

Campbell's Biology: Concepts and Connections, 7e (Reece et al.)
Chapter 27 Reproduction and Embryonic Development

27.1 Multiple-Choice Questions

1) Between 1980 and 2006, the rate of multiple births in the United States more than doubled, primarily as a result of

- A) better nutrition available for potential mothers.
- B) increased use of fertility drugs.
- C) better physical condition of potential mothers.
- D) increased exposure to new sources of radiation.

Answer: B

Topic: 27.1

Skill: Knowledge/Comprehension

2) Which of the following is *not* a potential advantage of asexual reproduction?

- A) It allows animals that do not move around to produce offspring without finding mates.
- B) It saves the time and energy required to produce gametes.
- C) It produces genetically diverse populations.
- D) It allows animals that are genetically well suited to a particular environment to quickly expand their populations.

Answer: C

Topic: 27.1

Skill: Knowledge/Comprehension

3) Fission is an asexual process

- A) that allows regeneration of lost body parts.
- B) that occurs in individuals that live in isolated areas.
- C) in which a parent separates into two individuals of approximately equal size.
- D) in which a parent fragments into several pieces.

Answer: C

Topic: 27.1

Skill: Knowledge/Comprehension

4) Which of the following statements regarding sexual reproduction is *true*?

- A) Sexual reproduction creates an individual that is a genetic copy of one parent.
- B) Sexual reproduction generates greater genetic variation than asexual reproduction.
- C) Sexual reproduction allows animals to expand their populations faster than asexual reproduction.
- D) Populations of organisms that reproduce through sexual reproduction generally have more difficulty adapting to changing environments.

Answer: B

Topic: 27.2

Skill: Knowledge/Comprehension

- 5) Hermaphrodites are animals that
- A) possess both male and female reproductive systems.
 - B) have the gonads of one sex but the external appearance of the other.
 - C) develop from unfertilized eggs.
 - D) must fertilize themselves.

Answer: A

Topic: 27.2

Skill: Knowledge/Comprehension

- 6) Reproductive systems with external fertilization are most common in
- A) terrestrial animals.
 - B) populations with many more males than females.
 - C) animals that are widely dispersed.
 - D) aquatic animals.

Answer: D

Topic: 27.2

Skill: Knowledge/Comprehension

- 7) Which of the following statements about the reproductive system of human females is *true*?
- A) In human females, eggs develop within the uterus.
 - B) The corpus luteum secretes progesterone, which helps maintain the uterine lining during pregnancy.
 - C) After 9 months of development, an embryo is called a fetus.
 - D) The cervix is an important structure of sexual arousal.

Answer: B

Topic: 27.3

Skill: Knowledge/Comprehension

- 8) The human egg is swept through the oviduct toward the uterus by
- A) the beating of the egg's cilia.
 - B) rhythmic contractions of the oviduct.
 - C) rhythmic contractions of the uterus.
 - D) the beating of cilia in the oviduct.

Answer: D

Topic: 27.3

Skill: Knowledge/Comprehension

- 9) Fertilization in the female reproductive tract typically occurs in the
- A) ovary.
 - B) upper part of the oviduct.
 - C) lower part of the oviduct.
 - D) uterus.

Answer: B

Topic: 27.3

Skill: Knowledge/Comprehension

10) The embryo implants in the _____ of the uterus.

- A) exometrium
- B) myometrium
- C) perimetrium
- D) endometrium

Answer: D

Topic: 27.3

Skill: Knowledge/Comprehension

11) Human testes are positioned in an external sac rather than in the abdominal cavity

- A) to shorten the distance that semen must travel during ejaculation.
- B) to shorten the distance that sperm must swim during insemination.
- C) so the testes can be kept cooler than the body's interior.
- D) so the testes can enlarge during sexual maturation.

Answer: C

Topic: 27.4

Skill: Knowledge/Comprehension

12) Men who take very long, hot baths are likely to

- A) produce more sperm.
- B) produce healthier sperm.
- C) produce more sperm and ones that are healthier.
- D) produce fewer sperm.

