constituent of the seminal fluid, which contains fructose and choline. Fructose, which is nutritive to spermatozoa, also allows forensic determination of rape, whereas choline crystals are the preferred basis for the determination of the presence of semen.

58. **The answer is A.** The external iliac artery becomes the femoral artery immediately after passing the inguinal ligament. Therefore, ligation of the external iliac artery reduces blood pressure in the femoral artery.

59. **The answer is D.** The obturator foramen transmits the obturator nerve and vessels. Therefore, the knife wound in this foramen injures the obturator nerve and vessels.

60. **The answer is C.** The bladder is situated in the anterior part of the pelvic cavity. Thus, a stab wound superior to the pubic symphysis would injure the bladder.