**CHAPTER 3 - REPRODUCTION**

**REPRODUCTION IN VERTEBRATES**

**QUESTION 1**

1. External fertilisation

2. Precocial

3. Amnion

4. Ovipary

5. Amniotic egg

**QUESTION 2**

1. A – embryo B – amnion C – air pocket D – yolk sac E – allantois

F – albumen G – shell H – chorion

2. E – collects and stores nitrogenous waste produced by the embryo

D – provides the embryo with nutrients

3. More yolk would allow for greater development of the chick so it can be more independent after hatching

4. Porous to allow for gaseous exchange

5. Table showing differences between Precocial and Altricial development

|  |  |
| --- | --- |
| **Precocial development** | **Altricial development** |
| Eyes opened | Eyes closed |
| Body covered in down feathers | Body covered in little or no down feathers |
| Able to move after hatching | Unable to move after hatching |
| Able to feed themselves | Fed by parents |

**QUESTION 3**

1. External fertilisation-large numbers of gametes are produced to increase the chances of successful fertilistion

2. Ovovivipary-development of a fertilised egg that is retained in the male seahorse’s pouch, the young obtain nutrients from the yolk of the egg.

3. Vivipary-The embryo develops inside the uterus and is protected by the amniotic fluid.

4. Penguin

**MALE REPRODUCTIVE SYSTEM**

**QUESTION 1**

1. Scrotum

2. Ejaculation

3. Testosterone

4. Vas deferens

5. Urethra

**QUESTION 2**

1. a) C

b) F

c) H

2. A – stores urine temporarily

B – produces a fluid that activates the sperm

D – transfers semen into the vagina

E – secretes seminal fluid with nutrients and enzymes for the sperm

G – stores sperm and allows them to mature

3. Sperm together with the fluid from the accessory glands, namely, the seminal vesicle, prostate gland and Cowper’s gland are released to form the semen that is ejaculated via the urethra.

4. Swollen prostate gland exerts pressure on the ureter causing the ureter to become narrower thus making it difficult to urinate.

5. Maintains a lower temperature than the body temperature for maximum sperm production

6. a) epididymis

b) seminal vesicle

c) Cowper’s gland

d) Prostate gland

e) Testis

7. Epididymis – vas deferens – ejaculatory duct – urethra

**QUESTION 3**

1. A-acrosome B-head C-middle piece D-tail

2. The front of the head of the sperm cell contains an acrosome which carries enzymes to dissolve a path into the ovum

Nucleus of the sperm carries genetic material of the male

The middle piece contains mitochondria which releases energy so that the sperm can swim

The long tail enables the sperm to swim towards the ovum

The contents of the sperm cell are reduced/condensed making the sperm light for efficient movement

Sperm cell is streamlined to allow for easy movement

3. No acrosome will be present in the sperm cell therefore no enzymes will be present. The sperm cell will not be able to penetrate the ovum therefore no fertilisation will occur

4. During spermatogenesis under the influence of testosterone the diploid cells in the seminiferous tubules of the testes undergo meiosis to form haploid spermatozoa.

**FEMALE REPRODUCTIVE SYSTEM**

**QUESTION 1**

1. Oestrogen

2. LH

3. Endometrium

4. Menstruation

5. Graafian

**QUESTION 2**

1. a) Muscular structure in which foetus develops

b) Tube that carries urine out of the bladder

c) Receives semen and is the birth canal

2. Ovary

3. Fallopian tube

4. Endometrium

**QUESTION 3**

1. a) Graafian

b) Corpus luteum

2. a) Ovulation

b) Day 14

3. a) FSH

b) LH

c) Progesterone

4. Meiosis

5. Under the influence of FSH the diploid cells in the ovary undergo mitosis to form numerous follicles. One cell inside the follicle enlarges and undergoes meiosis. Of the 4 cells that are produced only one survives to form a mature ovum.

6. The germinal cells that lines the ovary undergoes meiosis to for the ovarian follicles which matures into the Graafian follicle under the influence of FSH. A haploid ovum forms inside the Graafian follicle which swells and bursts to release the ovum during ovulation under the influence of LH and oestrogen. The ovum is released into the fallopian tube, the empty Graafian follicle develops into the corpus luteum which secretes progesterone that maintains the thickness of the endometrium. When progesterone is secreted this inhibits the production of FSH so no new follicle forms.

**QUESTION 4**

1. 14

2. 1 to 5

3. a) Promotes meiosis and the formation of the ovarian follicle which then matures into the Graafian follicle

b) Promotes ovulation and the formation of the corpus luteum

4. Day 1-2: LH is constant causing the ovarian follicle to develop into the Graafian follicle

Day 12-14: LH increases resulting in ovulation on day 14 thereafter LH levels decrease/drop and remain relatively constant from day 14 -28

5. As the levels of oestrogen increases, so too does the thickness of the endometrium

6. a) Corpus luteum

b) Progesterone promotes the thickening of the endometrium which prepares the endometrium for the implantation of the blastula

7. High levels of progesterone inhibits/decreases the secretion of FSH

8. To prevent the formation of a new follicle

9. FSH and oestrogen

10. No-corpus luteum is reduced in size/disintegrating and the endometrium is breaking down thickness is decreasing/reduced

**FERTILISATION AND EMBRYONIC DEVELOPMENT**

**QUESTION 1**

1. A – ovary E – fallopian tube G – endometrium H – spermatozoan

2. Fallopian tube

3. Cilia / ciliated epithelium

4. Blastocyst

5. a) B

b) A

c) H

d) C

6. In the fallopian tubes one sperm cell makes contact with the ovum’s membrane. The nucleus of the sperm enters the ovum. The membrane of the ovum becomes impenetrable to other sperm cells. The nucleus of the sperm cell fuses with the nucleus of the ovum to form a diploid zygote.

7. The diploid zygote undergoes repeated mitosis to form a solid mass of cells called the morula. The morula continues to divide via mitosis to form a ball of cells with a fluid filled cavity called the blastula/blastocyst. The outer membrane of the blastocyst forms the chorionic villi which attaches to the endometrium.

8. Progesterone levels would decrease, the endometrium will no longer be maintained and miscarriage would occur.

9. Yes, the other fallopian tube is still present and fertilisation may still take place and the developing embryo can move along this fallopian tube to the uterus/ during IVF the embryo can be inserted into her uterus

10. Insufficient space for growth/no placenta/decreased blood supply/no nutrients/no oxygen

**QUESTION 2**

1. A – chorion B – amnion C – amniotic fluid D – vagina E – placenta

F – chorionic villi G – umbilical cord H – foetus I – endometrium

J – wall of uterus

2. a) Umbilical artery

b) Umbilical vein

c) Umbilical vein

3. a) E

b) I

c) D

d) J

e) C

f) B

g) G

4. Serves as a organ for gaseous exchange, excretion and nutrient supply for the foetus

Produces antibodies that provide passive immunity for the foetus

Secretes progesterone that maintains the uterine wall during pregnancy

Serves as a micro-filter that prevents pathogenic bacteria from the mother entering the foetus

5. Gaseous exchange system/ excretory system/digestive system

6. The foetus will receive less nutrients and therefore have a lower birth mass/underdevelopment. The foetus will receive less oxygen and therefore have a lower birth mass/under-development. Waste will accumulate which will affect the functioning of the foetus.

7. Acts as a shock-absorber/ protects the embryo against dehydration/ protects the embryo against temperature changes