Multiple Choice. Read each question thoroughly before answering. From the choices available, choose the answer that is the most correct. Place all answers on the accompanying answer sheet.

1. It is impossible for sperm to be functional (able to fertilize the egg) until after ________.
   a. the tail disappears  
   b. they become spermatids  
   c. they undergo capacitation  
   d. they have been stored in the uterus for several days

2. All of the following things occur during meiosis I with the exception of one thing. Select the statement below that does not occur during meiosis I.
   a. The homologous chromosomes are separated from each other.
   b. A single diploid (2n) cell has become two haploid (n) cells.
   c. Portions of maternal chromosomes crossover with equivalent portions of paternal chromosomes.

3. The corpus luteum prevents loss of the implanted embryo through menstruation by secreting ________.
   a. human chorionic gonadotropin  
   b. luteinizing hormone  
   c. progesterone and estrogens  
   d. follicle-stimulating hormone

4. All but one of the following statements describes the necessity of the blood testis barrier. Select the one statement that does not describe a necessity of the blood testis barrier.
   a. Spermatocytes undergo meiosis only during puberty, well after the immune system has come to recognize "self" from "non-self" cells.
   b. Spermatogenesis produces new combinations of genes and chromosomes that results in unique antigens that the immune system may see as foreign.
   c. Foreign antigens produced by the newly formed sperm could initiate an autoimmune response against the developing sperm.
   d. Sperm can only be produced at temperatures lower than body temperature. Inflammation in the testis could raise the temperature too high to produce sperm.

5. Relaxin is a hormone produced by the placenta and ovaries. The function of this hormone is to ________.
   a. block the pain of childbirth  
   b. ensure the implantation of the blastula  
   c. relax the pubic symphysis  
   d. prevent morning sickness

6. The dartos and cremaster muscles are important to the integrity of the male reproductive system. Which of the following is true about the role they play?
   a. They contract to push sperm along the ductus deferens.  
   b. They regulate the temperature of the testes.  
   c. They are responsible for penile erection.  
   d. They contract to allow ejaculation.

7. Which hormone maintains the viability of the corpus luteum?
   a. estrogen  
   b. progesterone  
   c. human chorionic gonadotropin

8. Which of the following glands are responsible for 70% of the synthesis of semen?
   a. the seminal vesicles  
   b. the bulbourethral glands  
   c. the prostate  
   d. the pituitary

9. The correct sequence of preembryonic structures is ________.
   a. zygote, blastocyst, morula  
   b. zygote, morula, blastocyst  
   c. blastocyst, morula, zygote  
   d. morula, zygote, blastocyst

10. T/F. The period from fertilization through week eight is called the embryonic period.
11. How long is the secondary oocyte viable and capable of being fertilized after it is ovulated?
   a. 12-24 hours  
   b. 24-36 hours  
   c. 36-72 hours  
   d. a full week

12. The structures that receive the ovulated oocyte, providing a site for fertilization, are called the ________.
   a. Graafian follicles  
   b. fallopian tubes  
   c. infundibula  
   d. fimbriae

13. Select the correct statement about fertilization.
   a. Both spermatozoa and the ovulated secondary oocyte remain viable for about 72 hours in the female reproductive tract.
   b. Millions of sperm cells are destroyed by the vagina’s acidic environment.
   c. If estrogen is present, the pathway through the cervical opening is blocked from sperm entry.
   d. Once inside the uterus, most sperm cells are protected and remain viable.

14. If gametes were diploid like somatic cells, how many chromosomes would the zygote contain?
   a. Twice the diploid number, and with every succeeding generation, the chromosome number would continue to double and normal development could not occur.
   b. Triple the diploid number, and with every succeeding generation, the chromosome number would continue to triple and normal development would not occur.
   c. Half the diploid number with no change in development.
   d. There is no relationship between gametes and somatic cells.

