

# BAB 1

## Mikroorganisma Microorganisms

### Kertas 1

Setiap soalan diikuti oleh empat pilihan jawapan, A, B, C dan D. Pilih jawapan terbaik bagi setiap soalan.  
Each question is followed by four alternative answers, A, B, C and D. Choose the best answer for each question.

#### 1.1 Dunia Mikroorganisma World of Microorganisms

- 1 Rajah 1 menunjukkan sejenis mikroorganisma.  
Diagram 1 shows a type of microorganism.



Rajah 1 / Diagram 1

Antara yang berikut, yang manakah cara pembiakan bagi mikroorganisma tersebut?  
Which of the following is the method of reproduction of the microorganism?

- A Konjugasi  
Conjugation
- B Pertunasan  
Budding
- C Belahan dedua  
Binary fission
- D Pembentukan spora  
Spore formation

- 2 Antara mikroorganisma berikut, yang manakah membiak melalui belahan dedua?  
Which of the following microorganisms reproduces by binary fission?

A



C



B



D



### Tip Cemerlang

Bakteria membiak secara aseks, iaitu melalui belahan dedua dan juga secara seks melalui konjugasi.  
Bacteria reproduce asexually, that is by binary fission and also sexually by conjugation.

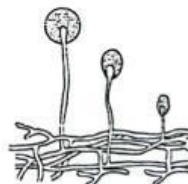
- 3 Maklumat berikut menerangkan ciri-ciri sejenis mikroorganisma.  
The following information describes the characteristics of a type of microorganism.

- Mempunyai saiz kurang daripada  $0.5 \mu\text{m}$   
Has a size of less than  $0.5 \mu\text{m}$
- Membiak dengan cara menjangkiti sel perumah  
Reproduce by infecting the cells of its host

Antara yang berikut, yang manakah mewakili mikroorganisma di atas?  
Which of the following represents the microorganism above?

- A Yis  
Yeast
- C Bakteriofaj  
Bacteriophage
- B *Bacillus anthracis*  
*Bacillus anthracis*
- D *Paramecium* sp.  
*Paramecium* sp.

- 4 Rajah 2 menunjukkan mikroorganisma yang ditemukan pada sekeping roti.  
Diagram 2 shows a microorganism found on a slice of bread.

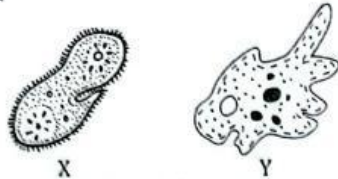


Rajah 2 / Diagram 2

Antara pernyataan berikut, yang manakah benar?  
Which of the following statements is true?

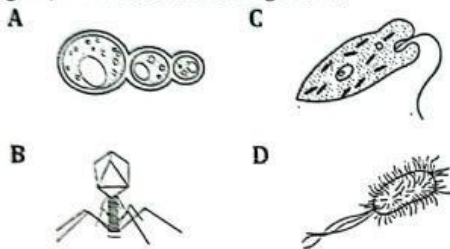
- A Membiak melalui pertunasan  
Reproduces by budding
- B Terdiri daripada sporangium dan hifa  
Made up of sporangium and hypha
- C Hanya boleh dilihat melalui mikroskop elektron  
Can only be seen through an electron microscope
- D Mempunyai klorofil dan dapat menjalankan proses fotosintesis  
Has chlorophyll and can carry out photosynthesis process

- 5 Rajah 3 menunjukkan dua jenis mikroorganisma, X dan Y.  
Diagram 3 shows two types of microorganisms, X and Y.

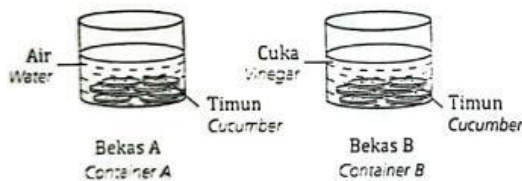


Rajah 3 / Diagram 3

Antara yang berikut, yang manakah dikelaskan dalam kumpulan yang sama seperti mikroorganisma di atas?  
Which of the following is classified in the same group as the above microorganisms?



- 6 Rajah 4 menunjukkan keadaan timun di dalam dua bekas selepas dibiarkan selama dua hari.  
Diagram 4 shows the condition of cucumbers in two containers after left for two days.



Rajah 4 / Diagram 4

Apakah kesimpulan yang boleh dibuat daripada pemerhatian tersebut?  
What conclusion can be made from the observation?

- A Bakteria bertumbuh dengan baik pada pH rendah  
Bacteria grow well at low pH  
B Bakteria bertumbuh dengan baik dalam keadaan neutral  
Bacteria grow well in neutral condition  
C Bakteria bertumbuh dengan baik dalam keadaan berasid  
Bacteria grow well in acidic condition  
D Bakteria bertumbuh dengan baik dalam keadaan beralkali  
Bacteria grow well in alkaline condition

- 7 Rajah 5 menunjukkan sepinggan roti kering.  
Diagram 5 shows a plate of dried breads.



Rajah 5 / Diagram 5

Apakah faktor yang membantu roti tersebut bertahan lebih lama?  
What is the factor that helps the bread to last longer?

