CLINICAL OBSTETRICS AND GYNECOLOGY:

PreTest® Self-Assessment and Review

William F. Rayburn

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Preface

Continuing medical education should include a periodic review of knowledge within a given medical specialty. How this information is acquired and translated into clinical terms must be emphasized. During residency training or in private practice, the physician is exposed to such information by direct patient care and from a review of the current literature. A comprehensive gathering of this knowledge often lacks direction, however, and may not be acquired at all or until shortly before a major examination for certification or recertification.

To remain current on medical progress and to stimulate further reading, I have coordinated weekly board review sessions during the past 3 years as a study guide for residents training in obstetrics and gynecology at The Ohio State University and at the University of Michigan. Each meeting has involved the discussion of approximately 20 questions that I wrote that were similar in format and difficulty to those on the written examination for board certification. The multiple-choice or matching style questions were written so that answers could be easily found in standard textbooks or current journal articles.

Because this self-teaching method gained popularity, the questions were subsequently gathered and organized into this book. Illustrative cases from our obstetric and gynecologic services were used in writing questions to test clinical judgment and problem solving. Each question was reviewed by several qualified specialists to ensure clarity and to differentiate between those physicians who are well prepared from those less knowledgeable. The accompanying answers to each question also contain a corresponding current reference for additional reading.

I hope that this self-assessment and review provides useful information for assessing your strengths and weaknesses and for practicing test taking.

William F. Rayburn

Introduction

Clinical Obstetrics and Gynecology: PreTest® Self-Assessment and Review has been designed to provide physicians, as well as medical students, with a comprehensive, relevant, and convenient instrument for self-evaluation and review within the field of obstetrics and gynecology. Although it should be particularly helpful to residents preparing for the American Board of Obstetrics and Gynecology Certification examination and the Council on Resident Education in Obstetrics and Gynecology examinations, it should also be useful for physicians in practice who are interested in maintaining a high level of competence in obstetrics and gynecology. Study of this self-assessment and review book should help to (1) identify areas of relative weakness; (2) confirm areas of expertise; (3) assess knowledge of the sciences fundamental to obstetrics and gynecology; (4) assess clinical judgment and problem-solving skills; and (5) introduce recent developments in obstetrics and gynecology.

The book contains 600 patient-management multiple-choice questions that parallel the format and degree of difficulty of the questions on the above mentioned board examinations. Each question is accompanied by an answer, a paragraph-length explanation, and specific page references to major or specialized textbooks and/or current journal articles. A bibliography listing all the sources used for the questions follows the last chapter.

We have assumed that the time available to the reader is limited; as a result, this book can be used profitably a chapter at a time. By allowing no more than two and a half minutes to answer each question, you can simulate the time constraints of the actual board examinations. When you finish answering all the questions in a chapter, spend as much time as necessary verifying answers and carefully reading the accompanying explanations. The author of this book has designed the explanations to reinforce and supplement the information tested by the questions. If after reading the explanations for a given chapter, you feel a need for a more extensive and definitive discussion, consult the references listed.

We have used three basic question types in accordance with the format of the American Board of Obstetrics and Gynecology certification and recertification examinations. Considerable editorial time has been spent trying to ensure that each question is clearly stated and discriminates between those physicians who are well-prepared in a subject and those who are less knowledgeable.

This book is a teaching device that provides readers with the opportunity to evaluate objectively and update their clinical expertise, their ability to interpret data, and their ability to diagnose and solve clinical problems. The book meets the criteria for 22 credit hours in Category 5(d) for the Physician's Recognition Award of the American Medical Association. We hope that you will find this book interesting, relevant, and challenging. The author, as well as the PreTest staff, would be very happy to receive your comments and suggestions.

Contents

Reproductive Anatomy

DIRECTIONS: Each question below contains five suggested answers. Choose the **one best** response to each question.

