

Mark schemes

Q1.

[AO1 = 1]

A – Electrocardiogram (ECG)

[1]

Q2.

[AO1 = 6 AO3 = 10]

Level	Mark	Description
4	13-16	Knowledge of ways of studying the brain is accurate and generally well detailed. Discussion 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	9-12	Knowledge of ways of studying the brain is evident but there are occasional inaccuracies/omissions. Discussion is mostly effective. The answer is mostly clear and organised but occasionally lacks focus. Specialist terminology is used appropriately.
2	5-8	Limited knowledge of ways of studying the brain is present. Focus is mainly on description. Any discussion is of limited effectiveness. The answer lacks clarity, accuracy and organisation in places. Specialist terminology is used inappropriately on occasions.
1	1-4	Knowledge of ways of studying the brain is very limited. Discussion 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:

- post-mortem examinations study the brain after death to try and correlate structural abnormalities to behavioural changes
- EEGs use electrodes fixed to a participant's scalp which detect neuronal activity directly below where they are placed
- ERPs use electrodes fixed to a participant's scalp to detect neuronal activity in response to a stimulus introduced by the researcher
- fMRI use magnetic field and radio waves to detect changes in blood oxygenation and flow as a result of neural activity. It gives a moving picture of the brain; activity in regions of interest can be compared between a specific activity and a baseline task.

Possible discussion:

- fMRI data is complex and can be affected by the baseline task used and how the data is interpreted
- fMRIs have low temporal resolution and research is expensive leading to

- low sample sizes which can reduce the validity of studies
- post-mortem examinations require special permission to be conducted which often leads to small sample sizes
- post-mortem examinations can be affected by changes which occur during/after death
- post-mortem examinations enable deeper regions of the brain to be investigated than non-invasive techniques
- EEGs and ERPs are cheaper than fMRIs so enable larger sample sizes which can increase the validity of the data obtained
- EEGs and ERPs have poorer spatial resolution than fMRIs
- unlike post-mortem examinations, neuroimaging techniques allow the active brain to be investigated during specific tasks/activities
- research studies used to evaluate techniques described.

Credit other relevant material.

Note: discussion of alternative ways of studying the brain (such as lesion studies or CAT/PET scans) can also be credited.

[16]

Q3.

[AO1 = 4]

2 marks for **one** clear and coherent difference between fMRIs and ERPs as ways of studying the brain.

1 mark for **one** limited or muddled difference between fMRIs and ERPs as ways of studying the brain.

Possible content:

- fMRIs have poor temporal resolution whereas ERPs have good temporal resolution
- fMRIs have good spatial resolution whereas ERPs have poor spatial resolution
- fMRIs provide indirect measure of neural activity whereas ERPs offer a direct measure of neural activity
- different methodology - fMRIs work by measuring changes in blood oxygenation as a measure of neural activity whereas ERPs measure electrical activity via electrodes to detect brainwaves triggered by certain events
- fMRIs are more expensive than ERPs.

Credit other relevant differences.

Plus

2 marks for **one** clear and coherent similarity between fMRIs and ERPs as ways of studying the brain.

1 mark for **one** limited or muddled similarity between fMRIs and ERPs as ways of studying the brain.

Possible content:

- fMRIs and ERPs are both non-invasive and do not use radiation (risk free)

- fMRIs and ERPs both measure brain activity linked to events/tasks.

Credit other relevant similarities.

[4]