

Cecil Andrews College

**Year 11**

**ATAR**

**Human Biology**

**Test 6**

**Human Reproduction**

**& Development**

Syllabus Points:

* the production of offspring is facilitated by the structure and function of the male and female reproductive systems in producing gametes for fertilisation and providing for the developing embryo and foetus.
* both male and female reproductive systems are regulated by hormones, including the regulation of the menstrual and ovarian cycles.
* human gametes are produced through spermatogenesis and oogenesis, which are specific forms of meiosis, but varying significantly in process and products.
* for the establishment of a pregnancy, conception requires the union of viable sperm and ovum at the optimal time in the ovarian cycle.
* the development of the embryo after implantation involves the differentiation of cells into three different germ layers that will eventually produce specific systems in the body and the placenta.
* the stages of labour include birth, during which there are circulatory system changes in the child.
* there are a variety of assisted reproductive technologies to help overcome infertility problems, but each has its limitations, risks and benefits.
* there are a range of techniques available to genetically screen embryos before implantation or during early development, including blood tests, amniocentesis and chorionic villi sampling.

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Section** | **Available Marks** | **Achieved Marks** |
| **Multiple Choice** | **25** |  |
| **Short Answer** | **42** |  |
| **Extended Response** | **10** |  |
| **Total** | **77** |  |

**Section One: Multiple-choice (25 Marks)**

This section has **25** questions. Answer **all** questions on the separate Multiple-choice Answer Sheet provided. For each question shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, do not erase or use correction fluid, and shade your new answer. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

1. TDuring oogenesis, how may viable ova are produced from one primary oocyte?
   1. One.
   2. Two.
   3. Three.
   4. Four.
2. Follicle stimulating hormone (FSH) stimulates the:
   1. development of the corpus luteum.
   2. production of progesterone,
   3. production and development of a mature ovum in the female, and the production of sperm in the seminiferous tubules in the male.
   4. vascularisation and glandurisation of the endometrium, resulting in it becoming thickened.
3. The placenta is the organ that allows for:
   1. mixing of maternal blood and foetal blood.
   2. foetal blood transferring oxygen to maternal blood.
   3. maternal blood receiving nutrients from foetal blood.
   4. foetal blood receiving nutrients.
4. The greatest chance for an ovum to be fertilised, is having sexual intercourse:
   1. at the beginning of the menstrual flow.
   2. at the end of the menstrual flow.
   3. at the end of the menstrual cycle.
   4. two weeks after menstruation begins.
5. Sperm are produced in the:
   1. seminal vesicles.
   2. seminiferous tubules.
   3. interstitial cells.
   4. vas deferens.
6. In its passage through the oviduct to the uterus, the fertilised egg:
   1. swims by itself.
   2. descends by gravity.
   3. is propelled by cilia.
   4. is moved by spindles.
7. Fertilisation of the human ovum normally occurs in the:
   1. uterine tubes.
   2. uterus.
   3. uterine wall.
   4. anywhere, where sperm and ovum meet.
8. The ball of cells consisting of an outer trophoblast layer, an inner cell mass and a fluid-filled cavity is called:
   1. a zygote.
   2. a blastocyst.
   3. a stem cell.
   4. a multipotent cell.

Question 9 relates to the following information.

During childbirth, there are a number of key events:

* + - 1. dilation of the cervix.
      2. crowning.
      3. delivery of the placenta.
      4. breaking of the waters.
      5. contractions of the uterus.
      6. secretion of oxytocin.
      7. delivery of the baby.

