**Essay Title:** Discuss ways of studying the brain. (16 marks)

Studying the brain allows us to gain important insights into the underlying foundations of our behaviour and mental processes. A range of methods are available that involve scanning the living brain, and looking at patterns of electrical activity. A post-mortem examination is another possible approach.

Functional magnetic resonance imaging (fMRI) is a brain-scanning technique that measures blood flow in the brain when a person performs a task. An increase in blood flow is a response to the need for more oxygen in that area of the brain when it becomes active.

An electroencephalogram (EEG) measures electrical activity by attaching electrodes on the scalp. Small electrical charges are detected by the electrodes that are graphed over a period of time, indicating the level of activity in the brain.

An advantage of the EEG technique is that it has good temporal resolution: it takes readings every millisecond, meaning it can record the brain’s activity in real time as opposed to looking at a passive brain. This leads to an accurate measurement of electrical activity when responding to a specific task.

However, it could be argued that EEGs are uncomfortable for the participant as electrodes are attached to the head. This could result in unrepresentative readings as the patient’s discomfort may be affecting cognitive responses to situations. fMRI scans, on the other hand, are not invasive and would not cause the participants any discomfort, leading to more accurate recordings.

Another brain scanning technique, similar to EEGs, is event-related potentials (ERPs). These work by measuring small voltage changes in the brain triggered by specific events or stimuli. Establishing a specific response to a target stimulus requires multiple presentations of the stimulus, and then averaging the responses together. This filters out brain activity that is not related to the appearance of the stimulus.

This way of measuring brain activity is advantageous as it enables determination of how processing is affected by a
specific experimental manipulation. This makes ERPs a more experimentally robust method as it can eliminate extraneous neutral activity, something that other scanning techniques may struggle to do.

The final method of investigating the brain is post-mortem examination where researchers will study a person who displayed a particular behaviour while they were alive that suggested possible brain damage. An example of this technique is the work of Paul Broca, who examined the brain of a man who displayed speech problems when he was alive. It was subsequently discovered that he had a lesion in the area of the brain important for speech production that later became known as the Broca’s area.

This method of investigation has successfully contributed to the understanding of many disorders. Iverson examined the brains of deceased schizophrenic patients and found that they all had a higher concentration of dopamine, especially in the limbic system, compared to non-schizophrenic brains highlighting the importance of such investigations. Furthermore, post-mortem studies allow for a more detailed examination of anatomical and neurochemical aspects of the brain than would be possible with other techniques. They also enable researchers to examine deeper regions of the brain such as the hypothalamus and hippocampus, something that is not as easy with other methods of investigation.

[532 Words]
Examiner style comments: **Mark Band 4**
A sound essay that demonstrates a clear understanding of the different ways to investigate the brain. A range of techniques are discussed that include a clear explanation of how the techniques are used and the effectiveness of them. An effective discussion is evident that compares the strengths and weaknesses of each technique mentioned. The answer also demonstrates the use of specialist terminology throughout.