15. Cleavage as part of embryonic development is distinctive because it involves ________.
   a. cell division by mitosis with little or no growth between successive divisions  
   b. forming the primary germ layers  
   c. splitting the cell into two separate cells  
   d. meiotic cell divisions

16. The constancy of the chromosome number from one cell generation to the next is maintained through ________.
   a. mitosis  
   b. meiosis  
   c. cytokinesis  
   d. DNA synthesis

17. At what point is meiosis II completed for the female gamete?
   a. puberty  
   b. ovulation  
   c. fertilization  
   d. implantation

18. How do the testes respond to exposure to excessive body warmth?
   a. They move close to the pelvic cavity.  
   b. They move away from the pelvic cavity.  
   c. Excessive warmth has no effect on the testicles because of their location in the scrotum.  
   d. Excessive warmth is actually beneficial in that it speeds up the maturation of sperm.

19. A friend confides that she desires to have children but is having trouble conceiving. Which of the following is true regarding implantation?
   a. An estimated 60% of implanted embryos later miscarry due to genetic defects of the embryo.
   b. Detection of human chorionic gonadotropin (hCG) in blood or urine indicates failure of the blastocyst to implant.
   c. In cases where implantation fails to occur, a nonreceptive uterus becomes receptive once again.
   d. It is estimated that a minimum of two-thirds of all zygotes formed fail to implant by the end of the first week or spontaneously abort.

20. T/F. A blastocyst is a hollow ball of cells, while the morula is a solid ball of cells.
21. Which of the following hormones controls the release of anterior pituitary gonadotropins?
   a. LH   b. FSH   c. GnRH   d. testosterone

22. Effects of estrogen on the female body include ________.
   a. increased oiliness of the skin   b. deepening of the voice   c. growth of the breasts at puberty   d. growth of the larynx

23. The cells that produce testosterone in the testis are called ________.
   a. spermatocytes   b. spermatogonia   c. sustentacular cells   d. interstitial endocrine cells

24. Which of the choices below is not a function of the vagina?
   a. serves as a passageway for the primary oocyte   b. serves as a passageway for menstrual flow   c. serves as the birth canal   d. receives semen from the penis during sexual intercourse

25. Select the correct statement about the uterine cycle.
   a. The menstrual phase of the cycle is normally from day 1 to day 8.
   b. During the secretory phase, estrogen levels are at their highest.
   c. During the proliferative phase, levels of progesterone rise as the follicle begins to produce more hormone.
   d. If fertilization occurs, the corpus luteum is maintained by a hormone secreted by the developing embryo.

26. Normally menstruation occurs when ________.
   a. blood levels of FSH fall off   b. blood levels of estrogen and progesterone decrease   c. blood levels of estrogen and progesterone increase   d. the corpus luteum secretes estrogen

27. The basic difference between spermatogenesis and oogenesis is that ________.
   a. during spermatogenesis two more polar bodies are produced
   b. the mature ovum is n, while the sperm is 2n
   c. in oogenesis, one mature ovum is produced, and in spermatogenesis four mature sperm are produced from the parent cell
   d. spermatogenesis involves mitosis and meiosis, but oogenesis involves meiosis only

28. Why doesn’t semen enter the urinary bladder during ejaculation?
   a. There is no common duct between the reproductive system and the urinary system.
   b. There is no urge to urinate during sexual intercourse because of the suppression of LH by testosterone buildup in the blood.
   c. The smooth muscle sphincter at the base of the urinary bladder closes.
   d. Ejaculation is a parasympathetic reflex resulting in no response by urinary contraction muscles.

29. Which hormone is the necessary trigger for ovulation to occur?
   a. LH   b. FSH   c. progesterone   d. estrogen

30. The hypothalamic-pituitary-gonadal axis ________.
   a. is the tight relationship between the cortex and the control of testicular function
   b. involves FSH and LH release
   c. involves posterior pituitary release of regulating hormones
   d. involves a positive feedback loop control of spermatogenesis
31. The duct system of the male reproductive system includes all but which of the following?
   a. epididymis    b. urethra    c. ductus deferens    d. corpus spongiosum

32. Which of the following statements about the female reproductive process is not true?
   a. The monthly discharge of the uterus (menses) is initiated by the decrease in secretion of female hormones.
   b. Ovulation usually occurs 14 days after the beginning of menses.
   c. Rebuilding the endometrium is under the control of prolactin.

