education

Department:
Education
PROVINCE OF KWAZULU-NATAL

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES

COMMON TEST

MARCH 2019

MARKS: 60

TIME: 1 hour

This question paper consists of 9 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers to each question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, protractor and a compass.
11. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.3) in the ANSWER BOOK, for example 1.1.4 A.

1.1.1 Two complimentary bases in a DNA strand are held together ...

A by strong nitrogen bonds.
B by weak hydrogen bonds.
C because they are coiled around each other.
D by weak nitrogen bonds.

1.1.2 Which of the following statements about species that use external fertilisation are correct?

(i) Most young survive to maturity
(ii) Water is needed for fertilization
(iii) Produce a small number of eggs
(iv) Produce a large number of eggs

A (i) and (ii) only
B (i), (ii) and (iv) only
C (ii) and (iii) only
D (ii) and (iv) only

1.1.3 Which of the following distinguishes prophase **1** of meiosis from prophase of mitosis?

A Nucleolus and nuclear membrane disappear
B Homologous chromosomes pair up
C Nuclear membrane breaks down
D Chromosomes become visible

(3 x 2) **(6)**

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1.2 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY, B ONLY, BOTH A AND B or NONE** of the items in COLUMN II. Write **A only, B only, both A and B,** or **none** next to the question number (1.2.1 to 1.2.2) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.2.1	The development in some birds where the hatchlings are able to feed on their own	A · Precocial B · Altricial
1.2.2	Holds together chromatids	A Chiasma · B Centromere

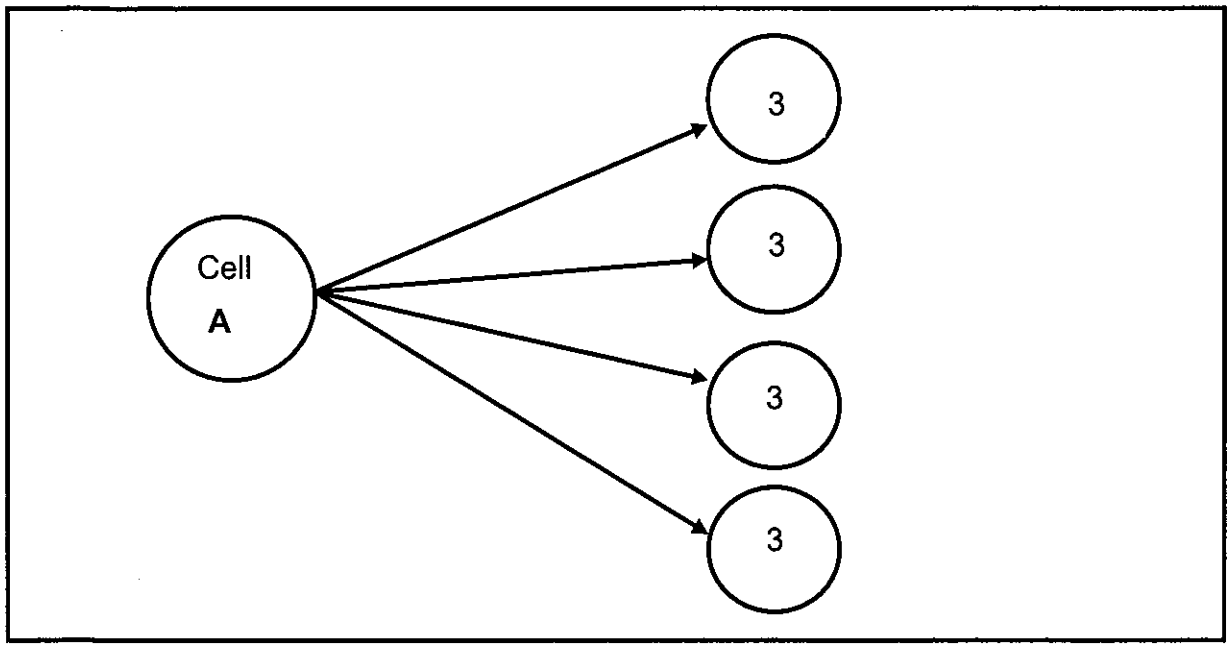
(2 x 2) **(4)**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1 The diagram below represents cell division.



