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

Q1.

(a) Describe how viruses are replicated.

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(4)

(b) A scientist investigated the effect of a virus species on a bacterial culture.

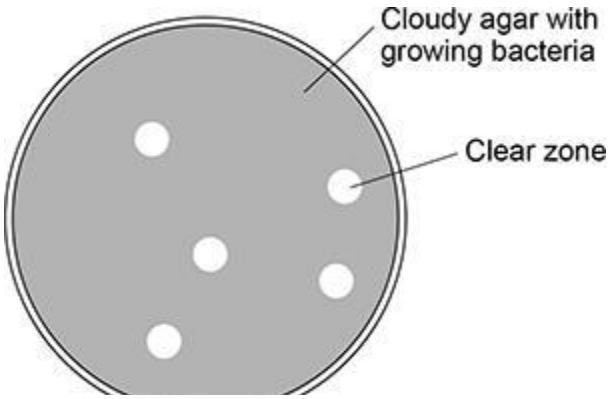
The scientist:

- mixed a diluted sample of the virus with a bacterial culture in liquid agar
- poured the liquid agar into a Petri dish and let the agar set
- incubated the virus-bacterial culture at 30 °C for 24 hours.

Figure 1 shows the appearance of the Petri dish after 24 hours.

Figure 1

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Explain why clear zones are present in **Figure 1**.

_____

_____

_____

(1)

(c) Predict the appearance of the Petri dish if the incubation was extended by a few more hours.

_____

_____

_____

(1)

(d) Animal cells replicate during the cell cycle.

Figure 2 shows one animal cell at a stage of the cell cycle.

Figure 2



Identify the stage of the cell cycle shown in **Figure 2**.

Explain the appearance of the cell shown in **Figure 2**.

Do **not** refer to organelles in your answer.

Identity of stage _____

Explanation _____

_____

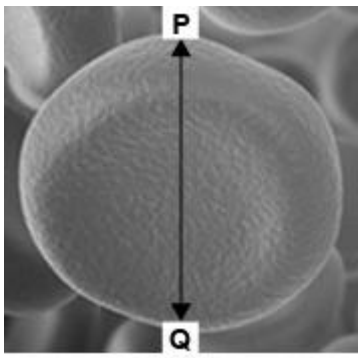
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(2)
(Total 8 marks)

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Q2.

(a) The photograph below shows an image of a red blood cell at a magnification of × 5500



Calculate the actual diameter in µm of the red blood cell between points **P** and **Q**.

Show your working.

Answer _____ µm

(2)

(b) A haemocytometer is a special microscope slide that can be used to determine the mean number of red blood cells in 0.004 mm^3 of blood.

- A researcher prepared a 10^{-3} dilution of a sample of blood from an adult.
- Using a haemocytometer, the researcher determined that the mean number of red blood cells in 0.004 mm^3 of the diluted blood sample was 21

The volume of blood in the body of the adult was 4.8 dm^3

Calculate the total number of red blood cells in the body of this adult.

Show your working.

Answer _____

(2)

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(c) The solution used to dilute the blood had to have the same water potential as the blood.

Explain why.

_____

_____

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_____

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_____

(2)

(d) There are four main blood groups in the human ABO blood group system.

The table below shows the basis on which each of these blood groups is classified.

ABO blood group	Antigens present on red blood cells	Antibodies present in blood plasma
A	A	Anti-B
B	B	Anti-A
AB	A and B	No anti-A and no anti-B
O	No A and no B	Anti-A and anti-B

A transfusion of blood from a blood group **A** donor to a blood group **B** recipient would cause agglutination of the donated red blood cells.

Use information in the table above to explain why.

_____

_____

_____

_____

_____

_____

(2)

(e) Using the table above, give the blood groups of people who could accept a donation of blood group **O** without causing agglutination of the **donated** red blood cells.

Blood groups _____

(1)

(Total 9 marks)

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