- A Suhu  
Temperature  
B Nutrien  
Nutrient  
C Nilai pH  
pH value  
D Kelembapan  
Humidity



- 8 Jadual 1 menunjukkan hubungan antara suhu dengan pertumbuhan bakteria.  
Table 1 shows the relationship between the temperature and the growth of bacteria.

| Suhu (°C)<br>Temperature (°C) | Bilangan koloni bakteria (mm)<br>Number of bacterial colonies (mm) |
|-------------------------------|--------------------------------------------------------------------|
| 10                            | 4                                                                  |
| 25                            | 12                                                                 |
| Y                             | 18                                                                 |
| 50                            | 8                                                                  |

Jadual 1 / Table 1

Apakah suhu optimum Y bagi pertumbuhan bakteria tersebut?  
What is the optimum temperature Y for the growth of the bacteria?

- A 29°C  
B 37°C  
C 42°C  
D 47°C

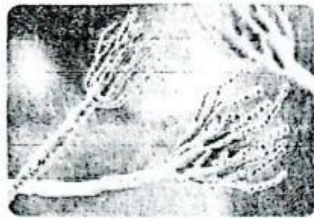


### Tip Cemerlang

Keadaan suhu yang terlalu rendah boleh merencatkan pertumbuhan mikroorganisma manakala suhu yang terlalu tinggi mampu membunuh mikroorganisma.  
Low temperatures can retard the growth of microorganisms while temperatures which are too high can kill microorganisms.

## 1.2 Mikroorganisma Berfaedah Useful Microorganisms

- 9 Rajah 6 menunjukkan sejenis mikroorganisma.  
Diagram 6 shows a type of microorganism.



Rajah 6/ Diagram 6

Apakah peranan mikroorganisma tersebut dalam bidang perubatan?  
What is the role of the microorganism in medical field?

- A Menghasilkan vaksin  
Produces vaccines
  - B Menghasilkan insulin  
Produces insulin
  - C Menghasilkan antibiotik  
Produces antibiotics
  - D Menghasilkan analgesik  
Produces analgesics
- 10 Antara pernyataan berikut, yang manakah benar tentang larutan pembersih ekoenzim?  
Which of the following statements is true about eco enzyme cleaning solution?
- A Kos tinggi  
High cost
  - B Tidak perlu disental dengan kuat  
No needs to scrub hard
  - C Dihasilkan melalui bahan kimia  
Produced by chemical substances
  - D Buih yang dihasilkan menyumbatkan saliran  
Foam produced may clog drainage

## 1.3 Pencegahan dan Rawatan Penyakit yang Disebabkan oleh Mikroorganisma Prevention and Treatment of Diseases Caused by Microorganisms

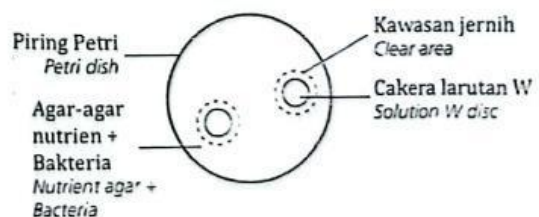
- 11 Antara yang berikut, yang manakah contoh antiseptik?  
Which of the following is the example of antiseptic?

- A Autoklaf  
Autoclave
- B Povidone  
Povidone
- C Periuk tekanan  
Pressure cooker
- D Penapis mikron  
Micron filter

- 12 Antara yang berikut, yang manakah dipadankan dengan betul?  
Which of the following is correctly matched?

| Teknik aseptik<br>Aseptic technique              | Penerangan<br>Description                                                                                                                       |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| A Sinaran Radiation                              | Digunakan untuk membunuh mikroorganisma di dalam bilik bedah<br>Used to kill microorganisms in operating theatres                               |
| B Pendidihan Boiling                             | Dapat menapis zarah-zarah seni dan mikroorganisma daripada air atau cecair<br>Can filter fine particles or microorganisms from water or liquids |
| C Penggunaan antiseptik<br>Use of antiseptics    | Tidak sesuai digunakan pada kulit atau luka<br>Is not suitable to be used on skin or wounds                                                     |
| D Penggunaan disinfektan<br>Use of disinfectants | Disapu pada permukaan kulit atau luka untuk mencegah jangkitan patogen<br>Applied on human skin or wounds to prevent pathogenic infections      |

- 13 Rajah 7 menunjukkan kesan larutan W ke atas pertumbuhan bakteria.  
Diagram 7 shows the effect of solution W on the growth of bacteria.



Rajah 7/ Diagram 7

Apakah larutan W tersebut?  
What is the solution W?

- A Vaksin  
Vaccine
- B Antiseptik  
Antiseptic
- C Antiserum  
Antiserum
- D Antibiotik  
Antibiotic

## Kertas 2 Bahagian A

Jawab semua soalan.  
Answer all questions.



- 1 Rajah 1 menunjukkan satu eksperimen yang dijalankan untuk mengkaji kesan keamatan cahaya terhadap pertumbuhan mikroorganisma.  
Diagram 1 shows an experiment carried out to study the effect of light intensity on the growth of microorganisms.