1. Collateral arterial circulation to the pelvis includes branches from all the following arteries EXCEPT the

(A) external iliac artery
(B) femoral artery
(C) inferior mesenteric artery
(D) ovarian artery
(E) renal artery

2. The internal pudendal nerve and vessels cross the ischiorectal fossa in the space known as

(A) Gartner's duct
(B) Alcock's canal
(C) Nuck's canal
(D) the arcuate line
(E) the fossa navicularis

3. The aorta bifurcates at the spinal level of

(A) L-2
(B) L-4
(C) L-6
(D) S-2
(E) none of the above

4. Lymphatics from the upper third of the vagina drain directly into the

(A) inguinal nodes
(B) hypogastric nodes
(C) iliac nodes
(D) periaortic nodes
(E) inferior mesenteric nodes

5. Blood flow to the middle portion of the vagina is primarily supplied by which of the following arteries?

(A) Uterine
(B) Inferior vesical
(C) Middle hemorrhoidal
(D) Internal pudendal
(E) Perineal

6. Blood supply from the right ovarian vein empties into the

(A) pampiniform plexus
(B) inferior vena cava
(C) right renal vein
(D) right hypogastric vein
(E) right uterine vein

7. Sensory fibers transmitting pain from uterine contractions pass through

(A) the fifth and sixth thoracic nerve roots
(B) the eleventh and twelfth thoracic nerve roots
(C) the second, third, and fourth sacral nerves
(D) the pudendal nerve
(E) none of the above

8. Correct statements about the Frankenhäuser nerve plexus include all the following EXCEPT that it

(A) is a uterovaginal plexus of nerves
(B) has ganglia on either side of the cervix
(C) has branches to supply the uterus, bladder, and upper vagina
(D) contains nerve fibers within the pudendal nerve
(E) is composed of sympathetic and parasympathetic nerve fibers

9. The typical sequence of events during puberty is the development of

(A) pubic hair, axillary hair, menarche, breast bud
(B) breast bud, pubic hair, axillary hair, menarche
(C) menarche, breast bud, axillary hair, pubic hair
(D) breast bud, axillary hair, pubic hair, menarche
(E) axillary hair, breast bud, pubic hair, menarche

10. The perineal body consists of all the following structures EXCEPT the

(A) central tendon
(B) bulbocavernosus muscle
(C) superficial transverse perineal muscles
(D) external anal sphincter
(E) levator ani

11. A rare lesion completely occluding the vaginal orifice and causing retention of menstrual flow is

(A) hematometra
(B) a myrtiform caruncle
(C) an imperforate hymen
(D) a cribiform hymen
(E) the fossa navicularis

12. The embryonic development of the fallopian tubes and the uterus is dependent on

(A) sufficient concentration of estrogen
(B) lack of testosterone
(C) lack of müllerian inhibitory factor (MIF)
(D) coincidental development of the urogenital sinus
(E) XY genotype

13. The percentage of women with müllerian duct abnormalities accompanied by a urinary tract anomaly is

(A) 10 percent
(B) 25 percent
(C) 50 percent
(D) 75 percent
(E) 90 percent

14. Which of the following sequences correctly lists the order in which portions of the fallopian tubes extend from the uterine cornua to the ovaries?

(A) Interstitium, ampulla, fimbria, isthmus
(B) Fimbria, interstitium, isthmus, ampulla
(C) Interstitium, isthmus, ampulla, fimbria
(D) Isthmus, interstitium, ampulla, fimbria
(E) Isthmus, interstitium, fimbria, ampulla

15. The maximum number of germ cells is found at which stage of development?

(A) Fetal development at midgestation
(B) Fetal development at late gestation
(C) Infancy
(D) Puberty
(E) Reproductive age

16. The trigone of the bladder is bound by

(A) two ureteral orifices posteriorly, one urethral orifice anteriorly
(B) one ureteral orifice posteriorly, two urethral orifices anteriorly
(C) two ureteral orifices anteriorly, one urethral orifice posteriorly
(D) one ureteral orifice anteriorly, two urethral orifices posteriorly
(E) none of the above

17. All the following statements about the bladder are true EXCEPT that

(A) the bladder is retroperitoneal
(B) the base is close to the lower uterine and cervical segments
(C) the trigone is contiguous with the anterior vaginal fornix
(D) the union with the uterus forms the anterior cul-de-sac
(E) the submucosa becomes thin when infected and bladder capacity is increased

18. All the following statements about the rectum are true EXCEPT that it

(A) passes retroperitoneally beneath the posterior cul-de-sac
(B) passes behind the urogenital diaphragm
(C) is separated from the posterior vaginal wall by loose areolar tissue
(D) is injured as frequently as the bladder during pelvic surgery
(E) may adhere to the cervix in the presence of inflammatory disease