Answer: D

Topic: 27.4

Skill: Knowledge/Comprehension

13) After being produced in the testes, sperm mature further in a structure called the

- A) vas deferens.
- B) epididymis.
- C) prostate.
- D) seminal vesicle.

Answer: B

Topic: 27.4

Skill: Knowledge/Comprehension

14) Which of the following produces a thick fluid containing fructose, which is used for energy by sperm?

- A) prostate gland
- B) bulbourethral gland
- C) seminal vesicles
- D) epididymis

Answer: C

Topic: 27.4

Skill: Knowledge/Comprehension

15) Which of the following statements regarding spermatogenesis and oogenesis is *true*?

- A) Meiosis in spermatogenesis produces two cells from one primary spermatocyte.
- B) Meiosis in oogenesis produces one mature egg from one primary oocyte.
- C) Oogenesis begins at puberty.
- D) Spermatogenesis begins at birth.

Answer: B

Topic: 27.5

Skill: Knowledge/Comprehension

16) Which of the following statements comparing spermatogenesis and oogenesis is *true*?

- A) During oogenesis, four cells are produced with each sharing equally the cytoplasm from the parent cell.
- B) Men, but not women, can produce gametes throughout their lives.
- C) Spermatogenesis and oogenesis rely upon mitosis to produce gametes.
- D) Spermatogenesis, but not oogenesis, is an example of gametogenesis.

Answer: B

Topic: 27.5

Skill: Knowledge/Comprehension

17) Menstruation

- A) is triggered by an LH surge.
- B) is triggered by HCG.
- C) is triggered by an increase in the levels of estrogen and progesterone.
- D) coincides with the beginning of the pre-ovulatory phase of the ovarian cycle.

Answer: D

Topic: 27.6

Skill: Knowledge/Comprehension

18) Which of the following hormones stimulates the growth of an ovarian follicle?

- A) LH
- B) FSH
- C) estrogen
- D) progesterone

Answer: B

Topic: 27.6

Skill: Knowledge/Comprehension

19) A decrease in _____ is followed by the gradual degradation of the corpus luteum.

- A) LH
- B) FSH
- C) estrogen
- D) progesterone

Answer: A

Topic: 27.6

Skill: Knowledge/Comprehension

20) Which of the following agents can cause an infection that can ultimately develop into pelvic inflammatory disease in women?

- A) *Treponema pallidum*
- B) papilloma virus
- C) *Candida albicans*
- D) *Chlamydia trachomatis*

Answer: D

Topic: 27.7

Skill: Knowledge/Comprehension

21) Which of the following STDs is caused by a virus that can also cause cancer?

- A) genital warts
- B) syphilis
- C) gonorrhea
- D) candidiasis

Answer: A

Topic: 27.7

Skill: Knowledge/Comprehension

22) Sterilization, in which the sperm is surgically prevented from reaching the egg, is accomplished by

- A) the rhythm method.
- B) tubal ligation or vasectomy.
- C) cervical capping.
- D) mifepristone.

Answer: B

Topic: 27.8

Skill: Knowledge/Comprehension

23) Which of the following statements regarding birth control is *true*?

- A) The most widely used birth control pills contain a combination of FSH and LH.
- B) Natural family planning is generally reliable.
- C) Morning-after pills taken within three days of unprotected intercourse prevent fertilization or implantation about 75% of the time.
- D) Birth control pills work primarily by preventing fertilization and implantation.

Answer: C

Topic: 27.8

Skill: Knowledge/Comprehension

24) The function of a sperm cell's acrosome is to

- A) carry the sperm's nucleus.
- B) fuse with the jelly coat of the egg cell.
- C) carry enzymes that help the sperm penetrate the egg.
- D) carry the fuel that powers the sperm.

