SB025
Biology 1
Semester 1
Session 2023/2024
2 *hours*

SB025
Biologi 1
Semester 1
Sesi 2023/2024
2 jam

Name

No Matrik											

Tutorial Class

Tutorial lecturer's name

KOLEJ MATRIKULASI PAHANG
KEMENTERIAN PENDIDIKAN MALAYSIA
PAHANG MATRICULATION COLLEGE
MINISTRY OF EDUCATION MALAYSIA

D'PUNCAK

---

2 JAM
2 *HOURS*

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU
DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

Questions	Marks
1	
2	
3	
4	
5	
6	
7	
Total	

Kertas soalan ini mengandungi 9 halaman bercetak.
This booklet consists of 9 printed pages.

1. **FIGURE 1** shows the stages in cell division.

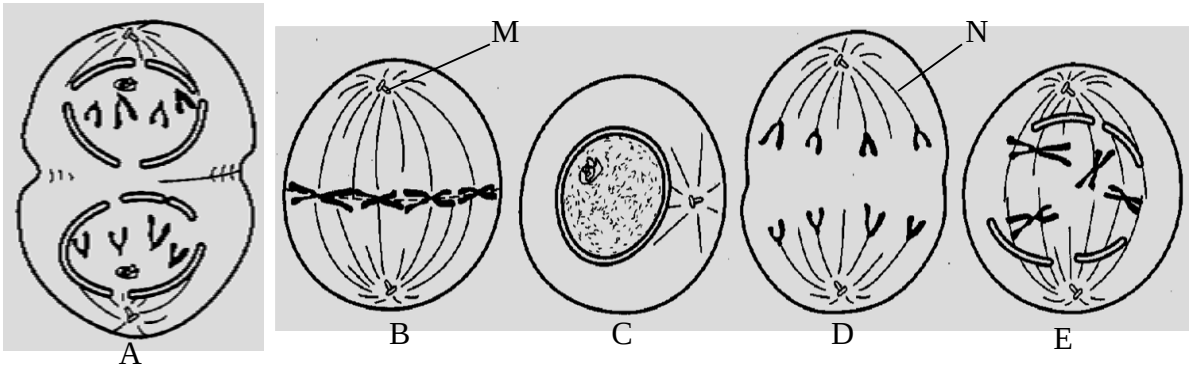

FIGURE 1

a) Name the structure **M** and **N**. [2 marks]

M : _____

N : _____

b) Arrange the correct sequence of stage **A** to **E** beginning the earliest stage. [1 mark]

_____

c) Briefly explain the difference between stage **D** and anaphase I. [2 marks]

_____

_____

d) The chromosome number of *Drosophila* sp. is 8.

(i) How many chromosome does the *Drosophila* sp. inherit from each parent?

[1 mark]

_____

(ii) How many chromosome found in gamete of *Drosophila* sp.?

[1 mark]

_____

2. A dihybrid cross between two pea plants with phenotype round seeds and yellow colour but unknown genotype was cross with pea plant of double recessive genotype for wrinkled seed and green colour where R represents the gene for round seeds and Y represents the gene for yellow colour. The cross produced the following results:

72 plant with round and yellow seed
75 plant with round and green seed
78 plants with wrinkled and yellow seed
81 plants with wrinkled and green seed

a) Using the symbols given, draw a genetic diagram to explain this cross. [3 marks]

b) State how can many possible alleles combination produced in dihybrid inheritance? [1 mark]

_____

c) Suggest the two parental genotype that can produce only round and green plant. [2 mark]

_____

d) If the gene is linked without crossing over, what is the expected number of individuals of each phenotype in F_1 generation? [1 mark]

_____

e) A test cross is a genetic cross used to determine the genotype of an individual showing a dominant phenotype. Explain the determination of genotype in dominant round (R) and yellow (Y) seed in garden pea plant (*Pisum sativum*) using test cross. [6 *marks*]

_____

_____

_____

_____

_____

_____

3. In population, the ability of tongue rolling is controlled by dominant allele T. 56% of individual in that population are able to roll their tongue.

i) What is the frequency of **T** allele in population? [2 marks]

ii) What is the frequency and amount of individual with TT, Tt and tt genotypes if the population consists of 500 people. [3 marks]

iii) If all non-rolling tongue individual are killed, what is the frequency of non-rolling tongue individual in the next generation. [2 marks]

4. **FIGURE 2** shows the process of protein synthesis in animal cell.

