

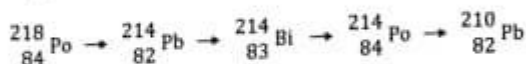
Bab

6

Fizik Nuklear Nuclear Physics

Kertas 1/ Paper 1

- 1 Rajah 1 menunjukkan siri pereputan radioaktif.
Diagram 1 shows a series of radioactive decay.



Rajah 1/ Diagram 1

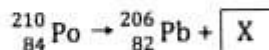
Tentukan sinar radioaktif yang dipancarkan dalam setiap peringkat siri pereputan di atas.
Determine the radioactive rays that are emitted in each stage of the above series of decay.

- A $\beta, \gamma, \gamma, \beta$
B $\beta, \alpha, \alpha, \beta$
C $\alpha, \alpha, \beta, \beta$
D $\alpha, \beta, \beta, \alpha$

- 2 Antara persamaan berikut yang manakah menunjukkan pereputan alfa?
Which of the following equation shows alpha decay?

- A ${}_{92}^{235}\text{U} + {}_0^1\text{n} \rightarrow {}_{56}^{141}\text{Ba} + {}_{36}^{92}\text{Kr} + 3{}_0^1\text{n}$
B ${}_{11}^{24}\text{Na} \rightarrow {}_{12}^{24}\text{Mg} + {}_{-1}^0\text{e}$
C ${}_{27}^{60}\text{Co} \rightarrow {}_{27}^{60}\text{Co} + \gamma$
D ${}_{84}^{210}\text{Po} \rightarrow {}_{82}^{206}\text{Pb} + {}_2^4\text{He}$

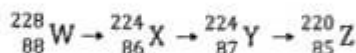
- 3 Persamaan berikut mewakili reputan nukleus polonium.
The following equation represents the decay of the polonium nucleus.



Apakah yang diwakili oleh X?
What is represented by X?

- A Sinar X
X-ray
B Zarah beta
Beta particles
C Sinar gamma
Gamma rays
D Zarah alfa
Alpha particles

- 4 Rajah 2 menunjukkan suatu siri pereputan.
Diagram 2 shows a decay series.

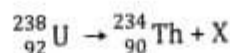


Rajah 2/ Diagram 2

Sinaran yang dikeluarkan terdiri daripada ...
The radiation given out consists of ...

- A dua zarah- α dan sinar gama
two α -particles and gamma rays
B dua zarah- β dan sinar gama
two β -particles and gamma rays
C dua zarah- α dan satu zarah- β
two α -particles and one β -particle
D satu zarah- α dan dua zarah- β
one α -particle and two β -particles

- 5 Reputan satu nukleus uranium diwakili oleh persamaan berikut.
The decay of a uranium nucleus is represented by the following equation.



Apakah X?
What is X?

- A ${}_1^1\text{H}$ C ${}_1^3\text{H}$
B ${}_1^2\text{H}$ D ${}_2^4\text{He}$

- 6 Aktiviti sampel P menjadi 3.125% daripada nilai asal selepas 200 minit.
The activity of sample P becomes 3.125% of its original value after 200 minutes.

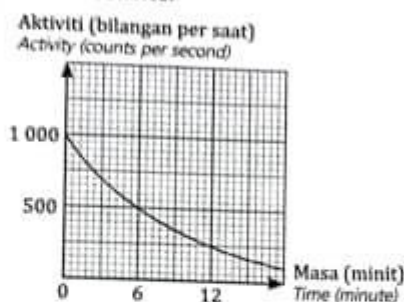
$$100\% \xrightarrow{T_{\frac{1}{2}}} 50\% \xrightarrow{T_{\frac{1}{2}}} 25\% \xrightarrow{T_{\frac{1}{2}}} 12.5\%$$

$$\xrightarrow{T_{\frac{1}{2}}} 6.25\% \xrightarrow{T_{\frac{1}{2}}} 3.125\%$$

Berapakah separuh hayatnya?
What is its half-life?