Answer: C

Topic: 27.9

Skill: Knowledge/Comprehension

25) Which of the following generates the ATP that is required for movement of the sperm's tail?

- A) a mitochondrion in the neck and middle piece
- B) mitochondria in the sperm tail
- C) the sperm plasma membrane
- D) the acrosome

Answer: A

Topic: 27.9

Skill: Knowledge/Comprehension

26) Which of the following serves as an impenetrable barrier that prevents more than one sperm from fertilizing an egg?

- A) the acrosome
- B) the jelly coat of the egg
- C) the sperm's plasma membrane
- D) the vitelline layer

Answer: D

Topic: 27.9

Skill: Knowledge/Comprehension

27) Which of the following events occurs first during embryonic development?

- A) gastrulation
- B) neurulation
- C) cleavage
- D) organ formation

Answer: C

Topic: 27.10

Skill: Knowledge/Comprehension

28) Which of the following results from cleavage?

- A) formation of the nervous system
- B) formation of the notochord
- C) formation of more cells
- D) segmentation

Answer: C

Topic: 27.10

Skill: Knowledge/Comprehension

29) Which of the following processes is most similar to the process of cleavage?

- A) slicing up a pie into eight pieces
- B) stringing beads onto a string
- C) inflating a balloon
- D) melting a stick of butter in a hot pan

Answer: A

Topic: 27.10

Skill: Knowledge/Comprehension

- 30) Two important contributions that cleavage makes to development are to
- A) establish the basic tissues of the body and define the future nervous system.
 - B) create a multicellular embryo and partition the embryo into developmental regions.
 - C) create a multicellular embryo and establish the basic tissues of the body.
 - D) establish the basic body plan and determine the location of the mouth and anus.

Answer: B

Topic: 27.10

Skill: Knowledge/Comprehension

- 31) At the end of gastrulation, the ectoderm makes up the

- A) lining of the embryonic digestive tract.
- B) embryonic nervous system.
- C) outer layer of the gastrula.
- D) inner layer of the gastrula.

Answer: C

Topic: 27.11

Skill: Knowledge/Comprehension

- 32) What occurs during gastrulation?

- A) A solid embryo is changed into a hollow morula.
- B) A solid blastula is changed into a hollow embryo that has four tissue layers.
- C) A hollow blastula is changed into a hollow embryo that has three tissue layers.
- D) A neural tube is created by invagination of the ectoderm.

Answer: C

Topic: 27.11

Skill: Knowledge/Comprehension

- 33) Which of the following structures develops from mesodermal tissue?

- A) muscles
- B) lining of the digestive tract
- C) skin
- D) nervous system

Answer: A

Topic: 27.11

Skill: Knowledge/Comprehension

- 34) The brain and spinal cord are formed from

- A) the notochord, which forms from mesoderm
- B) the notochord, which forms from endoderm
- C) the neural tube, which forms from mesoderm
- D) the neural tube, which forms from ectoderm

Answer: D

Topic: 27.12

Skill: Knowledge/Comprehension

35) Which of the following options correctly represents the sequence in which most animals develop?

- A) zygote, cleavage, blastula, gastrula, organ formation
- B) cleavage, zygote, gastrula, blastula, organ formation
- C) zygote, cleavage, gastrula, blastula, organ formation
- D) zygote, cleavage, organ formation, blastula, gastrula

Answer: A

Topic: 27.12

Skill: Knowledge/Comprehension

36) When a chemical signal from a group of embryonic cells causes a different, nearby group of cells to embark on a particular developmental course (say, differentiating into a leg), the interaction between the two groups of cells is called

- A) induction.
- B) coordinated differentiation.
- C) codifferentiation.
- D) potentiation.

Answer: A

Topic: 27.13

Skill: Knowledge/Comprehension

37) Cells migrate from one place to another during gastrulation using

- A) cilia.
- B) cellular protrusions.
- C) flagella.
- D) peristalsis.