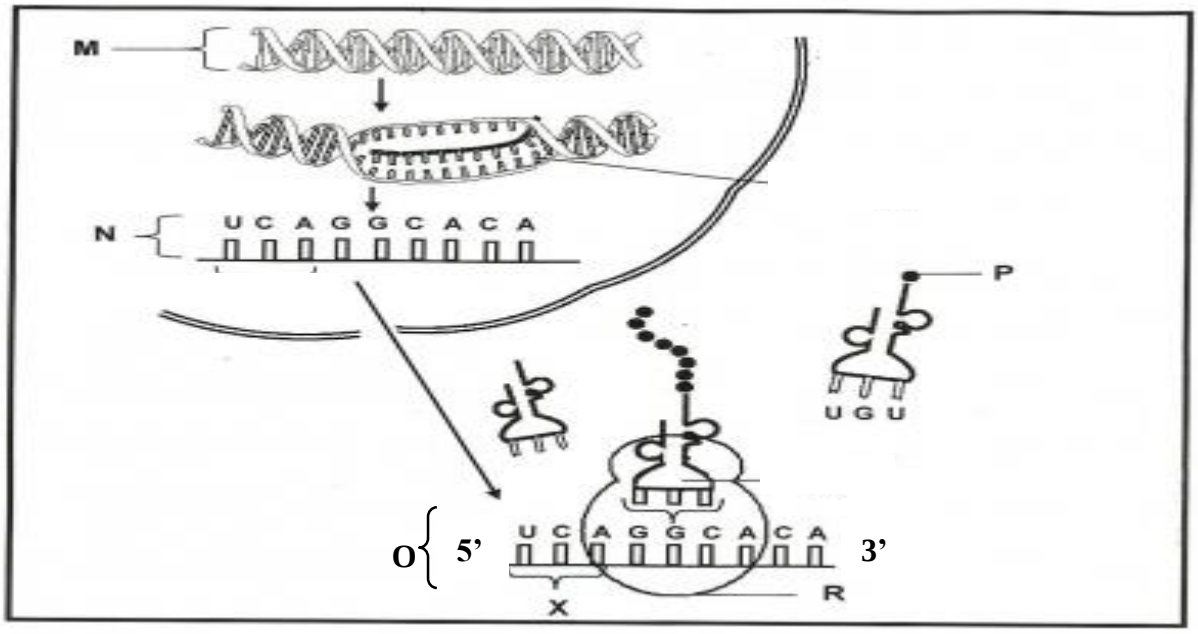

FIGURE 2

a) What is the anticodon sequence for **X**? [1 mark]

_____

b) State the enzyme that catalyses the binding of **P**? [1 mark]

_____

c) Give **ONE** reason why **M** is not used directly by **R** for synthesis of protein. [1 mark]

_____

d) Briefly describe what happen to **N** before enter cytoplasm. [4 marks]

_____

_____

_____

_____

e) Explain the mechanism of the *lac* operon when someone drinks cow milk. [7 marks]

_____

_____

_____

_____

_____

_____

_____

5. **FIGURE 3** shows a karyotype of an individual.

