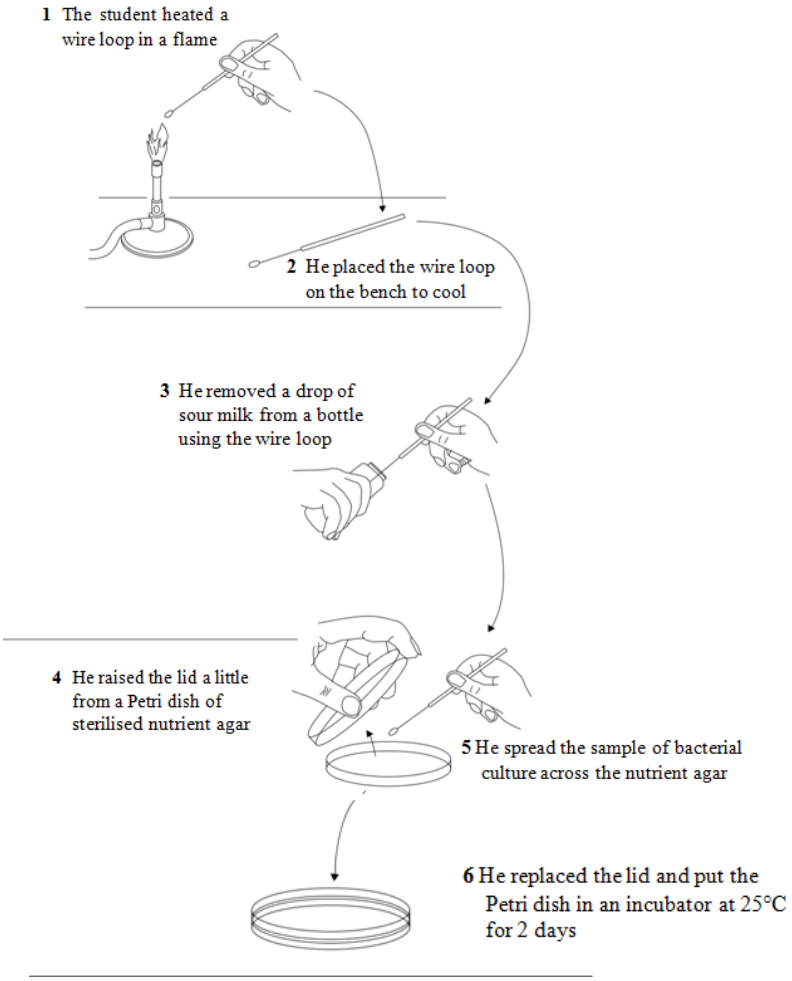
Culturing Microorganisms

Q: 1 The diagram shows how a student transferred some sour milk from a bottle to a Petri dish of nutrient agar.



List A gives four actions carried out by the student.

List B gives five possible effects of these actions.

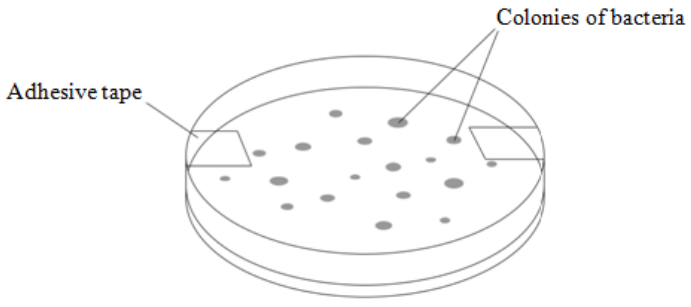
Draw a straight line from each action in List A to its effect in List B.

Draw only one line from each action.

List A – Action	List B – Effect
Heating loop in flame	Risk of contamination with bacteria increased
Placing loop on bench to cool	Risk of bacteria entering decreased
Only lifting lid of Petri dish a little	Kills bacteria
Placing Petri dish in incubator at 25 °C rather than 35 °C	Prevents air entering
	Risk of growth of pathogens decreased

(4 marks)

Q:2 The diagram shows a Petri dish containing nutrient agar. Colonies of bacteria are growing on the nutrient agar.



Draw a ring around the correct answer to complete each sentence.

(a) **(i)** Agar jelly contains carbohydrates.

These carbohydrates are a source of [energy / minerals / protein] for the bacteria.

(1 mark)

(a) **(ii)** The dish is sealed with adhesive tape to prevent the entry of [carbon dioxide / microorganisms / oxygen] from the air.

