Mark schemes

Q1.

[AO1 = 6 AO2 = 4 AO3 = 6]

Level	Marks	Description
4	13-16	Knowledge of plasticity and functional recovery of the brain after trauma is accurate and generally well detailed. Application is effective. 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 plasticity and functional recovery of the brain after trauma is evident but there are occasional inaccuracies/omissions. Application/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 plasticity and functional recovery of the brain after trauma is present. Focus is mainly on description. Any discussion/application 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 plasticity and functional recovery of the brain after trauma is very limited. Discussion/application 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:

- brain plasticity is the ability of the brain to modify the structure and function based on experience
- functional recovery is where the brain recovers abilities previously lost due to brain injury
- neuronal unmasking – activation of 'dormant' synapses to compensate for damaged areas of the brain
- structural changes supporting neuronal unmasking such as axonal sprouting, reformation of blood vessels, denervation super-sensitivity and recruitment of homologous areas
- knowledge of relevant studies.

Possible application:

- research supports Xavier's belief that young brains are more plastic – neural reorganisation is greater in children than adults
- full recovery is not passive unlike what Xavier suggested, it depends on the extent of the damage and on various internal and external factors over time
- as the teacher suggested recovery is not always complete (eg the man

who cycled without a helmet) and depends on the extent and location of damage and the level of subsequent care (eg physiotherapy)
- loss of the man's speech could have been due to damage to Broca's area.

Possible discussion:
- evidence from case studies; eg E.B. Danelli et al. (2013)
- evidence from animal studies; eg Hubel & Wiesel (1963) and discussion of the limitations of these
- the influence of variables factors affecting recovery after trauma such as educational level/cognitive reserve; eg Schneider et al. (2014), age; eg Elbert et al. (2001), Corkin et al. (1989), Huttenlocher, (2002), Plata et al. (2008), Bezzola, et al. (2012), gender; eg Ratcliffe et al. (2007), or physical exhaustion/stress/alcohol; eg Fleet & Heilman (1986)
- experiential factors which may be used to enhance plasticity and functional recovery such as meditation, learning new skills, playing video games, physiotherapy, etc
- methodological issues and their implications.

Credit other relevant material.

[16]

Q2.

[AO1 = 6 AO3 = 10]

Level	Marks	Description
4	13-16	Knowledge of localisation of function in 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 localisation of function in 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 localisation of function in 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 localisation of function in 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:
- concept of functional localisation and origins from phrenology

- basic neuroanatomical organisation – concepts of hemispheric lateralisation and contralateral organisation
- localisation of the motor, somatosensory, visual, auditory and language centres
- outline of functions assigned to motor, somatosensory, visual, auditory and language centres
- gender differences in neuroanatomical localisation of function, eg Harasty et al. (1997)
- differences in localisation of function based on left/right-handedness.

Possible discussion:

- research evidence to support localisation of function, eg Phineas Gage, HM, Tan/Leborge, etc and evidence from brain scanning studies
- challenges to localisation of function, eg holistic theory, equipotentiality theory – Lashley's work with rats, issue of plasticity – case study EB, Dronkers et al. (2007), etc
- discussion of gender differences, beta bias and androcentrism in research
- discussion of individual differences
- issue of reductionism
- methodological critique of evidence – issues of generalisation from animal research and case studies and issues of baseline tasks in imaging studies.

Credit other relevant material.

[16]

Q3.

[AO1 = 2]

2 marks for a clear and coherent answer.

1 mark for a limited/muddled answer.

Possible content:

- Broca's area is responsible for speech production whereas Wernicke's area is responsible for language comprehension
- Broca's area enables speech to be fluent whereas Wernicke's area enables speech to be meaningful.

Credit other relevant material.

Note: do not credit structural differences.

[2]

Q4.

[AO1 = 4]

1 mark for each of the following:

	Area of brain
Which area is responsible for processing sensations such as pain and pressure?	**C**
Which area processes information such as colour and shape?	**D**
Which area processes information such as pitch and volume?	**E**
Which area is responsible for voluntary movements?	**B**

[4]

Q5.

[AO1 = 3 AO3 = 5]

Level	Mark	Description
4	7-8	Knowledge of split-brain research 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 split-brain research 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 split-brain research 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 split-brain research 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:

- 'split-brain' patients have had their corpus callosum severed
- Sperry's methodology
- Sperry's key visual/tactile findings
- case of Karen Bryne – Alien Hand Syndrome.

Possible evaluation points:

- 'split-brain' research has enabled discoveries of lateralisation of function
- experiments on split-brain patients were scientific
- research has added to the unity of consciousness debate
- lack of controls: extent of disconnection between hemispheres varied, lack of valid control groups, may be additional effects of surgery other than just procedure, some patients had experienced drug therapy for much longer than others
- artificial data – in real life severed corpus callosum can be compensated for by unrestricted use of two eyes
- 'split-brain' patients may initially suffer from hemispheres acting independently but in an adaptive process one tends to dominate
- issue of generalisability – research relates to small sample sizes, Andrewes (2001) and patients are atypical
- research oversimplifies hemispheric lateralisation – usually hemispheres are constantly communicating, and plasticity allows for compensation across hemispheres
- contradictory findings casting doubt over discoveries made, eg Gazzaniga (1998), patient JW in Turk et al. (2002).

Credit other relevant material.

[8]