- A 30 minit/ minutes
B 40 minit/ minutes
C 50 minit/ minutes
D 100 minit/ minutes

- 7 Rajah 3 menunjukkan graf lengkungan bagi reputan radioaktif bagi suatu bahan.
Diagram 3 shows a curve graph for radioactive decay for a substance.



Rajah 3/ Diagram 3

Antara pernyataan berikut, yang manakah benar?

Which of the following statements is true?

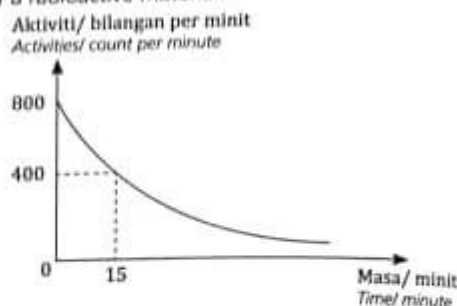
- I Separuh hayat bagi bahan ini ialah 6 minit
The half-life of the substance is 6 minutes
 - II Tiada bahan tertinggal selepas 12 minit mereput
There are no substance left after 12 minutes decay
 - III Baki sebanyak 100 aktiviti selepas 80% bahan mereput
A total of 100 activities left after 80% of the substance decays
 - IV Selepas 2 kali mereput, aktiviti menjadi 250 bilangan per saat
After 2 decays, the activity becomes 250 numbers per second
- A I sahaja
I only
- B I dan II sahaja
I and II only
- C II dan III sahaja
II and III only
- D I dan IV sahaja
I and IV only

- 8 Sebuah meter kadar mencatatkan bacaan 1 300 aktiviti per minit suatu sumber radioaktif pada pukul 1:00 petang. Pada pukul 2:30 petang hari yang sama, kadar bilangan telah berkurang kepada 325 aktiviti per minit. Berapakah setengah hayat sumber radioaktif itu?

A rate meter counter is recording 1 300 activities per minute of a radioactive source at 1:00 pm. At 2:30 pm on the same day, the reading has reduced to 325 activities per minute. What is the half-life of the radioactive source?

- A 15 minit/ minutes
- B 25 minit/ minutes
- C 45 minit/ minutes
- D 60 minit/ minutes

- 9 Rajah 4 ialah graf yang menunjukkan lengkung pereputan suatu bahan radioaktif.
Diagram 4 is a graph which shows the decay curve of a radioactive material.



Rajah 4/ Diagram 4

Jika aktiviti awal bahan radioaktif itu ialah 800 bilangan per minit, berapakah aktiviti selepas 1 jam?

If the initial of the radioactive material is 800 counts per minute, what is the activity after 1 hour?

- A 400
- B 200
- C 100
- D 50

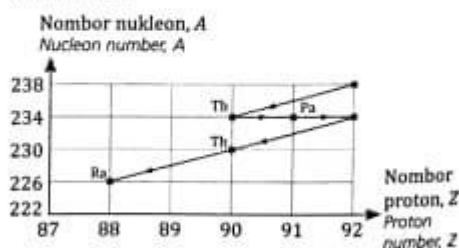
- 10 Fosforus-32 mempunyai separuh hayat selama 15 hari. Apakah pecahan fosforus-32 yang tinggal selepas 75 hari?

Phosphorous-32 has a half-life of 15 days. What fraction of an original sample of phosphorus-32 remains after 75 days?

- A $\frac{1}{4}$
- B $\frac{1}{8}$
- C $\frac{1}{16}$
- D $\frac{1}{32}$

- 11 Rajah 5 menunjukkan siri pereputan radioaktif bagi nukleus uranium-238 kepada nukleus radium-226.

Diagram 5 shows a series of radioactive decays for the nucleus of uranium-238 to nucleus of radium-226.



Rajah 5/ Diagram 5

Berapakah bilangan zarah alfa dan zarah beta yang dipancarkan dalam proses ini?

What is the number of the alpha particles and beta particles emitted during this process?