19. Cell layers surrounding an ovarian follicle from the oocyte outward are the

(A) zona pellucida, theca interna, granulosa
(B) zona pellucida, granulosa, theca interna
(C) theca interna, zona pellucida, granulosa
(D) theca interna, granulosa, zona pellucida
(E) granulosa, theca interna, zona pellucida

20. Which of the following statements about the squamocolumnar junction of the cervix is true?

(A) It is situated high in the endocervical canal until puberty
(B) It is a transformation zone from transitional to squamous epithelium
(C) It is the least common site of carcinoma of the cervix
(D) It is a common site for squamous metaplasia
(E) It may often be poorly delineated during pregnancy

DIRECTIONS: Each question below contains four suggested answers of which **one or more** is correct. Choose the answer

A	if	1, 2, and 3	are correct
B	if	1 and 3	are correct
C	if	2 and 4	are correct
D	if	4	is correct
E	if	1, 2, 3, and 4	are correct

21. Branches of the abdominal aorta that supply blood to the pelvic viscera include the

(1) external iliac artery
(2) inferior mesenteric artery
(3) superior mesenteric artery
(4) ovarian artery

22. Statements that correctly describe the hypogastric artery include

(1) it provides blood to the pelvic viscera and muscles
(2) visceral branches from the posterior division include the inferior vesical, uterine, superior vesical, and middle hemorrhoidal arteries
(3) it becomes the internal pudendal artery to supply blood to the perineum and vulva
(4) the anterior division gives off branches to the iliolumbar, lateral sacral, and superior gluteal muscles

23. Sympathetic fibers from the spinal cord that innervate the uterus are

(1) transported along the second, third, and fourth sacral nerves
(2) the major nerve supply to the uterus
(3) found to pass through the Frankenhäuser plexus
(4) responsible for vasoconstriction

24. The levator ani muscle consists of which of the following muscles?

(1) Puborectalis
(2) Iliococcygeous
(3) Pubococcygeous
(4) Iliorectalis

25. True statements about the vaginal pH include

(1) the adult level is usually 4 to 5
(2) the level is unchanged after puberty
(3) the level relates to a breakdown of glycogen in the superficial mucosa
(4) the level is influenced by vaginal gland secretion

26. Drainage from the uterus includes which of the following lymphatic structures?

(1) Lymphatics from the ovarian region
(2) Periaortic nodes
(3) Hypogastric nodes
(4) Inguinal nodes

27. When compared to the nulliparous uterus, the uterus after childbirth becomes

(1) less triangular in shape
(2) increased in weight
(3) longer than before pregnancy
(4) the same length as the cervix

28. The anatomy of the round ligament is correctly described by which of the following statements?

(1) It contains vertical tubules that are lined by ciliated epithelium
(2) It encloses the uterine vessels and lower ureter
(3) It is a remnant of the wolffian duct
(4) It is composed of smooth muscle that hypertrophies and elongates during pregnancy

29. Insertion of the round ligament at the abdominal inguinal ring is an important anatomic landmark because

(1) the segment of accompanying peritoneum may become cystic in some adults
(2) endometrial implants may be located there
(3) it is a site for herniation of the small bowel and omentum
(4) it is a homologue to the gubernaculum testis in the male

30. The uterosacral ligaments function to

(1) contain important nerve fibers from the hypogastric and sacral plexus
(2) protect against injury to the ureter
(3) maintain the uterus in an anteflexed position
(4) provide the major support to the uterus

31. The cardinal ligament provides support to the pelvis by means of

(1) surrounding the cervix and base of the bladder
(2) attaching to the lateral walls of the pelvis
(3) its location at the base of each broad ligament
(4) its function as a component of the pubovesicocervical fascia

DIRECTIONS: The group of questions below consists of lettered choices followed by several numbered items. For each numbered item select the **one** lettered choice with which it is **most** closely associated. Each lettered choice may be used once, more than once, or not at all.

Questions 32-35

For each description that follows, choose the pelvic nerve with which it is usually associated.

(A) Obturator
(B) Lumbosacral
(C) Sciatic
(D) Internal pudendal
(E) Femoral

32. Adduction of the thigh and sensation to medial aspect of the thigh

33. Motor and sensory fibers to lateral leg and foot

34. Striated muscle of pelvic floor and lower extremities

35. Motor and sensory fibers to the perineum and vulva

Questions 36-40

For each anatomic structure listed below, select the appropriate arterial blood supply.