(1 mark)

(b) **(i)** The dish is placed in an incubator at a temperature of [10 °C / 25 °C / 75 °C] .

(1 mark)

(b) **(ii)** This temperature is used rather than 35 °C so that it is less likely that [fungi / pathogens / yeasts] will grow in the dish.

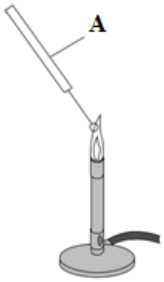
(1 mark)

Q:3 **(a)** It is important to prevent contamination when growing microorganisms. The diagram shows the transfer and culturing of microorganisms.

Stage V A Petri dish with agar is heated to

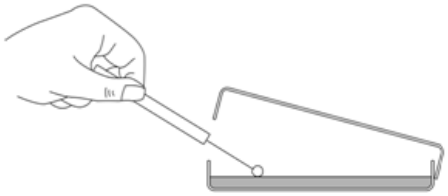
Stage V A Petri dish with agar is heated to 120 °C for 20 minutes, then cooled

Stage W



Stage X

Stage Y



Stage Z Petri dish kept at 25 °C for 48 hours

(a) (i) Name the apparatus labelled A in stage W.

Draw a ring around one answer.

Inoculating loop pipette thermometer

(1 mark)

(a) (ii) Give the letters of the two stages from V, W, X, Y and Z, which are carried out to kill microorganisms.

Stages and

(2 marks)

(a) (iii) Give the letter of the stage, V, W, X, Y or Z, where incubation takes place.

Stage

(1 mark)

(b) A culture medium used for growing microorganisms contains various nutrients. Which nutrient is the main source of energy for the microorganisms?

Draw a ring around one answer.

carbohydrates mineral ions vitamins

(1 mark)

Q:4 (a) Microorganisms can be grown on agar jelly in a Petri dish.

List A gives three actions used when growing microorganisms.

List B gives four possible effects of these actions.

Draw a straight line from each action in List A to its effect in List B.

List A – Action	List B – Effect
	To reduce the growth of pathogens
The agar jelly is heated at 120 °C for 30 minutes	
	To kill unwanted microorganisms
Make sure the temperature for growing the microorganisms is no higher than 25 °C	
	To prevent microorganisms from the air getting into the Petri dish
The lid of the Petri dish is held on with tape	
	To prevent oxygen entering the Petri dish

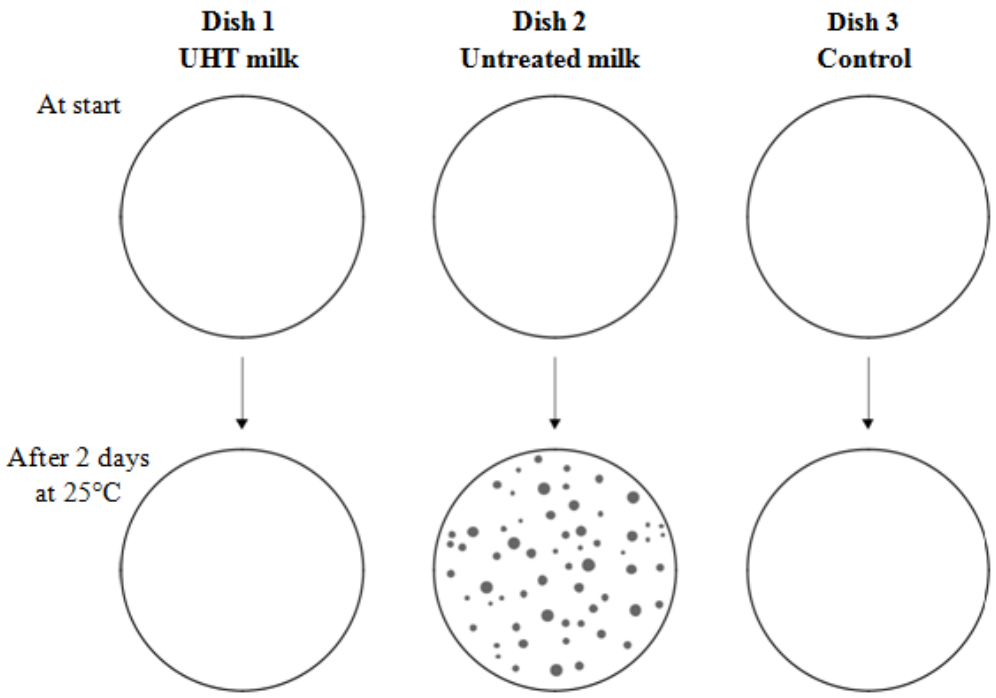
(3 marks)

(b) UHT milk is milk that has been heated to 135 °C, then cooled.