Rajah 1 / Diagram 1

- (a) Nyatakan **satu** pemerhatian pada roti pisang yang telah disimpan dalam gelap selama tiga hari.  
State **one** observation on the banana bread which has been kept in the dark for three days.

[1 markah/ mark]

- (b) Berdasarkan Rajah 1, apakah mikroorganisma X? Tandakan (✓) bagi jawapan anda.  
Based on Diagram 1, what is microorganism X? Mark (✓) for your answer.

| Mukor<br>Mucor | Protozoa<br>Protozoa | Alga<br>Algae |
|----------------|----------------------|---------------|
|                |                      |               |

[1 markah/ mark]

- (c) Nyatakan **satu** hipotesis untuk eksperimen tersebut.  
State **one** hypothesis for the experiment.

[1 markah/ mark]

- (d) Nyatakan pemboleh ubah bergerak balas dalam eksperimen tersebut.  
State the responding variable in the experiment.

[1 markah/ mark]

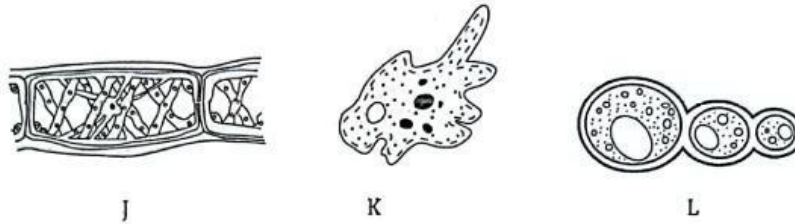
- (e) Pada pendapat anda, mengapakah bantal dijemur di bawah cahaya matahari? **(KBAT)**  
In your opinion, why are pillows exposed to sunlight?

[1 markah/ mark]

## Bahagian B

Jawab semua soalan.  
Answer all questions.

- 2 (a) Rajah 2.1 menunjukkan tiga jenis mikroorganisma J, K dan L.  
Diagram 2.1 shows three types of microorganisms, J, K and L.



Rajah 2.1/ Diagram 2.1

- (i) Mengapakah mikroorganisma J dapat membuat makanannya sendiri?  
Why can microorganism J make its own food?

[1 markah/ mark]

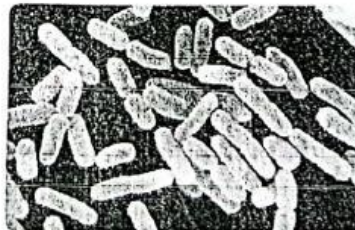
- (ii) Bagaimanakah mikroorganisma K mendapatkan nutriennya?  
How does microorganism K obtain its nutrients?

[1 markah/ mark]

- (iii) Nyatakan satu kegunaan mikroorganisma L dalam industri.  
State one use of microorganism L in industry.

[1 markah/ mark]

- (b) Rajah 2.2 menunjukkan sejenis bakteria.  
Diagram 2.2 shows a type of bacterium.



Rajah 2.2/ Diagram 2.2

- (i) Namakan bakteria tersebut.  
Name the bacterium.

[1 markah/ mark]

- (ii) Berikan dua kegunaan serum yang dihasilkan daripada bakteria di atas.  
Give two uses of the serum derived from the bacterium above.

1 \_\_\_\_\_  
2 \_\_\_\_\_

[2 markah/ marks]

### Bahagian C

Jawab **semua** soalan.

Answer **all** questions.

**3** Kaji pernyataan berikut.

Study the following statement.

Pertumbuhan bakteria dipengaruhi oleh nilai pH.  
The growth of bacteria is affected by pH value.

- (a) Nyatakan **satu** pernyataan masalah daripada maklumat di atas.

Suggest **one** problem statement from the above information.

[1 markah/ mark]

- (b) Cadangkan **satu** hipotesis untuk menyiasat pernyataan di atas.

Suggest **one** hypothesis to investigate the above statement.

[1 markah/ mark]

- (c) Berdasarkan pernyataan yang diberi, reka bentuk satu eksperimen makmal untuk menguji hipotesis anda dengan menggunakan tabung uji steril, kapas steril, bubur nutrien steril, 2 cm<sup>3</sup> asid hidroklorik cair, 2 cm<sup>3</sup> larutan natrium hidroksida, air suling steril dan kultur bakteria.

Based on the given statement, design a laboratory experiment to test your hypothesis by using sterile test tubes, sterile cotton wools, sterile nutrient broth, 2 cm<sup>3</sup> of dilute hydrochloric acid, 2 cm<sup>3</sup> of sodium hydroxide solution, sterile distilled water and bacterial culture.

Huraian anda haruslah mengandungi aspek berikut:

Your description should include the following aspects:

- (i) Tujuan eksperimen

Aim of the experiment

[1 markah/ mark]

- (ii) Mengenal pasti pemboleh ubah

Identification of variables

[2 markah/ marks]

- (iii) Prosedur atau kaedah

Procedure or method

[4 markah/ marks]

- (iv) Penjadualan data

Tabulation of data

[1 markah/ mark]