IGCSE Biology – Human Reproduction Practice Test (Sample)

Study Guide

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Questions

1. What is a zygote?

A. A small egg cell

B. The first cell formed by the fusion of sperm and egg

C. The fluid surrounding the fetus

D. A type of reproductive hormone

2. Which structure contains the genetic material in a sperm cell?

A. Nucleus

B. Cytoplasm

C. Cell membrane

D. Flagellum

3. During what phase does labor begin?

A. Fetal development

B. Zygotic phase

C. Embryonic phase

D. Gestational phase

4. Which tube transports urine from the bladder to the outside of the body?

A. Urethra

B. Ureter

C. Oviduct

D. Uterus

5. Which of the following factors can affect human fertility?

A. Age, hormone levels, health, and lifestyle factors

B. Stress levels and career success

C. Geographical location and weather conditions

D. Education level and economic status

6. What is the name given to the diploid cell formed when a sperm fertilizes an ovum?

A. Zygote

B. Embryo

C. Blastocyst

D. Gamete

7. What is the genotype for males in humans?

A. XX

B. XY

C. YY

D. XYY

8. What occurs during the luteal phase of the menstrual cycle?

A. The corpus luteum forms and secretes progesterone to prepare the uterus for potential pregnancy

B. Ovulation occurs and an egg is released

C. The menstrual flow begins

D. The lining of the uterus thickens

9. What is a primary sexual characteristic in females?

A. Development of female reproductive organs

B. Menstrual cycle regulation

C. Breast development

D. Voice pitch changes

10. What is the average length of a menstrual cycle?

A. 21 days

B. 28 days

C. 30 days

D. 35 days

Answers

1. B
2. A
3. D
4. A
5. A
6. A
7. B
8. A
9. A
10. B

Explanations

1. What is a zygote?

A. A small egg cell

B. The first cell formed by the fusion of sperm and egg

C. The fluid surrounding the fetus

D. A type of reproductive hormone

A zygote is defined as the first cell that is formed when a sperm cell successfully fertilizes an egg cell. This process of fertilization involves the merging of genetic material from both the male and female gametes, resulting in a single diploid cell that contains a complete set of chromosomes—half contributed by the sperm and half from the egg. The zygote then undergoes a series of cell divisions, leading to the development of an embryo. This is a fundamental concept in human reproduction, as the zygote marks the very beginning of the developmental process that can lead to the formation of a new organism. The incorrect options represent different biological concepts unrelated to the definition of a zygote. The mention of a small egg cell relates to an oocyte rather than a zygote. The fluid surrounding the fetus refers to amniotic fluid, which serves a different physiological role during pregnancy. A type of reproductive hormone does not define a zygote either; hormones are involved in various reproductive processes, but they are not the cells that arise from fertilization.

2. Which structure contains the genetic material in a sperm cell?

A. Nucleus

B. Cytoplasm

C. Cell membrane

D. Flagellum

The nucleus is the structure in a sperm cell that contains the genetic material. In the case of sperm, the nucleus holds the DNA, which is crucial for passing genetic information to the egg upon fertilization. This DNA is tightly packaged in the nucleus to ensure it stays protected and is efficiently delivered during reproduction. The other structures mentioned do not contain the genetic material. For instance, the cytoplasm is involved in various cellular processes but does not store DNA. The cell membrane serves as a protective barrier for the cell and regulates the movement of substances in and out but does not store genetic information. The flagellum is responsible for the motility of the sperm, allowing it to swim towards the egg but does not contain any genetic material either. Thus, the nucleus stands out as the vital component for genetic inheritance in sperm cells.

3. During what phase does labor begin?

A. Fetal development

B. Zygotic phase

C. Embryonic phase

D. Gestational phase

Labor begins during the gestational phase, which encompasses the entire period of pregnancy from conception to birth. This phase includes multiple stages, with labor being the culmination of the gestational process. The gestational phase is characterized by significant physical changes and developmental milestones, preparing the body for childbirth. During labor, the body undergoes a series of physiological changes, including contractions of the uterus, cervical dilation, and the eventual delivery of the baby. This process is initiated typically around the end of the gestational phase when the fetus is fully developed and ready to be born.

4. Which tube transports urine from the bladder to the outside of the body?

A. Urethra

B. Ureter

C. Oviduct

D. Uterus

The urethra is the tube responsible for transporting urine from the bladder to the exterior of the body. It plays a vital role in the urinary system, allowing waste to be excreted. The bladder stores urine until it is ready to be expelled, and when it contracts, urine is pushed into the urethra. In contrast, the ureter is a tube that carries urine from the kidneys to the bladder, while the oviduct (also known as the fallopian tube) is involved in the female reproductive system, facilitating the transport of eggs from the ovaries to the uterus. The uterus itself is an organ where a fertilized egg can develop during pregnancy. Hence, the urethra stands out as the correct option for the role of transporting urine to the outside.