Answer: B

Topic: 27.13

Skill: Knowledge/Comprehension

38) Which of the following occurs during cellular migration and development into specialized tissue?

- A) Cells are transferred to the appropriate region of the embryo via the bloodstream.
- B) Cells fuse to produce multinucleated giant cells.
- C) Similar cells glue themselves in place by secreting glycoproteins.
- D) Most cells of the developing tissue undergo the process of apoptosis.

Answer: C

Topic: 27.13

Skill: Knowledge/Comprehension

39) Which of the following describes apoptosis?

- A) programmed cell death
- B) gastrulation
- C) phagocytosis
- D) neural tube formation

Answer: A

Topic: 27.13

Skill: Knowledge/Comprehension

40) Research indicates that _____ respond(s) to _____ signals that inform a cell about its position relative to other cells in the embryo.

- A) nervous tissue . . . hormonal
- B) master control genes . . . chemical
- C) organs . . . radio
- D) organelles . . . chemical

Answer: B

Topic: 27.14

Skill: Knowledge/Comprehension

41) The discovery of _____ explains embryonic pattern formation in a wide variety of organisms.

- A) the three-dimensional forms of animals
- B) induction
- C) homeotic genes
- D) programmed cell death

Answer: C

Topic: 27.14

Skill: Knowledge/Comprehension

42) A major goal of developmental research is to understand

- A) how DNA directs formation of a three-dimensional animal.
- B) evolutionary similarities between species.
- C) DNA transcription.
- D) hormone interactions.

Answer: A

Topic: 27.14

Skill: Knowledge/Comprehension

43) Another term for gestation is

- A) conception.
- B) fertilization.
- C) development.
- D) pregnancy.

Answer: D

Topic: 27.15

Skill: Knowledge/Comprehension

44) When does the human blastocyst implant in the wall of the uterus?

- A) within a few hours of fertilization
- B) about a day after conception
- C) about a week after conception
- D) only after all four extraembryonic membranes become established.

Answer: C

Topic: 27.15

Skill: Knowledge/Comprehension

- 45) The yolk sac of humans
A) stores nutrients to support the developing embryo.
B) is evidence of human's relationships to egg-laying vertebrates.
C) secretes HCG.
D) absorbs nutrients from, and releases waste to, the mother's blood.

Answer: B

Topic: 27.15

Skill: Knowledge/Comprehension

- 46) The human embryo's first blood cells arise in the
A) developing liver.
B) developing bone marrow.
C) yolk sac.
D) allantois.

Answer: C

Topic: 27.15

Skill: Knowledge/Comprehension

- 47) What would happen if the chorion failed to secrete human chorionic gonadotropin?
A) The maternal elements of the placenta would fail to develop.
B) The fetal elements of the placenta would fail to develop.
C) Neural tube formation would not occur, and the embryo would have no central nervous system.
D) The embryo would be aborted.

Answer: D

Topic: 27.15

Skill: Application/Analysis

- 48) Which of the following structures contributes to the structure of the placenta as well as completely surrounding the embryo?
A) chorion
B) amnion
C) yolk sac
D) allantois

Answer: A

Topic: 27.15

Skill: Knowledge/Comprehension

- 49) At which gestational age does a developing human fetus first look obviously human and not like other vertebrate embryos?
A) 2 weeks
B) 4 weeks
C) 9 weeks
D) 4 months

Answer: C

Topic: 27.16

Skill: Knowledge/Comprehension

50) Which of the following processes dominates the third trimester of human development?

- A) formation of external features such as arms and legs
- B) formation of hair and fingernails
- C) rapid growth
- D) organ formation

Answer: C

Topic: 27.16

Skill: Knowledge/Comprehension

51) Which of the following occurs during the process of labor?