(A) Internal pudendal artery
(B) Uterine artery
(C) Superior vesical artery
(D) Middle sacral artery
(E) Hemorrhoidal artery

36. Cervix and vagina

37. Bladder

38. Rectosigmoid

39. Clitoris

40. Labia

Reproductive Anatomy

Answers

1. **The answer is E.** *(Mattingly, ed 5. pp 39-40.)* Collateral arterial circulation to the pelvis includes branches from the aorta, external iliac artery, and femoral artery. Branches from the aorta involve the ovarian arteries, inferior mesenteric artery, lumbar and vertebral arteries, and middle sacral artery. Branches from the external iliac artery involve the deep iliac circumflex artery and the inferior epigastric artery. Medial and lateral femoral circumflex arteries are the main branches of the femoral artery to supply the pelvis.

2. **The answer is B.** *(Mattingly, ed 5. p 33.)* Alcock's canal is the space in which the internal pudendal nerve and vessels cross the ischiorectal fossa. This space may be the site of hematoma or abscess formation. The pelvic floor is composed primarily of the levator ani and coccygeus muscles and provides the primary support for the pelvic viscera.

3. **The answer is B.** *(Mattingly, ed 5. p 36.)* The aorta bifurcates at the spinal level of L-4. This location is an anatomic site familiar to pelvic surgeons, since an incision to the lower portion of the aorta would need to be extended somewhat above the umbilicus. Furthermore, the paraaortic lymph nodes should be included in the complete assessment for pelvic tumors. The abdominal aorta gives off two major branches prior to the bifurcation—the ovarian artery and the inferior mesenteric artery.

4. **The answer is C.** *(Pritchard, ed 16. p 19.)* Lymphatics from the upper third of the vagina drain directly into the iliac nodes. Lymphatic drainage from the lower third of the vagina is similar to that emptying from the vulva and involves the inguinal lymph nodes. The middle third of the vagina is drained from lymphatics that eventually empty into the hypogastric nodes.

5. **The answer is B.** *(Pritchard, ed 16. p 19.)* The vagina is supplied by several arteries within the pelvic cavity. The middle third is principally supplied by the inferior vesical arteries. The lower third is supplied by the internal pudendal arteries and the middle hemorrhoidal arteries. The upper third is supplied by the cervicovaginal branches of the uterine arteries. Venous drainage from the vagina involves an extensive plexus of vessels that eventually empty into the hypogastric veins.

6. **The answer is B.** *(Pritchard, ed 16. p 30.)* Venous blood from the upper part of the uterus and the ovaries collects within the pampiniform plexus, which is situated within the broad ligament. Blood returning from this plexus passes through the ovarian vein and either into the inferior vena cava on the right side or into the left renal vein.

7. **The answer is B.** *(Pritchard, ed 16. p 30.)* Innervation of the uterus primarily involves the sympathetic nervous system but also partly includes the parasympathetic system. The sympathetic system enters the pelvis through the hypogastric plexus, which arises from the aortic plexus below the promontory of the sacrum. On descending on either side, these nerves merge at the uterovaginal plexus of Frankenhäuser. Painful sensations from uterine contractions are carried from sensory fibers in the uterus through the eleventh and twelfth

thoracic nerve roots and eventually to the central nervous system. Painful sensations from the cervix and upper vagina are transmitted to the second, third, and fourth sacral nerves, whereas the perineum is equipped with sensory fibers from the pudendal nerve.

8. **The answer is D.** *(Pritchard, ed 16. p 30.)* The Frankenhäuser nerve plexus is a uterovaginal plexus of nerves located on either side of the cervix. It contains parasympathetic and sympathetic nerve fibers that branch to supply the uterus, bladder, and upper vagina. This nerve plexus does not contain fibers within the pudendal nerve. Pain sensation from the lower portion of the birth canal primarily passes through the pudendal nerve, whereas sensory fibers from the cervix and upper part of the birth canal pass through the Frankenhäuser nerve plexus.

