**ATAR HUMAN BIOLOGY – UNIT 2**

**Task 10 – Extended Response – Assisted Reproductive Technologies (ART)**

NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **WEIGHTING: 7.5 %**

TEACHER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **PART 1 MARKS = \_\_\_\_\_\_\_\_\_ /30 =\_\_\_\_\_\_\_\_\_\_**

**Conditions**

Time for the task

* Part 1: One week of homework time to research topic and complete notes. These will be collected in prior to the validation. 25%
* Part 2: One lesson for in-class validation – extended response, exam style questions. 75%

*This will be completed without the use of notes.*

**Part 1:**

Lucy and Fred have been trying to have a baby for several years with no success. They decided to go to a clinic for testing to determine why Lucy has not become pregnant. When the test results came back Lucy was diagnosed as having *Chlamydia*. While Fred was found to have a *Sperm Allergy.*

**Research the following relating to Lucy and Fred’s situation.**

1. a. Briefly describe how Lucy’s condition could lead to her having fertility problems. (2 marks)

b. Briefly describe the symptoms of Fred’s condition and explain why it could cause infertility. (2 marks)

2. Possible ART treatments for this couple include Surrogacy, GIFT and ICSI procedures. Using **dot points**, provide a step by step explanation for each treatment, including hormones, timing etc. (8 marks)

3. Produce a list that outlines the risks associated with any ART treatment. (5 marks)

4. Outlinethe financial, moral and ethical issues couples like Lucy and Fred must consider before using ART procedures? (3 marks)

5. There are a range of techniques available to genetically screen embryos before implantation and during development, these include pre-implantation genetic diagnosis, amniocentesis and chorionic villi sampling.

a. Describe how each technique is carried out, including the information that they provide. (6 marks)

b. Compile what moral/ethical and physiological considerations the couple would need to consider before using one of these techniques? (4 marks)

**\*\*Please include a bibliography for all sources used or just to help inform your understanding of a topic.**

**Marks will be deducted for information that has just been cut and pasted!**

**Answer Key – Part 1**

**Human Biology Unit 2 – ATAR Year 11**

**Extended Response – Assisted Reproductive Technologies (ART)**

**Part 1:**

Lucy and Fred have been trying to have a baby for several years with no success. They decided to go to a clinic for testing to determine why Lucy has not become pregnant. When the test results came back Lucy, had a severe case of *Endometriosis*. While Fred was found to have a *Sperm Allergy.*

**Research the following relating to Lucy and Fred’s situation.**

1. a. Briefly describe the details of Lucy’s condition. **(2)**

**\* one mark each**

*\* untreated chlamydia lead to scarring of uterus and fallopian tube*

*\* leads to PID which can cause infertility*

b. Briefly describe the details of Fred’s condition. **(2)**

**\* one mark each**

*\* allergic to own sperm so makes antibodies against them & swelling/rash or such like*

*\* white blood cells kill the sperm resulting in low sperm count*

2. Possible ART treatments for this couple include Surrogacy, GIFT and ICSI procedures. Using **dot points**, provide a step by step explanation for each treatment.

a. GIFT **(3)**

**correct procedure outlined (1)**

**hormones mentioned for egg stimulation and implantation/uterus lining (1)**

**indication of timing ie uterus lining will be mature enough for egg by time it reaches uterus. (1)**

*\* hormones (FSH) used to stimulate ovaries to produce increased number of eggs*

*\* eggs collected using ultrasound and fine hollow needle when mature (timing)*

*\* sperm collected, washed and best sperm selected, usually no hormones used*

*\* eggs and sperm are mixed together in a dish*

*\* gametes immediately transferred into the fallopian tubes*

*\* fertilisation occurs in fallopian tube*

b. ICSI **(3)**

**procedure to collect eggs and sperm (1)**

**sperm washed and best selected (1)**

**eggs cultured to day 2-5 before insertion (1)**

*\* hormones used to stimulate increase production of eggs*

*\* eggs collected using ultrasound and fine hollow needle*

*\* sperm collected, washed and best sperm selected, usually no hormones used*

*\* embryologist isolates sperm and injects it into individual egg*

*\* eggs cultured after fertilisation – can be 2 – 5 days*

*\* embryo transplanted into uterus using thin catheter through cervix*

**c. Surrogacy (2)**

**collect eggs and sperm and join (1)**

**IVF into surrogate mothers uterus/idea just “renting a uterus” (1)**

3. Produce a **list** that outlines the risks associated with any ART treatment. **(5)**

**\* one mark per point**

*\* negative reaction to medication*

*\* multiple births (twins, triplets, etc.)*

*\* procedure may not work*

*\* miscarriage*

*\* complications at birth*

*\* ectopic pregnancy*

*\* low birth weight*

*\* premature birth*

*\* birth defects*

4.  **Outline the financial, moral and ethical issues** Lucy and Fred must consider when using ART procedures? **(3)**

**\* ½ mark per point**

**\* any suitable 6**

*\* misinformed by clinic*

*\* what to do with extra eggs / sperm / embryo’s*

*\* who owns eggs / sperm / embryo’s*

*\* when does life begin*

*\* plenty of children to adopt why go through the procedure*

*\* stress on relationship*

*\* financial strain*

5. There are a range of techniques available to genetically screen embryos before implantation and during development, these include pre-implantation genetic diagnosis, amniocentesis and chorionic villi sampling.

a. Describe how each technique is carried out, including the information that they provide. (6 marks)

* *Pre implantation genetic diagnosis– testing of the chromosomes for disorders (1)  
  screening of sperm for sex selection and removal of cell from ball of cells and testing chromosomes (1)*
* *Amniocentesis – taking a sample of the amnion to find foetal cells and culture (1),   
  test chromosomes for genetic disorders done week 14-16 (1)*
* *Chorionic villi sampling – taking a sample of the chorionic villi to find foetal cells and culture(1)  
  test chromosomes for genetic disorders done week 10-14 (1)*

b. Compile what moral/ethical and physiological considerations the couple would need to consider before using one of these techniques? (4 marks)

**\*must have some comment about a valid point. Not just state**

* **physiological**
  + *testing can cause miscarriage (1)*
* **moral/ethical**
  + *termination before/ after 16 week mark (1)*
  + *which disease would you terminate(1)*
  + *how do people in society with a disease feel if people are terminating children with same condition(1)*