- A) positive feedback involving oxytocin and prostaglandins
- B) negative feedback involving oxytocin and prostaglandins
- C) positive feedback involving estrogen and human chorionic gonadotropin
- D) negative feedback involving estrogen and human chorionic gonadotropin

Answer: A

Topic: 27.17

Skill: Knowledge/Comprehension

52) Contractions in uterine smooth muscle during labor are initiated by

- A) epinephrine.
- B) estrogen.
- C) oxytocin.
- D) prolactin.

Answer: C

Topic: 27.17

Skill: Knowledge/Comprehension

53) Which of the following options correctly lists the three stages of labor in the order in which they occur?

- A) dilation, expulsion, delivery of the placenta
- B) dilation, crowning, expulsion
- C) contractions, dilation, expulsion
- D) dilation, crowning, delivery of the placenta

Answer: A

Topic: 27.18

Skill: Knowledge/Comprehension

54) Which of the following statements regarding infertility and fertilization procedures is *true*?

- A) Embryos fertilized through assisted reproductive technologies cannot be frozen for later use, as they degrade rapidly.
- B) In GIFT, sperm are injected into an embryo *in vitro*, and the embryo is placed into the oviducts.
- C) In IVF, fertilization occurs in a dish. The embryo is allowed to develop for several days, then the embryo is placed into the uterus.
- D) Children conceived using reproductive technologies such as IVF and ICSI display a high rate of abnormalities resulting from these procedures.

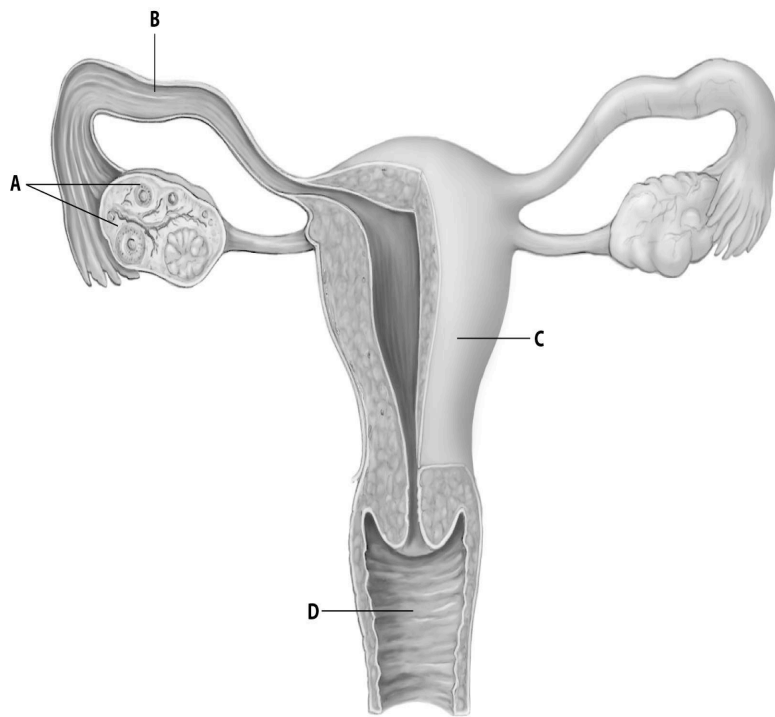
Answer: C

Topic: 27.19

Skill: Knowledge/Comprehension

27.2 Art Questions

1) In which part of the human female reproductive system does fertilization normally take place?



