GRADE 12 TERM 1 PRACTICAL MEIOSIS **30 MARKS**

QUESTION 1

Study the micrographs A to H that show meiotic cell division in human cells. Use your knowledge on the phases of meiosis and answer the questions that follow.

Micrograph A

1.1. Name **TWO** places in the human body where this cell will be found. (2)

_____
_____

1.2. How many chromosomes will there be in a human cell like Micrograph A at the start of meiosis? (1)

_____

1.3. How many sets of DNA will there be in a human cell like Micrograph A at the start of meiosis? (1)

_____

Micrograph B

1.4. Identify the phase of meiosis represented by Micrograph B. (1)

_____

1.5. Give **ONE** visible reason for your answer in QUESTION 1.4. (2)

_____
_____
_____

1.6. Draw a complete, labelled line diagram of this phase of meiosis in the space provided. Assume the cells has a diploid number of 6. (6)

Micrograph C

1.7. What happens to the chromosomes during this phase of meiosis? (2)

_____
_____
_____

Micrograph D

1.8. Identify the phases of meiosis represented by Micrograph D. (1)

_____

1.9. In this human cell, how many chromosomes will be present in each nucleus at the end of this phase? (1)

_____

Micrograph E

1.10. Identify the phase of meiosis represented by Micrograph E. (1)

_____

1.11. Give **ONE** similarity between the chromosomes in the nuclei of this micrograph and the nuclei of Micrograph A. (1)

_____
_____
_____

1.12. Give **ONE** difference between the chromosomes in the nuclei of this micrograph and the nuclei of Micrograph A. (1)

_____
_____
_____

Micrograph F

1.13. Identify the phase of meiosis represented by Micrograph F. (1)

_____

1.14. Give **ONE** visible reason for your answer in QUESTION 1.13. (2)

_____
_____

1.15. Give **ONE** way in which the chromosomes of Micrograph F differs from the chromosomes in Micrograph B. (2)

_____
_____
_____
_____

Micrograph G

1.16. Identify the phase of meiosis represented by Micrograph G. (1)

_____

1.17. Give **TWO** visible reasons for your answer in QUESTION 1.16. (2)

_____

_____

_____

_____

Micrograph H

1.18. Give **ONE** difference between the chromosomes in the cells shown in Micrograph D and Micrograph H. (2)

_____

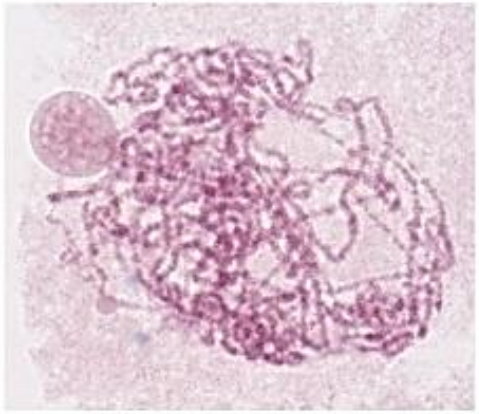
_____

_____

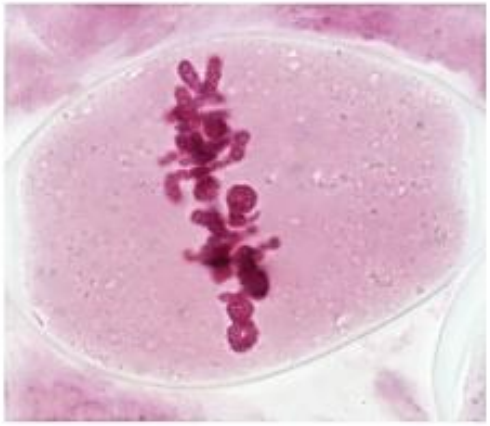
TOTAL: [30]