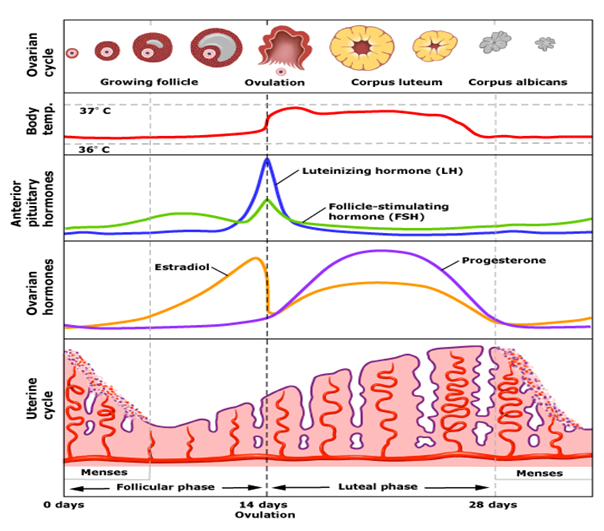
1. Using the above, the normal sequence of events is:
2. vi, I, v, ii, iv, iii and vii.
3. vi, v, I, iv, ii, vii, and iii.
4. I, ii, iv, vi, v, vii and iii.
5. v, vi, I, ii, iv, vii and iii.
6. The primary sexual organ is a female is the:
   1. uterus.
   2. vagina.
   3. womb.
   4. ovary.
7. Which of the following is the first **haploid** cell formed during the process of spermatogenesis?
   1. Spermatogonia.
   2. Primary spermatocytes.
   3. Secondary spermatocytes.
   4. Spermatids.
8. Choose the correct order for the path of sperm from the testis to outside the body.
   1. Vas deferens→epididymis→ejaculatory duct→penis.
   2. Epididymis→vas deferens→ejaculatory duct→penis.
   3. Ejaculatory duct→vas deferens→epididymis→penis.
   4. Penis→ejaculatory duct→epididymis→vas deferens.
9. Amniotic fluid is important by serving as a medium:
   * + 1. for providing nutrients to the embryo
       2. to provide a constant temperature surrounding the embryo
       3. to act as a shock absorber for the embryo
   1. i only.
   2. I and ii only.
   3. ii and iii only.
   4. I, ii and iii.
10. If a couple who had been trying unsuccessfully to have a baby wished to try IVF using the woman’s own ovum and the man’s sperm, which infertility problem is it most likely that they have?
    1. Failure of the sperm to mature.
    2. Reduced levels of progesterone causing the endometrium to break down.
    3. Insufficient room for the foetus in the uterus.
    4. Blocked uterine tubes (Fallopian tubes) due to an earlier infection.
11. The most vulnerable time for adverse effects on the development of the offspring is during:
    1. conception.
    2. the first three months.
    3. the last trimester.
    4. birth.
12. A developing baby needs calcium, phosphorus and vitamin D for:
    1. rapid growth.
    2. strong muscular development.
    3. skeletal development.
    4. energy.
13. Choose the correct order of sperm production.
    1. Primary spermatocyte, secondary spermatocytes, spermatogonium, spermatids.
    2. Primary spermatocyte, secondary spermatocyte, spermatids, spermatozoa.
    3. Spermatogonium, primary spermatocyte, secondary spermatocytes, spermatids.
    4. Primary sperm, secondary spermatocytes, spermatogonium, spermatids, spermatozoa.
14. A short time after the baby is born, the after-birth is expelled. This is composed of:
    1. the membranous bag that contained the baby.
    2. wastes produced by the developing foetus.
    3. water fluid also called colostrum.
    4. the placenta and associated foetal membranes.
15. Which of these structures is formed from the ectoderm?
    1. Dermis of skin.
    2. Muscle.
    3. Bone.
    4. Nervous system.
16. Stem cells which give rise to all of the cell types that make up the human body and also all of the cell types that make up the membranes that surround the developing embryo (including the placenta) are called:
    1. pluripotent stem cells.
    2. multipotent stem cells.
    3. totipotent stem cells.
    4. impotent stem cells.
17. A test that uses a thin needle to extract fluid from the amniotic sac during pregnancy to check for foetal abnormalities such as Down’s Syndrome is :
    1. an ultrasound.
    2. amniocentesis.
    3. genetic profiling.
    4. chorionic villus sampling.
18. Which of the following chemicals is known to have a serious teratogenic effect?
    1. Paracetamol.
    2. Alcohol.
    3. Folic acid.
    4. Lactic acid.
19. As cells develop, they lose their potential to differentiate into a variety of cells. This is referred to as their potency. Which order below shows the cells in **decreasing** order of potency?
    1. Totipotent→pluripotent→multipotent.
    2. Pluripotent→totipotent→multipotent.
    3. Multipotent→totipotent→pluripotent.
    4. Totipotent→multipotent→pluripotent.
20. The Ductus arteriosis is a duct which allows blood to:
    1. move from the right atrium directly to the left atrium.
    2. bypass the liver and move directly towards the vena cava.
    3. move from the aorta directly to the pulmonary artery.
    4. move from the pulmonary artery directly to the aorta.
21. During parturition, the cervix will be fully dilated by the:
    1. end of the first stage of labour.
    2. middle of the second stage of labour.
    3. end of the third stage of labour.
    4. end of the second stage.