9. **The answer is B.** *(Speroff, ed 2. pp 44-45.)* The typical sequence of puberty events in females is growth initiation, thelarche, pubarche, and finally menarche. This evolution usually begins between 8 and 14 years of age and is completed within 2 to 4 years. These changes result from a gradually increasing level of gonadotropin and steroid production, until adult levels are reached. The precise signal that initiates these events of puberty is uncertain. In females, the first steroid to rise is dehydroepiandrosterone, then androstenedione, and finally estrogens.

10. **The answer is E.** *(Pritchard, ed 16. pp 19-20.)* The perineal body consists of the central tendon, bulbocavernosus muscle, and external anal sphincter. These structures provide support for the perineal body and are often torn or lacerated during labor or delivery unless an episiotomy is made. Deeper within the perineum is the pelvic diaphragm, which consists of the coccygeal muscles and the levator ani muscles. This muscular sheath provides efficient sphincter action for the vagina and rectum. The urogenital diaphragm is external to the pelvic diaphragm and consists of the urethral constrictor and the deep transverse perineal muscles.

11. **The answer is C.** *(Pritchard, ed 16. p 16.)* An imperforate hymen occludes the vaginal orifice and can cause retention of menstrual discharge. This is a rare lesion of the vaginal opening that is composed mainly of elastic and collagenous connective tissue. The structure of the hymen prior to coitus varies considerably. Following delivery, nodules formed as remnants of the hymen are known as myrtiform caruncles. The vaginal opening occupies the lower portion of the vestibule, the posterior portion of which is known as the fossa navicularis, which is usually obliterated following childbirth.

12. **The answer is C.** *(Pritchard, ed 16. p 33.)* The embryonic development of the uterus and fallopian tubes is dependent on a lack of müllerian inhibitory factor (MIF) and results from a union of the müllerian ducts, which first appear at the urogenital ridge in the fifth week of development. By the sixth week, the two müllerian ducts are fused at the midline, so that the upper ends produce the fallopian tubes and the fused lower part gives rise to the uterus. The uterine lumen is completed during the third month.

13. **The answer is B.** *(Romney, ed 2. pp 950-952.)* Approximately one-fourth of all women with müllerian duct abnormalities will have accompanying abnormalities of the urinary tract. The most common abnormality is a duplication of the ureters. Therefore, it is necessary to perform an intravenous pyelogram whenever a uterine or tubal abnormality is detected.

14. The answer is C. *(Pritchard, ed 16. pp 30-31.)* Portions of the fallopian tubes that extend from the uterine cornua to the ovaries include the interstitium, isthmus, ampulla, and infundibulum or fimbria. Each tube varies in length from 8 to 14 cm and is covered by peritoneum. The thickness varies from 2 to 8 mm, with the narrowest portion located at the isthmus. The musculature of each tube is arranged in two layers—an inner, circular layer and an outer, longitudinal layer.

15. The answer is A. *(Pritchard, ed 16. p 97. Speroff, ed 2. p 233.)* The maximum number of germ cells is found during fetal development at midgestation, when approximately 5 to 7 million primary oocytes are present within the fetal ovary. At birth, an estimated 2 million primary oocytes are found, whereas at puberty 400,000 to 500,000 oocytes are detected. Only 400 to 500 primary oocytes will be ovulated, with the majority degenerating in situ.

16. The answer is A. *(Mattingly, ed 5. p 27.)* The trigone of the bladder is bound by two ureteral orifices posteriorly and one urethral orifice anteriorly. The trigone is well protected and not vulnerable to tearing during hysterectomy. Therefore, damage to the trigone or ureterovesical junction is rare.

17. The answer is E. *(Mattingly, ed 5. p 27.)* Understanding the etiology of injury to the bladder requires knowledge of anatomic facts. Removing the uterus and cervix from near the bladder presents the bladder in a vulnerable position above the trigone. Repair of any bladder injury can easily be performed, with healing usually being prompt and complete. Failure to recognize an injury to the bladder, particularly during vaginal hysterectomy, may lead to a vesicovaginal fistula. Chronic infections of the bladder may lead to thickening of the mucosa with deep trabeculations and a reduction in bladder capacity, leading to symptoms of urinary frequency.

18. The answer is D. *(Mattingly, ed 5. pp 28-29.)* The rectum is rarely in direct risk of surgical injury at the time of hysterectomy. It is protected because it is retroperitoneal and surrounded by an avascular, loose areolar space. The rectum passes through the posterior pelvic floor, behind the urogenital diaphragm, and is supported by the puborectalis portion of the levator ani muscles.