2.1.1 Name the type of cell division represented in the diagram. (1)

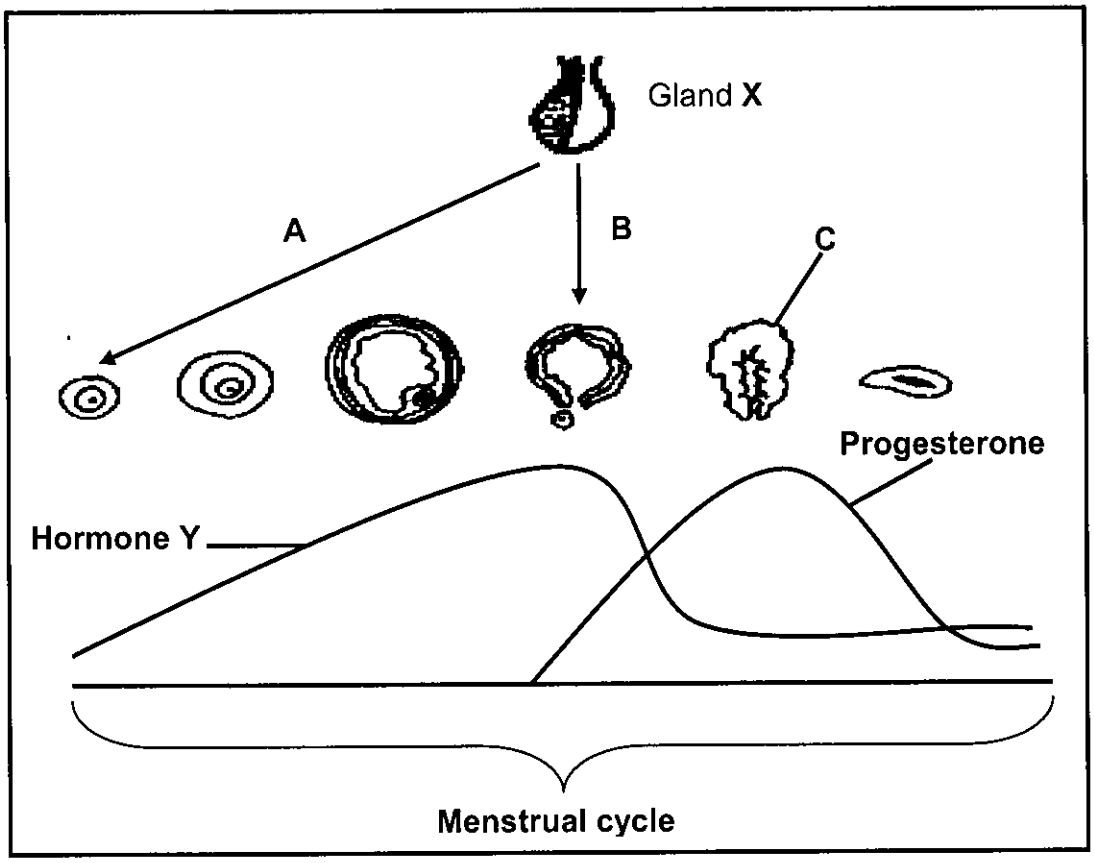
2.1.2 State where in the human male body does the type cell division mentioned in QUESTION 2.1.1 takes place. (1)

2.1.3 How many chromosomes are present in cell **A**? (1)

2.1.4 Explain what the effect will be, if the crossing over did not take place during the type cell division named in QUESTION 2.1.1 above. (2)

2.1.5 In the human karyotype the first 22 pairs of chromosomes are referred to as ... (1)
(6)

2.2 The diagram below represents the stages of the menstrual cycle.



2.2.1 Identify:

(a) Gland **X** (1)