**Section Two: Short answer (58 Marks)**

This section has **nine (9)** questions. Answer **all** questions. Write your answers in the spaces provided.

Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate the original answer where the answer is continued, i.e. give the page number.

1. Study the diagram below and then answer the questions that follow:

[](https://www.google.com.au/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwjkw-TCjZneAhVHfysKHSzPBkIQjRx6BAgBEAU&url=https://medium.com/@bicspuc/menstrual-cycle-an-important-process-of-human-reproduction-e22a4abce2e2&psig=AOvVaw12cEqcee2P-UWBfNG4MebL&ust=1540265263158875)

1. Name the process occurring at A. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1 mark)
2. Name the structure represented by B. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1 mark)
3. Identify the substances represented by:
   * + 1. C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1 mark)
       2. D \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1 mark)
       3. E \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1 mark)
4. Calculate the time period indicated by F \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(1 mark)

27. Describe the pathway sperm need to travel from the testes of a man to reach an ovum in a woman.

(4 marks)

1. The foetus can be affected by environmental factors which will have an influence on later development. Give two (2) different factors which may affect an unborn child and briefly describe their influence on the unborn child.

Factor 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Description: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Factor 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Description: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(6 marks)

1. Describe the changes undergone by the corpus luteum during a normal ovarian cycle.

* When ovum is released, follicle collapses forming corpus luteum
* Secretes progesterone to increase endometrial lining ready for implantation (1)
* If no fertilisation, breaks down into scar tissue 8-10 days after ovulation
* Scar tissue-corpus albicans (1) and eventually disappears

1. How do these changes differ if pregnancy occurs?

* If pregnancy occurs, corpus luteus continues to develop
* Secretes progesterone to maintain endometrium (1), develop & maintain placenta
* Begins to degenerate in third month of pregnancy(1)

1. Describe how follicle stimulating hormone (FSH) and luteinising hormone (LH) regulate the male reproductive system.

* FSH stimulates the epithelial tissue of the seminiferous tubules in the testes to produce sperm (1)
* LH stimulates cells in the testes to secrete the hormone testosterone (1)

1. Motor skills develop as a child learns to control the movements of parts of its body and involved coordination of muscles. For the three patterns of motor development, explain what they mean and identify an example of each.

