Solutions Ch 3·5 Year 11

Answer 1

(3 marks)

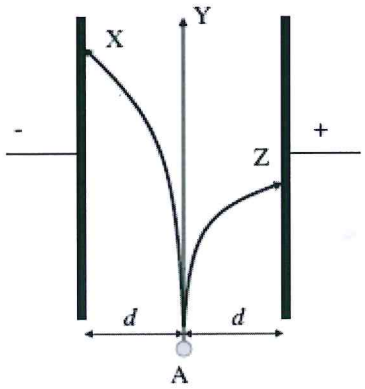
In a uranium mine the workers are lowered into the mine shaft in an enclosed metal lift. If alpha, beta and gamma radiation are all emitted by the rocks around the lift shaft, state the main radiation type or types the workers are exposed to inside the lift. Justify your answer.

Description	Marks
Gamma radiation	1
The metal will block all of the alpha and most of the beta radiation therefore only the gamma radiation can pass through the metal	1–2
Total	**3**

Answer 2

(1 mark)

There is a uniform electric field between two charged parallel plates as shown below. Three particles (α, β and γ) are ejected from A into the field parallel with the plates with similar velocities. Their paths (X, Y and Z) are shown on the diagram below.



The particles and their paths are best named as

A X = γ Y = β and Z = α
B X = α Y = β and Z = γ
C X = β Y = α and Z = γ
D X = α Y = γ and Z = β
E X = γ Y = α and Z = β
F X = β Y = γ and Z = α

Answer: _____

Description	Marks
D	1
	Total 1

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Answer 3

Year 11

(4 marks)

A geologist is using a Geiger counter to test some rocks for radioactivity and finds one that gives off radiation. Describe a simple experiment that could be done to determine whether the radiation is alpha, beta or gamma.

Description	Marks
Using a Geiger counter measure the counts per minute a short measured distance from the sample. Place a sheet of paper between the source and Geiger counter and measure counts per minutes, repeat using a sheet of aluminium foil	1–2
If the sheet of paper results in a large drop in the count, the sample is alpha, if the aluminium causes a large drop in count then it is beta, otherwise it is emitting gamma radiation	1–2
Total	**4**