This question requires a basic understanding of Faraday's law, which states that current is induced in a conductor when the magnetic environment around that conductor changes. For example, a coil will produc a current when being moved closer to, or away from a magnet, but will not produce any current if it stationary to the magnet. In the context of the metal detector, this means that an induced current, and therefore magnetic field, will only be produced when the induction field around the target is changing. An oscillating induction field ensures that object inside the detection zone of the coil will always experience a changing magnetic environment.

If the induction coil did not change, then metal objects would only be detected as they moved towards or away from the detector.

The correct answer is 'C'

'A' is incorrect as the coil is not turning 'off and on', but alternates between polarities. Also, keep in mind that the question relates to electromagnetic induction, not power consumption. This should be a strong clue that this is not the answer you are looking for.

'B' is a nonsense answer.

'D' is an incorrect statement. The induced magnetic field of the target will always oppose the induction field.