In an investigation, three sterile Petri dishes containing sterile agar jelly were set up as follows.

- UHT milk was added to dish 1.
- Untreated milk was added to dish 2.
- Dish 3 was left unopened as a control.
- The dishes were kept at 25 °C for two days.

The results are shown in the diagram on the opposite page.



(b)(i) Describe the difference in appearance between dishes 1 and 2 after two days.

_____

_____

(1 mark)

(b)(ii) Give one reason for this difference.

_____

_____

(1 mark)

(b)(iii) There was no change in the appearance of dish 3 after two days.

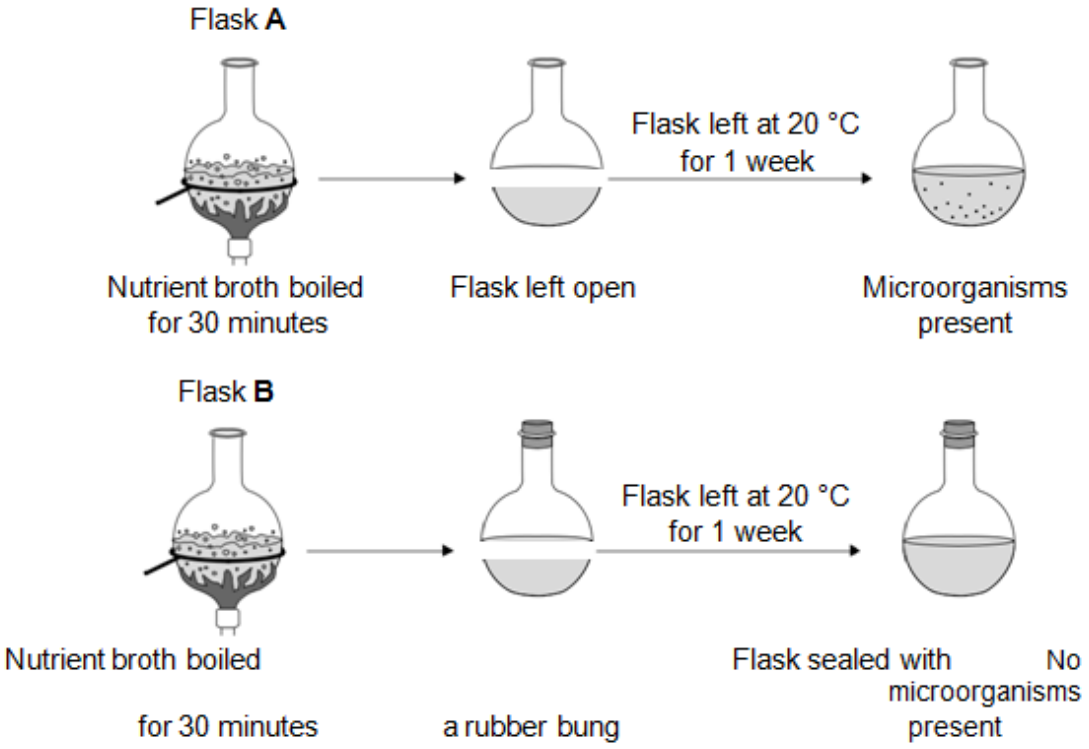
Give one reason why.

_____

_____

(1 mark)

Q:5 The diagram shows how some students did an investigation.



(a) Each flask of nutrient broth was first boiled for 30 minutes.

Why?

_____

_____

(1 mark)

(b) Flask A and flask B were set up differently.

(b) (i) Describe the difference in the way in which flask A and flask B were set up.

_____

_____

(1 mark)

(b) (ii) Describe the difference in the results for flask A and flask B after one week.

_____

_____

(1 mark)

(b) (iii) Suggest a reason for the difference in the results.

_____

_____

(1 mark)

(b) (iv) At the end of one week, the rubber bung was removed from flask B. Flask B was then left open at 20 °C for one more week.

What result would you expect?

_____

_____

(1 mark)

(c) The results of the investigation give evidence that supports the theory of biogenesis.

What is meant by biogenesis?

Tick (☒) one box.

The spontaneous generation of living organisms from non-living matter ☐

New species of organisms develop from an existing species ☐

Living organisms are produced only by other living organisms ☐

(1 mark)

TOTAL MARKS=25