Practice Question Set For A-Level
Subject : Biology
Paper-1 Topic: 2 Cells

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Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

(a) Describe the structure and function of the nucleus.

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(4)

(b) Name the main polymer that forms the following cell walls.

Plant cell wall _____

Fungal cell wall _____

(1)

Scientists investigated the effect of the number of fungal species in soil on the diversity of plant species.

The table below shows their raw data for soil containing 14 fungal species.

Plant species	**Total shoot biomass / g m^{-2}**
Poa compressa	2
Achillea millefolium	4
Aster cordifolius	5

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Aster novae-angliae	7
Chrysanthemum leucanthemum	15
Daucus carota	36
Fragaria virginiana	51

(c) Suggest **one** reason the scientists used biomass instead of the number of individuals of each plant species when collecting data to measure diversity.

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(1)

(d) The scientists used this equation to calculate the plant species index of diversity.

$$d = 1 - \sum \left(\frac{n}{N}\right)^2$$

where n = shoot biomass of each plant species
and N = total shoot biomass of all plant species

Use this equation to calculate the index of diversity for the data in the table above.

Index of diversity _____

(2)

(Total 8 marks)

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Q2.

(a) Describe viral replication.

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(3)

(b) Complete the table below by putting a tick (✓) where the feature is part of a cell cycle involving mitosis or a cell cycle involving binary fission.

Feature	**Cell cycle involving:**	
	mitosis	**binary fission**
Replication of linear DNA		
Replication of circular DNA		
Produces 2 daughter cells		
Produces 4 daughter cells		
Happens in prokaryotic cells		
Happens in eukaryotic cells		

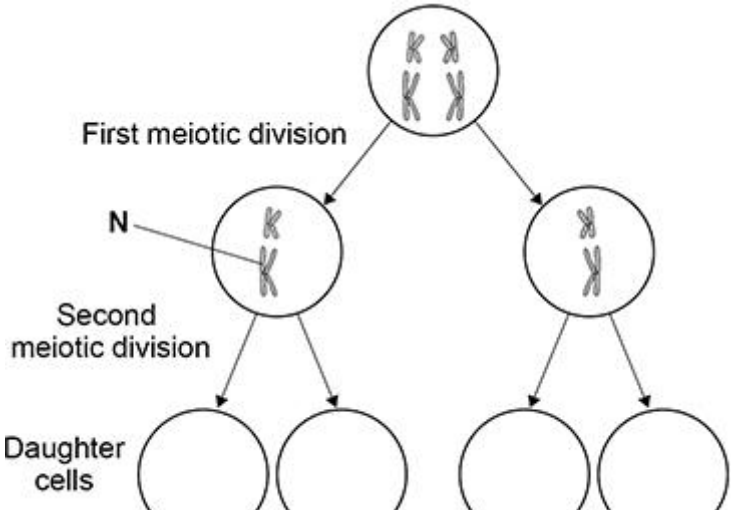
(2)

Figure 1 represents a cell undergoing meiosis. It shows the chromosomes in the parent cell and in the two cells formed after the first meiotic division.

The second division of meiosis proceeds normally except that non-disjunction occurs in the chromosome labelled **N**.

Figure 1

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(b) Complete **Figure 1** to show the chromosomes inside the daughter cells formed after the second meiotic division.

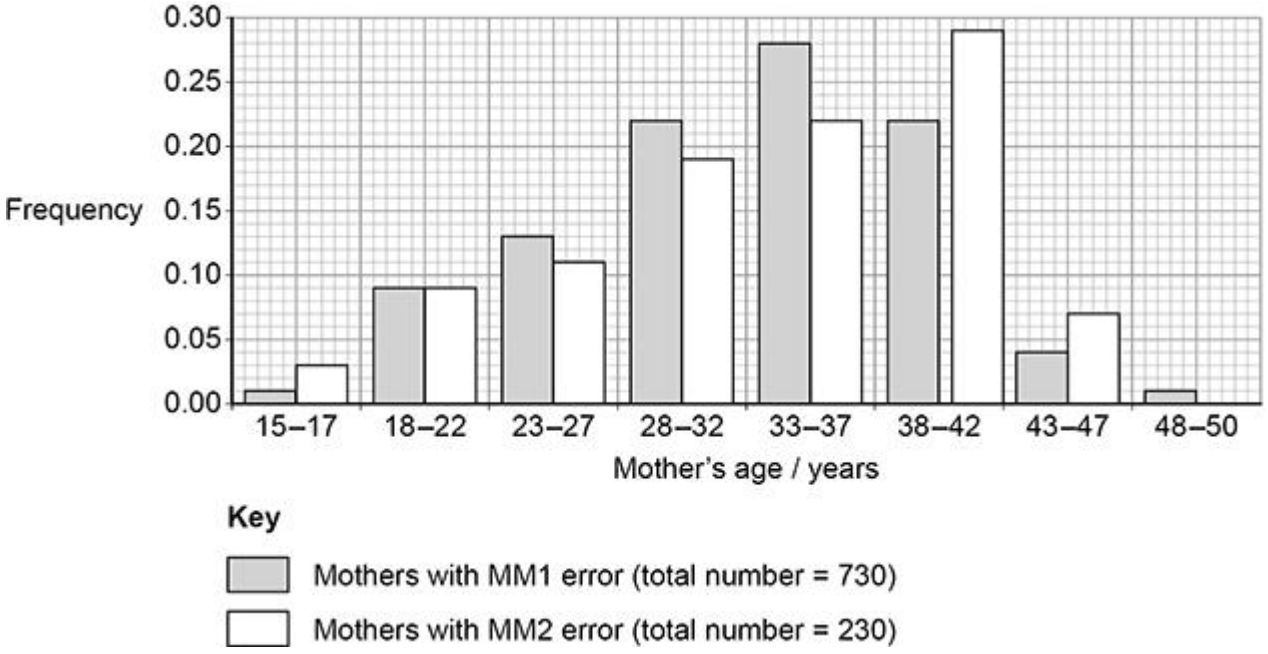
(2)

Doctors studied babies born with a mutation caused by chromosome non-disjunction during gamete formation in their mother.

They determined each mother's age at the time of childbirth and whether the non-disjunction happened in the first meiotic division (MM1 error) or in the second meiotic division (MM2 error).

Figure 2 shows the doctors' results.

Figure 2



(d) A student concluded that there were more mothers of age >37 with MM2 errors than with MM1 errors.

Using **Figure 2** and suitable calculations show why this conclusion is **not** valid.

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(2)
(Total 9 marks)

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