(b) Hormone **B** (1)

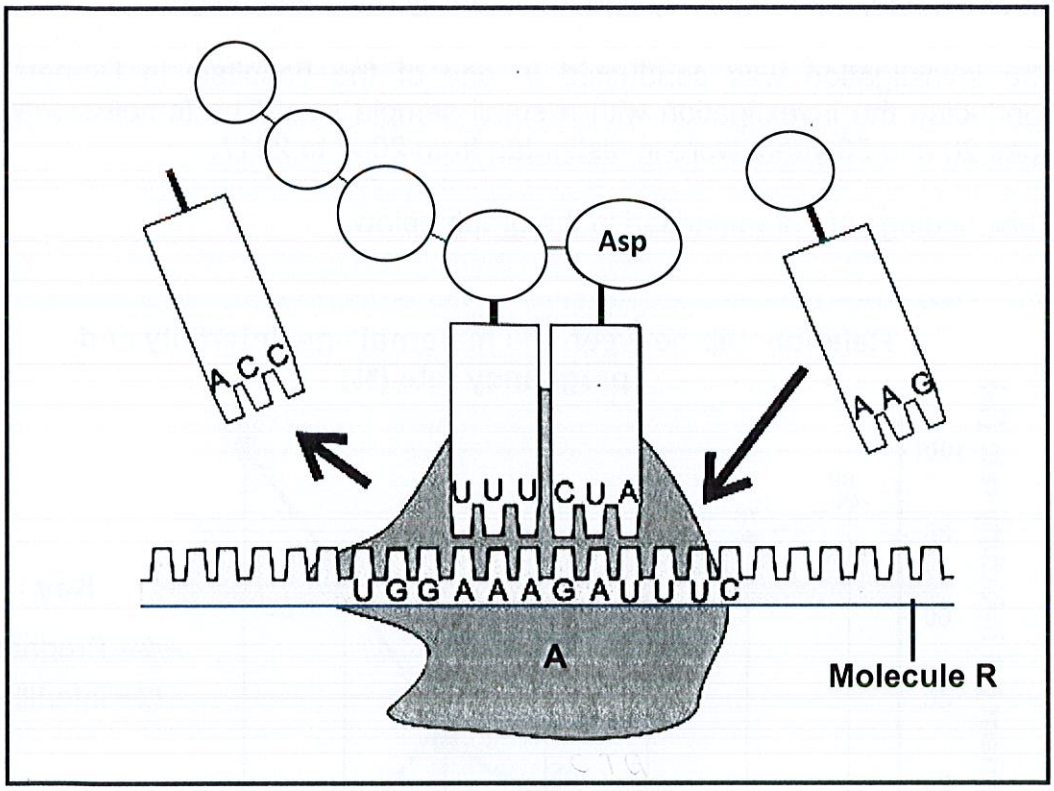
2.2.2 Give TWO visible reasons from the diagram indicating that fertilisation did not take place during this menstrual cycle. (2)