19. The answer is B. *(Pritchard, ed 16. pp 42-46.)* Each ovarian follicle appears as a transparent vesicle with a variable diameter up to 12 mm. Cell layers surrounding the ovarian follicle include the zona pellucida, granulosa, and theca interna. The zona pellucida is a clear, mucoid band that surrounds the ovum and likely persists until rupture of the follicle and fertilization of the ovum. The innermost epithelial lining of the follicle, the granulosa layer, contains cuboid cells with round and hyperchromatic nuclei. The outermost layer is known as the theca and is composed of specialized connective tissue. The theca externa contains stromal tissue surrounding the follicle, and the theca interna consists of connective tissue cells with follicular enlargements. Theca cells contain lipid and are yellowish and granular in appearance.

20. The answer is D. *(Novak, ed 8. pp 70-75.)* The squamocolumnar junction of the cervix is a metaplastic or transformation zone from squamous to columnar epithelium. The endocervix and endometrium differ histologically in that (1) the stroma of the cervix is composed of dense connective tissue, (2) cervical tunnels and clefts have no cyclic losses, and (3) the "picket" variety of epithelium within the endocervix has basal and solid nuclei instead of centrally placed, vesicular nuclei. During pregnancy, the squamocolumnar junction is usually clearly visible; the actual number of "glands" within the endocervix may increase and pile up into two or three layers.

21. **The answer is C (2, 4).** *(Mattingly, ed 5. pp 36-37.)* The inferior mesenteric artery and the ovarian arteries are branches of the abdominal aorta that supply blood to the pelvic viscera. The inferior mesenteric artery, which supplies blood to the rectosigmoid colon, is an important landmark in paraaortic lymph node dissection, since it is easily traumatized during dissection in this region. Accidental transection of this artery produces no serious consequences, since blood supply to the lower colon may also be supplied by the hemorrhoidal arteries. Both ovarian arteries are seen to course on the lateral side of the ureters. The courses of the two ovarian veins are different, however. The right ovarian vein passes over the lower portion of the abdominal ureter and ascends along the vena cava to enter the vena cava just below the right renal vein, whereas the left ovarian vein passes along the medial border of the psoas muscle to drain into the left renal vein.

22. **The answer is B (1, 3).** *(Mattingly, ed 5. pp 37-38.)* The hypogastric artery is the major source of blood supply to the pelvic viscera and muscles. It continues to the ischiorectal fossa as the pudendal artery and to the perineum and vulva, where it extends to reach the urogenital diaphragm and clitoris. The anterior division of the hypogastric artery gives off its most medial visceral branch as the uterine artery and eventually also gives off superior and inferior vesical branches to the bladder. The branches of the anterior hypogastric artery division supply the uterus, uterine tube, vagina, and bladder. Parietal branches to muscles within the pelvis are found primarily in the posterior but also in the anterior division of the hypogastric artery.

23. **The answer is E (all).** *(Pritchard, ed 16. p 30.)* Sympathetic fibers are the major nerve supply to the uterus and are transported along the second, third, and fourth sacral nerves to pass through the Frankenhäuser plexus. Although a few sensory fibers may be found within the sympathetic nerves, these fibers are primarily responsible for muscular contraction and vasoconstriction. The parasympathetic nerve fibers, on the other hand, inhibit contraction and lead to vasodilatation.

24. **The answer is A (1, 2, 3).** *(Mattingly, ed 5. p 33.)* The pelvic floor is composed primarily of the levator ani, which supports the pelvic viscera and prevents the uterus from descending into the vaginal cavity. This muscle consists of the iliococcygeus muscle, the pubococcygeus muscle, and the puborectalis muscle. Weakening of the pelvic wall and urogenital diaphragm with elongation of the pelvic ligaments may lead to the subsequent descent of the uterus.

25. **The answer is B (1, 3).** *(Pritchard, ed 16. p 19.)* The pH of the vagina is influenced by the acidic reaction resulting from the breakdown of glycogen in the vaginal mucus by lactobacilli. Furthermore, the pH varies with the degree of ovarian activity. Prior to puberty, the vaginal pH is approximately 7; once the bacilli become predominant within the vagina following puberty, the pH in adult women ranges between 4 and 5. Glands are not normally found within the vaginal epithelium and would therefore not influence the vaginal pH.