5. Which of the following factors can affect human fertility?

A. Age, hormone levels, health, and lifestyle factors

B. Stress levels and career success

C. Geographical location and weather conditions

D. Education level and economic status

The correct choice highlights several key factors that influence human fertility: age, hormone levels, health, and lifestyle factors all play significant roles. Age is crucial in fertility; women are generally most fertile in their 20s and early 30s, after which fertility declines. For men, while they can remain fertile longer, advancing age can affect sperm quality. Hormone levels directly influence reproductive functions. In women, hormones regulate the menstrual cycle and ovulation, while in men, hormones like testosterone are vital for sperm production. Any imbalance in these hormones can lead to fertility issues. Health status is also critical. Conditions such as obesity, diabetes, or sexually transmitted infections can impair fertility. Chronic illnesses and certain medications might have negative effects on reproductive health as well. Lifestyle factors, including diet, exercise, substance use (like alcohol and tobacco), and stress management, can significantly impact fertility. A healthy lifestyle generally promotes better reproductive health, while poor lifestyle choices can lead to fertility struggles. The other options, while they touch upon social and environmental aspects, do not directly connect to the biological and physiological factors that distinctly affect human reproductive functions as outlined in the correct choice.

6. What is the name given to the diploid cell formed when a sperm fertilizes an ovum?

A. Zygote

B. Embryo

C. Blastocyst

D. Gamete

The diploid cell formed when a sperm fertilizes an ovum is known as a zygote. This process marks the beginning of a new organism's development, as the zygote is formed by the fusion of the genetic material from both the sperm and the ovum, which each contain haploid sets of chromosomes. When they combine, they restore the diploid number, providing a complete set of genetic information. The zygote undergoes several rounds of cell division (mitosis) and begins the process of development, eventually forming an embryo. However, at the initial stage when the sperm and ovum fuse, the correct term is zygote, distinguishing it from later developmental stages such as the embryo, which refers to a more developed organism that follows the zygote stage. The terms blastocyst and gamete do not apply here; a blastocyst refers to a specific stage of development that occurs after the zygote has divided and formed a hollow ball of cells, while gametes are the reproductive cells (sperm and ova) that combine during fertilization. Thus, zygote accurately describes the initial diploid cell resulting from fertilization.

7. What is the genotype for males in humans?

A. XX

B. XY

C. YY

D. XYY

The genotype for males in humans is XY. This designation is based on the presence of two different sex chromosomes: one X chromosome and one Y chromosome. The X chromosome carries genes that are important for various physiological functions, while the Y chromosome carries genes crucial for male sex determination and the development of male reproductive structures. Males inherit an X chromosome from their mother and a Y chromosome from their father during fertilization, leading to the XY combination. This arrangement triggers the development of male characteristics, such as the formation of testes, which produce sperm and male hormones. The other options do not represent the typical male genotype. The XX combination is characteristic of females, while YY and XYY do not typically represent the standard genotypic make-up for males in the human species. Understanding the XY genotype helps in comprehending how sex-linked traits and genetic inheritance work in humans.

8. What occurs during the luteal phase of the menstrual cycle?

A. The corpus luteum forms and secretes progesterone to prepare the uterus for potential pregnancy

B. Ovulation occurs and an egg is released

C. The menstrual flow begins

D. The lining of the uterus thickens

During the luteal phase of the menstrual cycle, the corpus luteum, which develops from the follicle after ovulation, secretes progesterone. This hormone plays a crucial role in preparing the endometrium, or uterine lining, for a potential pregnancy. If fertilization occurs, progesterone maintains the thickened lining, which is essential for supporting an embryo. If fertilization does not happen, the corpus luteum degenerates, causing progesterone levels to drop, which ultimately leads to menstruation. This phase is vital for establishing the conditions necessary for a successful pregnancy or for the initiation of the menstrual flow if pregnancy does not occur. The other processes mentioned in the options relate to different phases of the menstrual cycle. Ovulation is the release of the egg, which occurs in the follicular phase before the luteal phase begins. The menstrual flow is a result of the shedding of the uterine lining and takes place at the start of a new cycle once the luteal phase has concluded. The thickening of the uterine lining occurs primarily during the follicular phase under the influence of estrogen before the luteal phase, when progesterone further maintains that lining. Therefore, the correct answer captures the specific hormonal changes and physiological preparations that characterize this

9. What is a primary sexual characteristic in females?

A. Development of female reproductive organs

B. Menstrual cycle regulation

C. Breast development

D. Voice pitch changes

A primary sexual characteristic in females refers to the anatomical structures that are directly involved in reproduction and are present at birth. The development of female reproductive organs, such as the ovaries, fallopian tubes, uterus, and vagina, is a key aspect of primary sexual characteristics. These organs are essential for the functions of reproduction, including ovulation, fertilization, and gestation. In contrast, menstrual cycle regulation, breast development, and changes in voice pitch are secondary sexual characteristics or functions that emerge later in life due to hormonal changes, primarily during puberty. While they are indeed important aspects of female sexual development, they do not constitute primary sexual characteristics since they do not involve the intrinsic reproductive structures themselves.

10. What is the average length of a menstrual cycle?

A. 21 days

B. 28 days

C. 30 days

D. 35 days

The average length of a menstrual cycle is widely considered to be about 28 days. This standard is based on the typical hormonal and physiological changes that occur within the female body. A menstrual cycle begins on the first day of menstruation and lasts until the start of the next period. During this cycle, various phases occur: the follicular phase, ovulation, the luteal phase, and the menstrual phase. The cycle is influenced by hormones such as estrogen and progesterone, which prepare the body for potential pregnancy. While individual cycles can vary significantly, with some women experiencing shorter or longer cycles, 28 days remains the most commonly cited average. Understanding the average length is important for tracking fertility, menstrual health, and planning for contraception or pregnancy. It also helps individuals recognize any irregularities in their cycles, which may warrant further exploration with a healthcare provider.