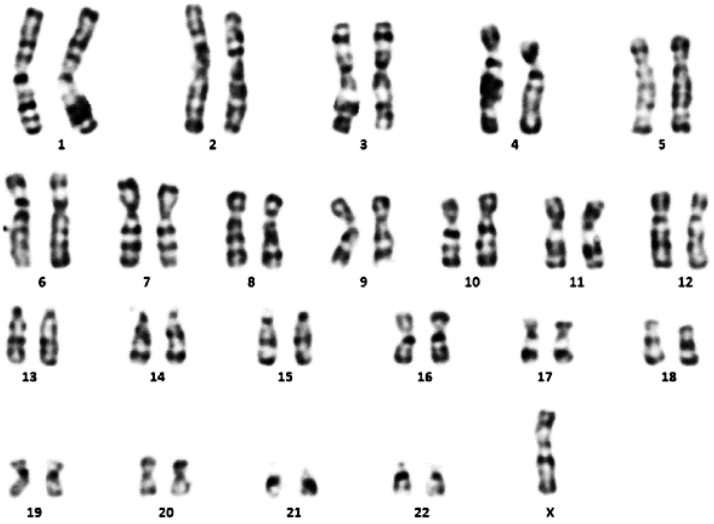

FIGURE 3

a) State the type of chromosomal mutation shown in **FIGURE 3.** [1 mark]

_____

b) i) Name the genetic disorder shown in **FIGURE 3**. [1 mark]

_____

ii) Give a reason for your answer in b (i). [1 mark]

_____

iii) Briefly describe how the genetic disease shown in **FIGURE 3** may be produced if the mutation occurs in the mother during meiosis II of oogenesis. [2 marks]

_____

_____

_____

c) If individual with karyotype above get married, what are the probability for this couple to have offspring with the same genetic disease? [1 mark]

_____

d) Philadelphia chromosome is produced due to reciprocal translocation between chromosome number 22 and chromosome number 9. Briefly explain how this mutation occurs and its effect. [5 marks]

_____

_____

_____

_____

_____

6. **FIGURE 4** shows the initial process of insulin production using gene technology.

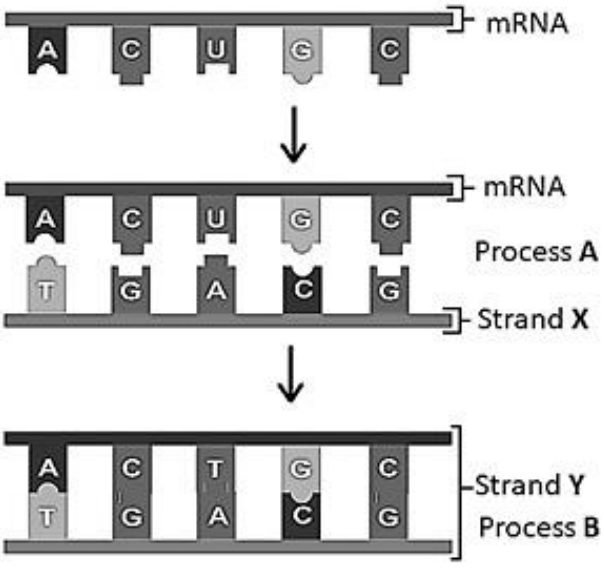

FIGURE 4

(a) State the source of mRNA used for insulin production. [1 mark]

_____

(b) State the enzymes that are involved in process **A** and process **B**. State their function. [2 marks]

	Enzyme	**Function**
Process **A**		
Process **B**		

(c) What is stand **Y**? State the benefit of strand **Y** compared to mRNA. [2 marks]

_____

_____

(d) State the consequence if human insulin cannot be produced using gene technology. [2 marks]

_____

_____

(e) Briefly describe the steps involved in Polymerase Chain Reaction (PCR). [6 marks]

_____

_____

_____

_____

_____

_____

7. (a) **FIGURE 5A** shows a secondary oocyte in fallopian tube.