A) part A

B) part B

C) part C

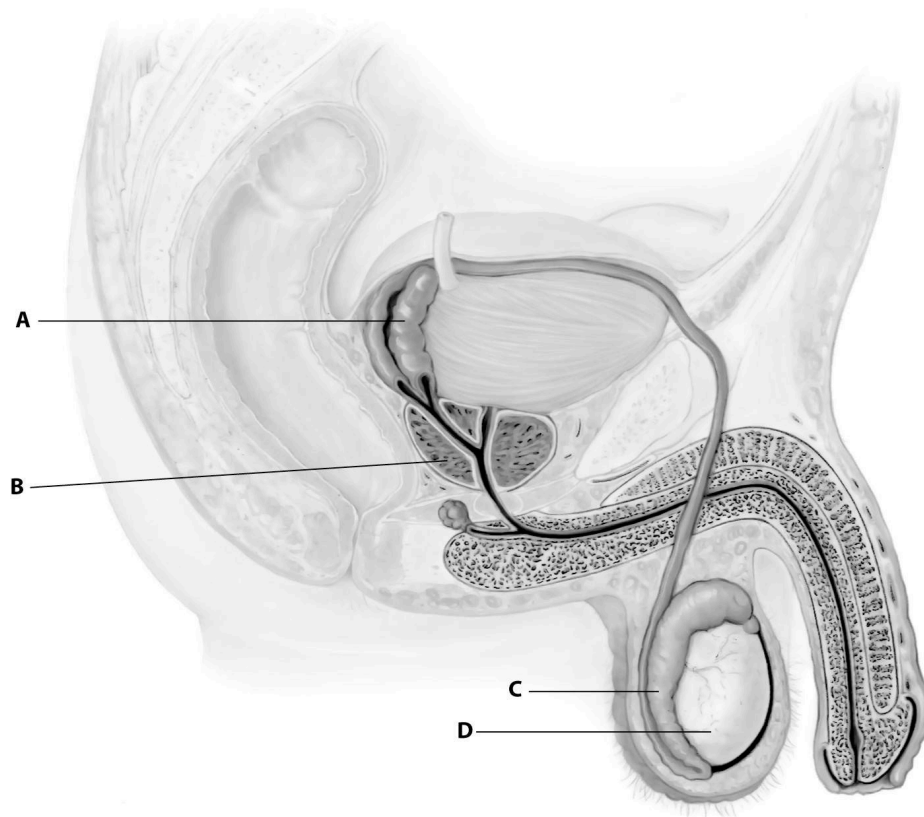
D) part D

Answer: B

Topic: 27.3

Skill: Application/Analysis

2) Which part of this figure depicting the human male reproductive system is the epididymis?



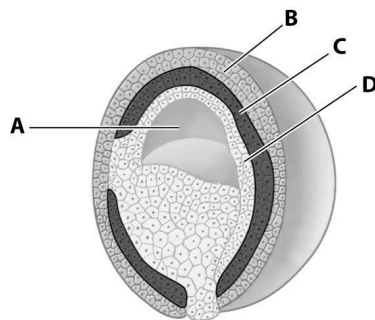
- A) part A
- B) part B
- C) part C
- D) part D

Answer: C

Topic: 27.4

Skill: Knowledge/Comprehension

3) Which part of this figure depicting a gastrula is the mesoderm?



- A) part A
- B) part B
- C) part C
- D) part D

Answer: C

Topic: 27.11

Skill: Knowledge/Comprehension

27.3 Scenario Questions

After reading the paragraph, answer the question(s) that follow.

Brittany's family includes several individuals with a genetic disorder that affects primarily males. Her husband Tony has no history of the disease to pass on to their children. They've decided that their best chance to have a healthy family is to have only daughters. Through a new type of assisted reproductive technology, it's possible to separate sperm that will produce sons from those that will produce daughters. Brittany's eggs will be fertilized by in vitro fertilization (IVF) with sperm that can produce only daughters. The developing female embryo can be implanted into her uterus to complete development normally.

- 1) The daughter-producing sperm used to fertilize Brittany's eggs should be
- A) diploid primary spermatocytes.
 - B) haploid secondary spermatocytes.
 - C) haploid sperm cells.
 - D) diploid sperm cells.

Answer: C

Topic: 27.2, 27.5

Skill: Knowledge/Comprehension

- 2) For IVF to be completed successfully, several _____ should be removed from Brittany's ovaries.
- A) primary oocytes
 - B) secondary oocytes
 - C) follicles
 - D) endometrial fragments

Answer: B

Topic: 27.5, 27.18

Skill: Knowledge/Comprehension