**6.2 HONORS CLASS WORKSHEET**

**1. Ionizing and penetrating power of radiation**

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| (a) | Explain briefly why alpha particles are more ionizing than beta particles and why beta particles are more ionizing than gamma rays | Alpha particles have a 2+ charge and are bigger  Beta particles have a -1 charge and are smaller  Gamma rays have no charge and no mass |
| (b) | Explain briefly why alpha particles are less penetrating than beta particles and why beta particles are less penetrating than gamma rays | Due to their high ionizing power, alpha particles quickly pick up two electrons and become He atoms  Beta particles are eventually absorbed into the shells of other atoms once they have slowed down enough  Gamma rays are not easily absorbed by atoms and so it is very hard to stop them |

Complete the following table by stating what effect the following barriers will have on each type of radiation; answer either “no effect”, “will reduce intensity” or “will completely stop”

|  |  |  |  |
| --- | --- | --- | --- |
| barrier | α-particles | β-particles | γ-rays |
| 10 cm of air | completely stop | no effect | no effect |
| a thin sheet of paper | completely stop | reduce intensity | no effect |
| a thin sheet of aluminium | completely stop | completely stop | no effect |
| a thick layer of lead | completely stop | completely stop | reduce intensity |

**2. Dangers of radiation**

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| --- | --- | --- |
| (a) | State the two ways in which radiation can be harmful | Can cause burns due to the high energy  Can cause cancer by making cells mutate |
| (b) | Explain why gamma radiation is generally considered more dangerous than alpha or beta radiation | You can’t stop it, so it is very difficult to control |
| (c) | In what circumstances would alpha or beta radiation be considered very dangerous? | If you ingest, inhale or inject it |