26. **The answer is A (1, 2, 3).** *(Pritchard, ed 16. p 30.)* Lymphatic drainage from the uterus flows into the hypogastric nodes, ovarian region, and periaortic nodes. The lower portions of the uterus and the cervix have lymphatic drainage to the hypogastric nodes and eventually to the iliac lymphatics. Lymphatic flow from the body of the uterus drains into the ovarian region and the hypogastric nodes.

27. **The answer is A (1, 2, 3).** *(Pritchard, ed 16. pp 21-22.)* Following delivery, the uterus becomes less triangular in shape, weighs more, and is longer than before pregnancy. The weight increases by approximately 20 g (from 60 to 80 g). In infants, the cervix is approximately twice the length of the uterus, whereas the uterus is the same length as the cervix in young virgins. Following childbirth, the uterus is approximately twice the length of the cervix.

28. **The answer is D (4).** *(Pritchard, ed 16. pp 25-27.)* The round ligament is composed of smooth muscle, which during pregnancy will hypertrophy and elongate. The nearby parovarium tissue consists of vertical tubules lined by ciliated epithelium in the broad ligaments. The Gartner's duct cyst, a small, cystic structure on the anterolateral portion of the vaginal wall, is a remnant of the wolffian duct that is infrequently found on the pelvic exam.

29. **The answer is E (all).** *(Mattingly, ed 5. p 31.)* The round ligaments are a prominent pair of pelvic ligaments that arise from the anterior surface of the uterus and pass laterally to enter the abdominal (internal) inguinal ring. The ligament is a homologue to the gubernaculum testis and brings segments of peritoneum into the inguinal canal during the developmental phase. Remnants of this peritoneum may become cystic during adult life and are known as cysts of Nuck's canal. Endometrial implants may also be located in the internal inguinal canal, and this may be a site of herniation of the small bowel and omentum.

30. **The answer is B (1, 3).** *(Mattingly, ed 5. p 31.)* The uterosacral ligaments serve to pull the cervix and lower uterine segment back and are attached to the posterior portion of the cervix. Important nerve fibers from the sacral and hypogastric plexus, which contain fibers from the parasympathetic and sympathetic nerves, are also contained within the uterosacral ligaments. The uterosacral ligaments neither provide the major support for the uterus nor protect against injury to the ureter.

31. **The answer is E (all).** *(Mattingly, ed 5. pp 30-31.)* The cardinal ligament is a long, extensive ligament that provides the major support to the uterus above the pelvic diaphragm. It is a component of the pubovesicocervical fascia, which surrounds the cervix, base of the urethra, and bladder and passes forward to join the paravesical fascia.

32-35. **The answers are: 32-A, 33-C, 34-B, 35-D.** *(Mattingly, ed 5. pp 34-36.)* Along with both the sympathetic and parasympathetic nerves, many motor and sensory nerves are found within the pelvis. Damage to the obturator nerve produces motor dysfunction and loss of sensation over the medial aspects of the thigh. This nerve may be damaged during pelvic surgery when there is trauma to the deep branches of the hypogastric artery. The obturator nerve is the only motor nerve to arise from the lumbar plexus and pass through the pelvis without innervating any pelvic structures.

The sciatic nerve is composed of fibers from the posterior divisions of L-4, L-5, S-1, and S-2. It passes through the greater sciatic foramen and innervates muscles of the lower extremities, especially the lateral leg and foot. The sciatic nerve can be injured by overstretching the nerve along the sacrospinus ligament by exaggerated positioning of the lower extremities during pelvic surgery. This type of injury can be prevented by supporting the knees in leg stirrups and by avoiding extreme lateral rotation of the suspended legs.

The lumbosacral nerve trunk contains major motor fibers that innervate striated muscles of the lower extremities and pelvic floor. Since it is directly adjacent to the deep branches of the hypogastric artery, it may be damaged during pelvic surgery if troublesome bleeding occurs in the sacroiliac fossa.

The internal pudendal nerve arises from S-2 and S-3. It enters through the greater sciatic foramen and eventually distributes to the muscles of the vulva and to the perineum.