2.2.3 State the effect of hormone **Y** on the lining of the uterus. (1)

2.2.4 Explain the effect of the disintegrating corpus luteum on the menstrual cycle. (4)
(9)
[15]

QUESTION 3

3.1 The diagram below shows the part of a stage in protein synthesis.



3.1.1 Identify organelle **A**. (1)

3.1.2 How many codons are shown altogether in the molecule **R**? (1)

3.1.3 Give the DNA base triplet for the amino acid **Asp**. (1)

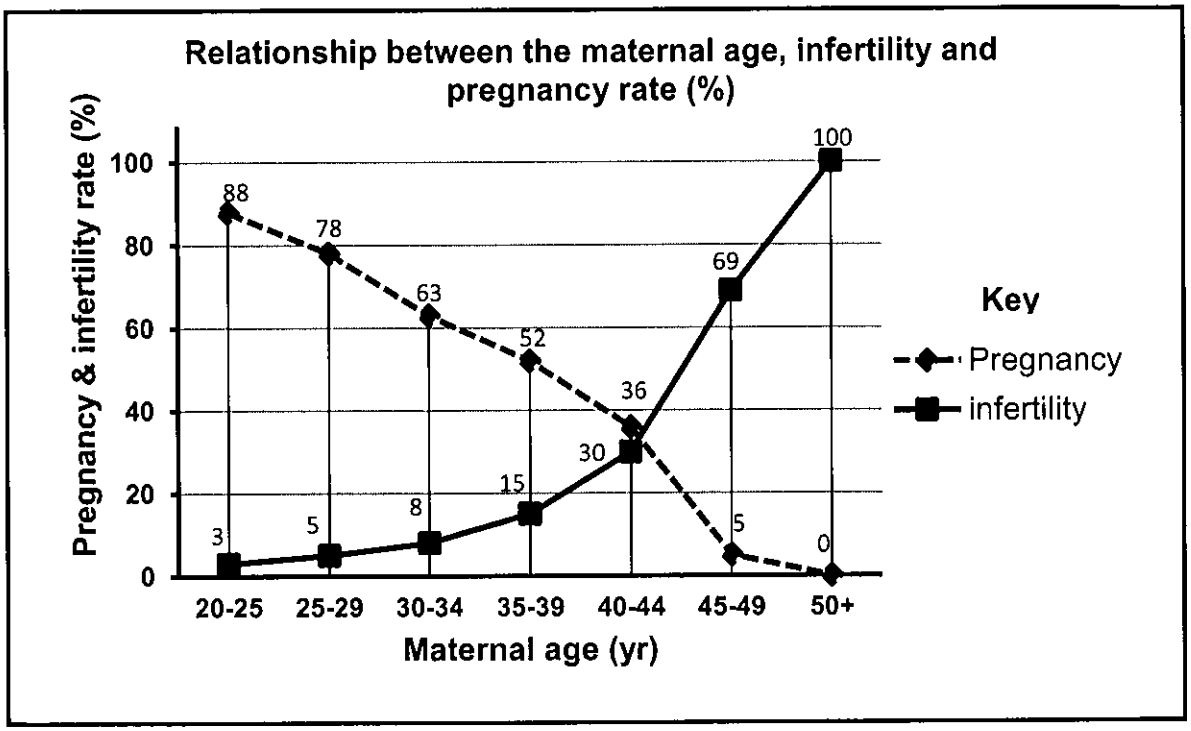
3.1.4 Name and describe the stage of protein synthesis shown in the diagram above (6)
(9)

3.2 Pregnancy is problematic in females aged between 17 and 35 years. The females aged between 40 and 45 years struggle to get pregnant.

Scientists conducted an investigation to establish the relationship between the maternal age, the pregnancy and the infertility rate percentage.

The investigation was conducted in one of the hospitals in Durban. He conducted the investigation with a small sample size. The females between ages 20 and 50 years were investigated from 2007 to 2017.

Their findings are summarised in the graph below.



3.2.1 Identify the:

(a) Dependent variable (1)

(b) Independent variable (1)

3.2.2 Refer to the passage above and state ONE way in which the scientists failed to ensure the reliability during this investigation. (1)

3.2.3 Describe the relationship shown in the graph by the maternal age, the pregnancy and infertility rate percentage. (3)
(6)
(15)

TOTAL SECTION B: 30

SECTION C

QUESTION 4

Describe the DNA replication and the process of oogenesis as it takes place in the ovary. Also describe how abnormal meiosis may results in an egg cell with one chromosome less.

Content: (17)
Synthesis: (3)
(20)

NOTE: NO marks will be awarded for answers in the form of tables, flow charts or diagrams.