Meiosis in the human body

A

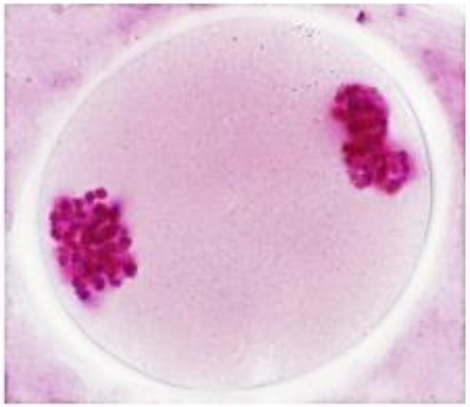


B

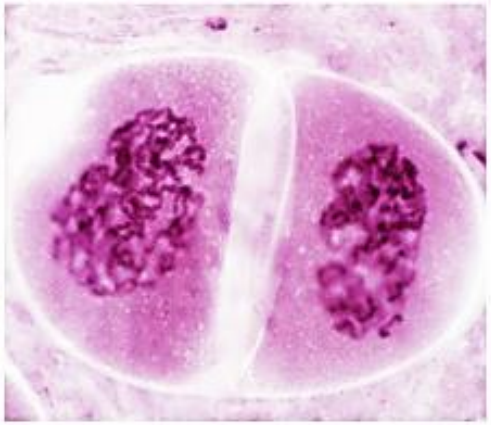


C

D

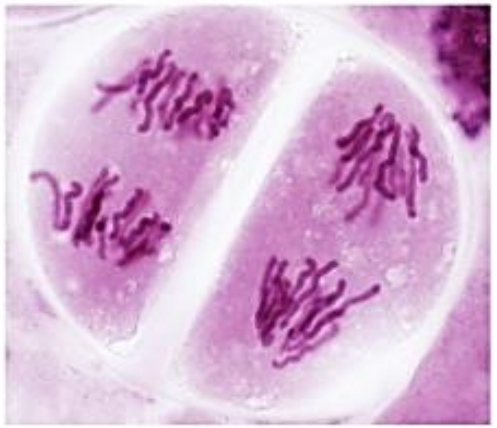


E

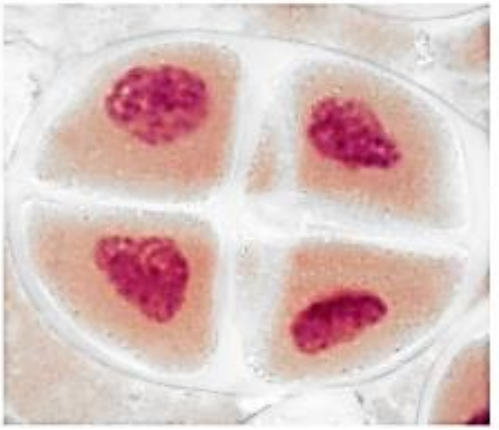


F

G



H



GRADE 12 TERM 1 PRACTICAL MEIOSIS MEMORANDUM

QUESTION 1

MICROGRAPH A

1.1. Ovaries✓ & Testes✓ (2)

1.2. 46 ✓ (1)

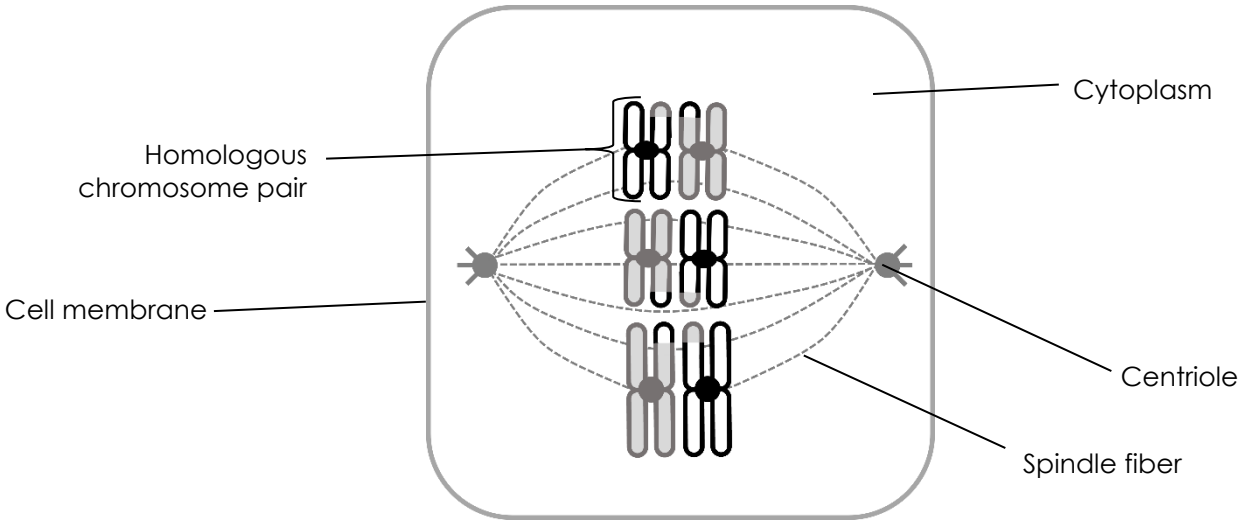
1.3. 2 ✓ (2 sets per chromosome) (1)

MICROGRAPH B

1.4. Metaphase 1✓ (1)

1.5. Double row / homologous chromosome pairs ✓ on the equator✓ (2)

1.6. **Metaphase 1** (6)



✓ Shading for crossing-over shown **(S)**
✓ Descriptive heading with name of phase **(H)**
✓ Replicated chromosomes drawn **(R)**
✓* 6 chromosomes in total **[compulsory mark]** **(C)**
✓* chromosomes drawn in 3 pairs **[compulsory mark]** **(P)**
✓ any 1 correct label

MICROGRAPH C

1.7. – Homologous chromosome pairs✓
– are separated / move to opposite poles✓ / chromosome number halves (2)

MICROGRAPH D

1.8. Telophase 1✓ (1)

1.9. 23 ✓ (1)

MICROGRAPH E

1.10. Prophase 2✓ (1)

1.11. **FIRST ONE ONLY**:
Chromosomes are in a chromatin network✓
Chromosomes are double stranded/have two chromatids each✓
Chromosomes have already replicated✓ (1)

1.12. **FIRST ONE ONLY:**
Micrograph A has double the number of chromosomes as Micrograph E✓
Micrograph A has two sets of chromosomes, Micrograph E has only one✓ (1)

MICROGRAPH F

1.13. Metaphase 2✓ (1)

1.14. Single row✓ chromosomes on the equator✓ of the cell (2)

1.15. **FIRST ONE ONLY x 2 MARKS**:
- Micrograph F's chromosomes are attached to spindle fibers on either side of their centromeres✓, Micrograph B's chromosomes are attached to spindle fibers on only one side of their centromeres✓
  OR
- Micrograph F's chromosomes are attached to spindle fibers as homologous pairs✓, Micrograph B's chromosomes are attached to spindle fibers as individual chromosomes✓ (2)

MICROGRAPH G

1.16. Anaphase 2✓ (1)

1.17. – Chromatids move to the poles✓
– Two daughter cells are visible✓ (2)

MICROGRAPH H

1.18. Chromosomes in Micrograph D are double stranded✓ (two chromatids with a centromere)
Chromosomes in Micrograph H are single stranded/single chromatids ✓ (2)

TOTAL: [30]