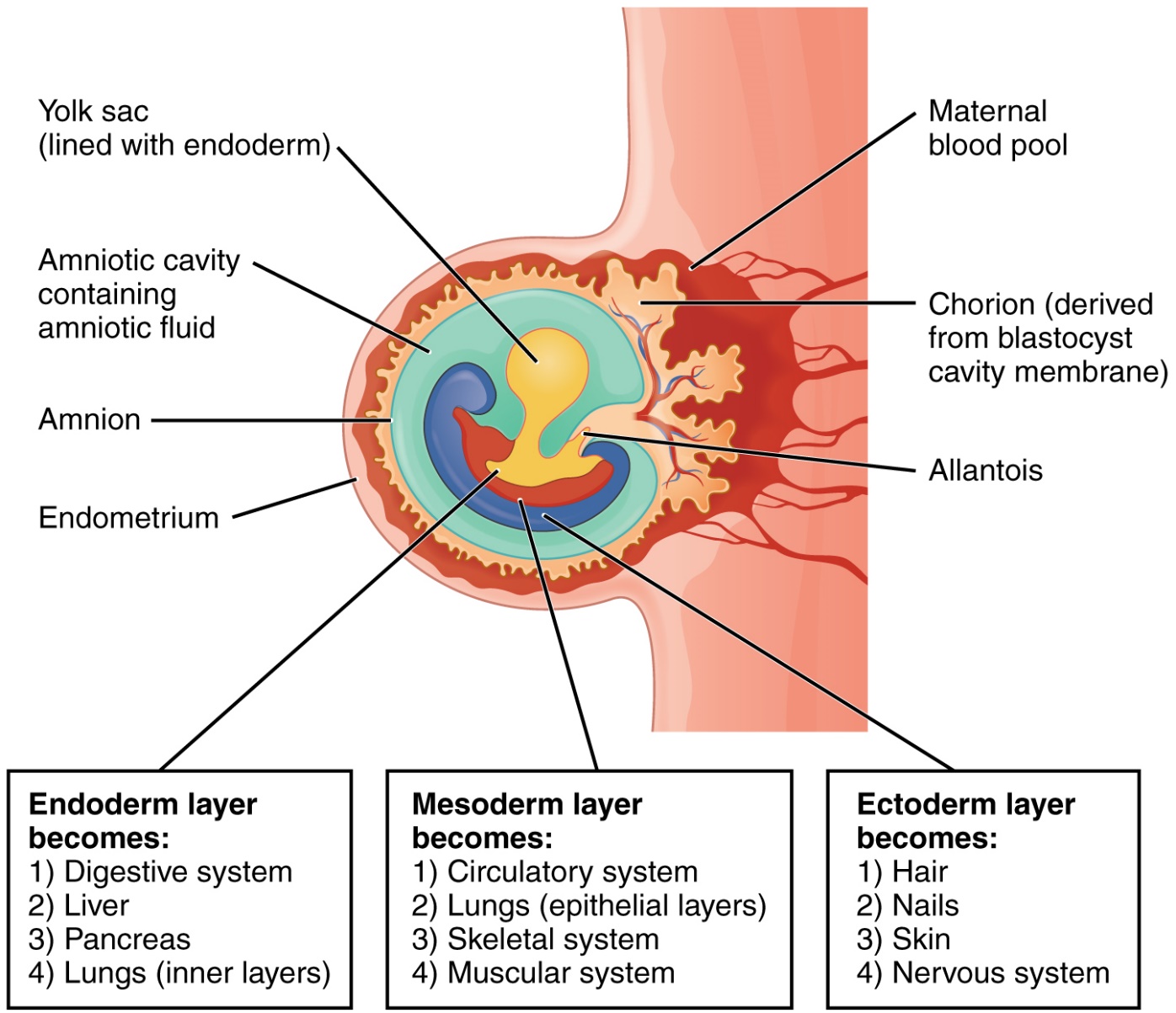
|  |  |  |
| --- | --- | --- |
| **Pattern of Motor Development** | **Explanation** | **Example** |
| Cephalocaudal | Development from head to foot | Follow object with eyes before able to pick it up  Any reasonable |
| Proximodistal | Development from trunk outwards | Control of upper arm before forearm, then hand, then fine movements of fingers |
| Gross to Specific | Development of larger muscle movements before fine muscle movements | Whole body rolls over, then crawl, then walk  Any reasonable |

1. In what way do stems differ from ordinary body cells?

Stem cells are not specialised, but have the ability to become specialised cells (to differentiate). They can also undergo repeated mitosis.

1. Outline two ways to monitor the health of the foetus.

* ultrasound – description
* amniocentesis –
* chorionic villus sampling (CVS) -

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**Section Three: Extended answer (10 Marks)**

This section contains **two (2)** questions. You must answer **one (1)** question. Write your answers in the lined pages provided.

Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Responses could include clearly labelled diagrams with explanatory notes; lists of points with linking sentences; clearly labelled tables and graphs; and annotated flow diagrams with introductory notes.

Suggested working time: 50 minutes.

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