

## Studying the Brain (A2 Only) - Mark Scheme

### Q1.

[AO3 = 3]

Up to three marks for a brief evaluation of the use of EEGs. Credit up to 3 separate evaluative points or one point fully elaborated or a combination of these.

Likely points: safe way of measuring brain activity; there is no surgery or invasive process; helps to identify activity in various regions of brain; its use as a diagnostic tool eg epilepsy; lacks precision in measuring individual action potential of neurons / electrodes not sensitive enough, etc.

### Q2.

[AO1 = 2]

**2 marks** for clear outline of the key difference: EEG is a recording of general brain activity usually linked to states such as sleep and arousal, whilst ERPs are elicited by specific stimuli presented to the participant.

**1 mark** for a muddled / vague answer that shows some understanding of general state vs specific response.

Note - question is about differences, so no credit for simply describing the technique.

### Q3.

[AO1 = 3 AO3 = 5]

Level	Marks	Description
4	7 – 8	Knowledge of one or more ways of studying the brain is accurate with some detail. Evaluation is thorough and effective. Minor detail and/or expansion of argument is sometimes lacking. The answer is clear, coherent and focused. Specialist terminology is used effectively.
3	5 – 6	Knowledge of one or more ways of studying the brain is evident but there are occasional inaccuracies/omissions. Evaluation is mostly effective. The answer is mostly clear and organised but occasionally lacks focus. Specialist terminology is used appropriately.
2	3 – 4	Limited knowledge of one or more ways of studying the brain is present. Focus is mainly on description. Any evaluation is of limited effectiveness. The answer lacks clarity, accuracy and organisation in places. Specialist terminology is used inappropriately on occasions.
1	1 – 2	Knowledge of one or more ways of studying the brain is

		very limited. Evaluation is limited, poorly focused or absent. The answer as a whole lacks clarity, has many inaccuracies and is poorly organised. Specialist terminology is either absent or inappropriately used.
	0	No relevant content.

**Possible content:**

Candidates are most likely to describe the techniques described on the specification (outlined below) but examiners should be aware of other methods candidates may use such as lesion studies or CAT/PET scans.

- fMRI – uses magnetic field and radio waves to monitor blood flow; it measures the change in the energy released by haemoglobin, reflecting activity of the brain (oxygen consumption) to give a moving picture of the brain; activity in regions of interest can be compared during a base line task and during a specific activity
- EEGs – electrodes are put on the scalp and detect neuronal activity directly below where they are placed; differing numbers of electrodes can be used depending on focus of the research
- ERPs – electrodes are put on the scalp and detect neuronal activity (directly below where they are placed) in response to a stimulus introduced by the researcher
- post-mortem examinations – brain is examined after death to try and correlate structural abnormalities/damage to behaviour.

**Possible evaluation:**

- fMRI captures dynamic brain activity as opposed to MRI/post-mortem examinations which purely show physiology
- interpretation of fMRI is complex and is affected by temporal resolution, biased interpretation and by the baseline task used
- fMRI research is expensive leading to reduced sample sizes which negatively impact the validity of the research
- EEGs and ERPs are cheaper so can be more widely used in research
- EEGs and ERPs have poor spatial resolution
- post-mortem examinations may lack validity due to small sample sizes (as special permission needs to be granted) and also due to neuronal changes during and after death
- advantages of investigating brain activity in humans rather than generalising from animal lesion/single electrode recording studies (for validity and ethical reasons)
- comparisons between techniques is an effective source of evaluation marks
- research studies are creditworthy as long as they are effectively used to evaluate the technique(s) described.

Credit other relevant material.