33. A boy who has not passed through puberty sustains an injury to his anterior pituitary such that FSH is no longer released, but LH is normal. After he grows to maturity, one would expect that he would ________.
   a. be unable to produce viable sperm    b. not develop secondary sex characteristics
   c. be impotent (unable to have an erection)    d. have impaired function of interstitial cells

34. Trace the correct path of the sperm during ejaculation.
   a. urethra → vas deferens → seminal vesicles → testes
   b. testes → urethra → vas deferens → penis
   c. seminiferous tubules → epididymis → vas deferens → urethra
   d. seminiferous tubules → vas deferens → epididymis → urethra
   e. vas deferens → seminiferous tubules → epididymis → urethra

35. Trace the path of the sperm from the point of ejaculation through the female reproductive tract. Assume that the sperm are seeking an egg to fertilize.
   a. uterus → urethra → cervix → fallopian tube
   b. urethra → vagina → oviduct → cervix
   c. cervix → fallopian tube → vagina → uterus
   d. vagina → uterus → oviduct → cervix
   e. vagina → cervix → uterus → oviduct

36. Which of the following is the function of the urethra in guys?
   a. It serves as the sex organ during sexual intercourse.    b. It allows for the passage of semen and urine.
   c. It is the enlarged tip of the sex organ which contains the orifice or opening.    d. It is the birth canal.

37. The lining of the uterus that is discharged during the menstrual phase is the
   a. endocardium.    b. oviduct.    c. endometrium.    d. hymen.    e. myocardium.

38. The structure from which an egg is released during ovulation is called a/an
   a. ovarian cyst.    b. primary follicle.    c. corpus luteum.    d. secondary follicle.
   e. Tertiary or Vesicular follicle.

39. Menarche refers to
   a. the menstrual phase.    b. premenstrual phase.    c. a time when men pause.
   d. cessation of menstruation.    e. onset of menstruation.

40. The role of the sperm’s acrosome in fertilization is to
   a. release enzymes that help a sperm head digest its way into an egg.    b. help the sperm swim to the egg.
   c. direct the sperm to the correct oviduct so fertilization can take place.    d. store energy for swimming to the egg.
41. In human females, implantation of the fertilized egg normally occurs in the
a. uterus.  b. oviduct.  c. vagina.  d. ovary.  e. abdominal cavity.

42. The mature follicles produce large quantities of ______, the corpus luteum produces mostly ________.
   a. FSH, LH  b. GnRH, inhibin  c. progesterone, estrogen  d. estrogen, progesterone

43. Which of the following are also called the male gonads?
   a. testes  b. epididymis  c. prostate gland  d. penis

(2 points each) Matching. From the choices provided, choose the best match for the following:

44. Stratum functionalis  47. Zona pellucida  49. Myoid cells
45. Clitoris  48. Syncytiotrophoblast  50. Fructose
46. Gestation

Matches (some will not be needed):

   a. The female copulatory organ.
   b. Growth of embryonic tissue digesting endometrium during blastocyst implantation.
   c. Layer of the endometrium that proliferates each month in preparation for implantation.
   d. A substance that helps neutralize vaginal acids.
   e. A layer of cells around the ovulated oocyte.
   f. Released by cells of the male reproductive tract and male glands to nourish sperm during storage and upon ejaculation.
   g. Smooth-muscle like cells that contract to move sperm and fluids out of seminiferous tubules.
   h. The inner cell mass of the blastocyst.
   i. The time from the last menstrual period until birth.
   j. The process of gametogenesis in males.
   k. Layer of the endometrium beneath the proliferating layer.
   l. The stem cells which become sperm.
   m. A thick, glycoprotein-rich, encapsulating layer secreted by the oocyte.
   n. The process of gametogenesis in females.
   o. Consisting of erectile tissue, it is homologous to the penis.

(5 points each) Written Answer. Prepare a written answer to the following questions. Write your answers on the answer sheet provided or separate sheets of paper as necessary. Place your name on all separate sheets. DO NOT WRITE YOUR ANSWERS TO THESE QUESTIONS ON THIS PAGE!

51. List and explain the differences between mitosis and meiosis.
52. Explain the hormonal control over the ovarian and uterine cycles.
53. Present the life cycle of ova (egg cells). Include events occurring in fetal development up to and including fertilization.
54. Explain the hormonal control over sperm production and testosterone secretion.
55. Define polyspermy and explain the mechanisms at work during fertilization that prevents it.