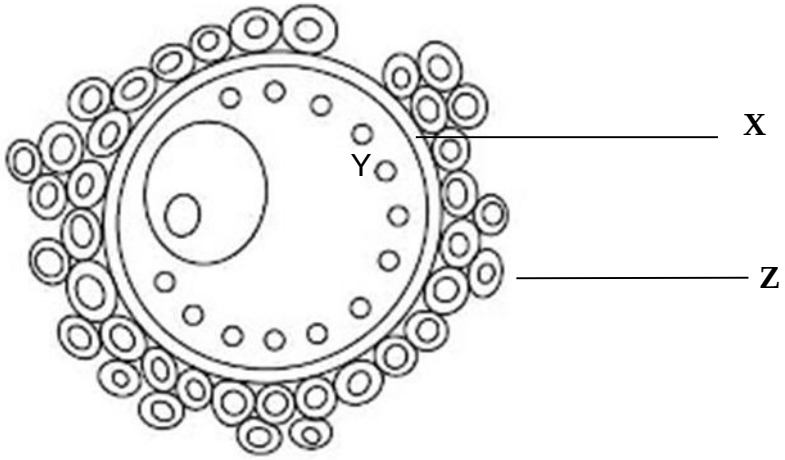

FIGURE 5A

(i) State structure **X** and cell **Z**. [2 marks]

_____

_____

(ii) Briefly explain what happen to structure **Y** once the secondary oocyte is fertilized. [2 marks]

_____

_____

(iii) What happen if there is no functional enzymes in granule **Y**? [1 mark]

_____

(b) **FIGURE 5B** shows hormonal control during parturition.

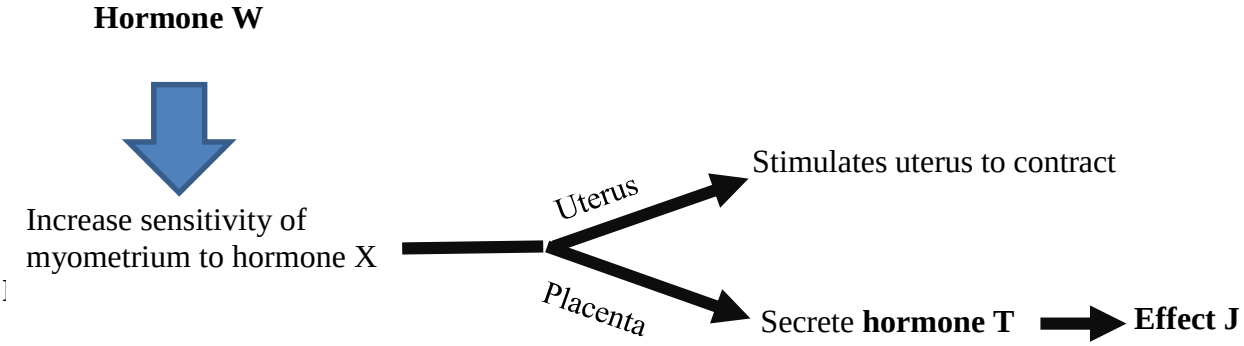

FIGURE 5B

(i) Name hormone **W** [1 mark]

_____

(ii) During parturition, the mother is in emotional and physical stress and hormone **T** secreted. State hormone **T** and Effect **J**. [2 marks]

_____

c) Describe the structure of secondary oocyte. [6 marks]

_____

_____

_____

_____

_____

_____

d) **FIGURE 6** below shows human growth curve. Describe the difference in growth between male and female during phase **C**. [2 marks]

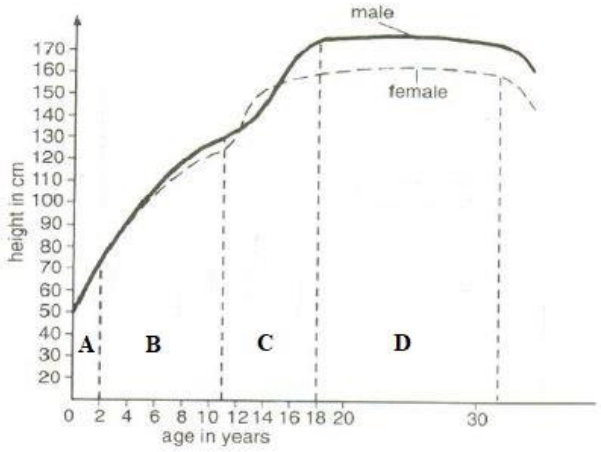

FIGURE 6

_____

_____

_____

END OF QUESTION