TOTAL SECTION C: 20

GRAND TOTAL: 60

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MARCH 2019 COMMON TEST

MEMORANDUM

KS: 60

randum consists of 4

SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	B / D✓✓		
	1.1.3	B✓✓	(3 x 2)	**(6)**
1.2	1.2.1	A only✓✓		
	1.2.2	B only✓✓	(2 x 2)	**(4)**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1	2.1.1	Meiosis✓	(1)
	2.1.2	Testis✓/Seminiferous tubules	(1)
	2.1.3	6✓	(1)
	2.1.4	- No exchange of genetic material✓ between homologous chromosomes - resulting in a decreased variation✓in offspring	(2)
	2.1.5	Autosomes✓	(1) **(6)**
2.2	2.2.1	(a) Pituitary gland✓/hypophysis	(1)
		(b) Luteinising hormone✓/ LH	(1)
	2.2.2	- Corpus luteum is degenerating✓/disintegrating - Progesterone is decreasing✓ **(Mark first TWO only)**	(2)
	2.2.3	Hormone **Y**/oestrogen thickens the endometrium✓	(1)
	2.2.4	- Progesterone level will decrease✓ in the blood - Menstruation will take place✓/ endometrium breaks down - No inhibition of pituitary gland✓/Hypophysis - from producing FSH✓ - The follicle will develop✓ - leading to ovulation✓	(4) Any 4 **(9)**
			[15]

QUESTION 3

3.1	3.1.1	Ribosome✓	(1)
	3.1.2	8✓	(1)
	3.1.3	CTA✓	(1)
	3.1.4	Translation*✓ - Each t-RNA picks up a specific amino acid✓ - When the anticodon on the tRNA✓ - Matches the codon of the mRNA✓ - Then tRNA brings the required amino acid to the ribosome✓ - Amino acids become attached by peptide bonds✓ - to form required protein✓ *** compulsory mark**+ any 5	(6) **(9)**
3.2	3.2.1	(a) – Percentage infertility - Pregnancy	(1)
		(b) Maternal age✓	(1)
	3.2.2	- Small sample size was used✓/ investigation was conducted in only one hospital. **Mark first ONE only**	(1)
	3.2.3	- As the maternal age increases✓ - the infertility increases✓ - and the pregnancy decreases✓	(3) **(6)** **(15)**
		TOTAL SECTION B:	**30**

SECTION C

QUESTION 4

DNA replication

- Occurs during interphase✓
- DNA molecule unwinds✓
- Weak hydrogen bonds between nitrogenous bases break✓
- DNA unzips✓/DNA strands separate from each other
- Both DNA strands serve as templates✓
- to form a complementary DNA strands✓ / A-T and G-C
- using free DNA nucleotides from the nucleoplasm✓
- The process is catalysed by enzymes✓ Any 7

(7)

Oogenesis

- Under the influence of FSH✓
- diploid cells✓/ germinal epithelial cells in the ovary
- divide by mitosis✓
- forming many follicles✓
- One cell inside a follicle enlarges and undergoes meiosis✓
- to produce four haploid cells✓
- One cell survives to form a mature haploid ovum✓ Any 6

(6)

Abnormal meiosis

- Mutations/errors may occur✓ during meiosis
- Chromosomes may fail to separate✓/non-disjunction
- During anaphase✓ 1/2
- this may result in an unequal distribution of chromosomes✓

(4)

Content: (17)
Synthesis: (3)
(20)

ASSESSING THE PRESENTATION OF THE ESSAY

Relevance	Logic sequence	Comprehensive
All information provided is relevant to the question	Ideas arranged in a logical cause-effect sequence	Answered all aspects required by the essay in sufficient detail
All the information provided is relevant to the: - DNA replication - Oogenesis - Abnormal meiosis There is NO irrelevant information	All the information regarding the: - DNA replication - Oogenesis - Abnormal meiosis in a logical sequence	At least the following points should be included: - DNA replication 5/7 - Oogenesis 4/6 - Abnormal meiosis 2/4
1 mark	**1 mark**	**1 mark**

TOTAL SECTION C: 20
GRAND TOTAL: 60

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