OXFORD

INTERNATIONAL
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INTERNATIONAL AS
PSYCHOLOGY
PS02

Unit 2: Biopsychology, Development and Research Methods 1

Mark scheme

June 2019

Version: 1.0 Final

196XPS02/MS

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from oxfordaqaexams.org.uk

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

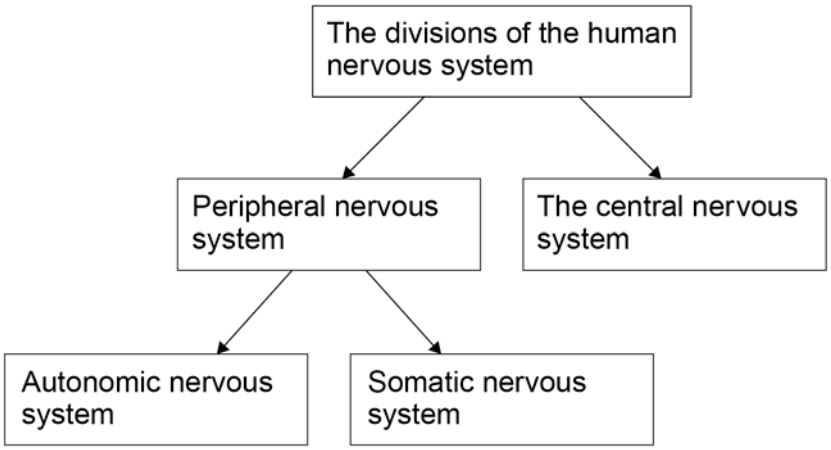
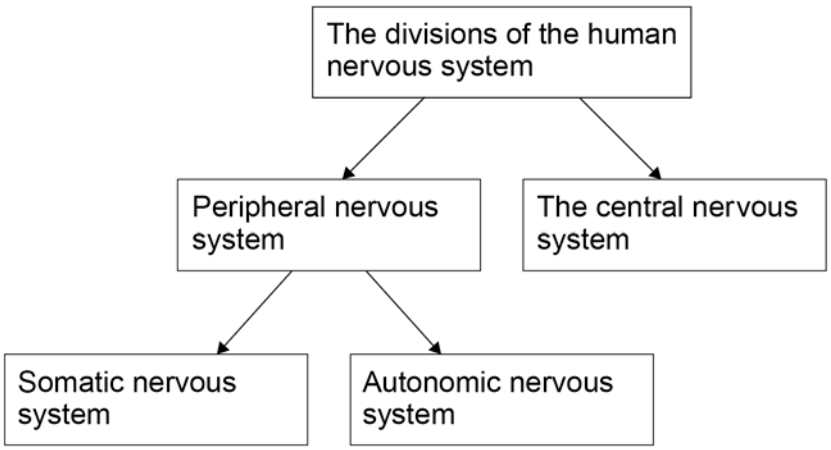
Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Section A: Biopsychology **Total for this section: 30 marks**

Question	Marking guidance	Total marks
01	Complete **Figure 1** by writing the name of a division in each box.  **or**  	**3** **AO1=3**

<table>
<tr><th>Question</th><th>Marking guidance</th><th>Total marks</th></tr>
<tr><td>02</td><td>
Outline the process of synaptic transmission.

Possible content:

• Transmission of nerve impulses across the synapse is chemical. Stored within the pre-synaptic terminal are neurotransmitters

• Electrical nerve impulses travel down the axon and when they reach the axon terminal they stimulate the release of neurotransmitter molecules (from the synaptic vesicles) into the synaptic gap

• The molecules cross to the post-synaptic membrane and lock into synaptic receptors (on the dendrites of the next neuron)

• The post-synaptic neuron converts the neurotransmitters to an electrical impulse to travel down to the next pre-synaptic terminal.

<u>Answers may refer to inhibition/excitation (not essential)</u>

Some neurotransmitters (eg serotonin) increase the negative charge on the post-synaptic neuron; this decreases the chance that the neuron will fire and pass on the electrical impulse (inhibition).

Some neurotransmitters (eg adrenaline) increase the positive charge on the post-synaptic neuron; this increases the chance that the neuron will fire and pass on the electrical impulse (excitation).

Accept a diagram as part of the outline.

<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>3</td><td>Knowledge of the process of synaptic transmission is clear and thorough. The answer is clear with appropriate use of terminology.</td><td>6–5</td></tr>
<tr><td>2</td><td>Some knowledge of the process of synaptic transmission is present. The answer lacks clarity/use of terminology in places.</td><td>4–3</td></tr>
<tr><td>1</td><td>Knowledge of the process of synaptic transmission is limited or very limited. There may only be a diagram. The answer is vague/muddled.</td><td>2–1</td></tr>
<tr><td>0</td><td>No creditable content.</td><td></td></tr>
</table>
</td><td>6

AO1=6</td></tr>
</table>

Question	Marking guidance	Total marks
03	Describe the fight or flight response. Refer to Sienna's experience in your answer. **Possible content:** • The fight or flight response is a reflex response and the body's physiological reactions to threat/stressful situations • The response is generated from the sympathetic branch of the ANS and allows the individual to react quickly so that they can fight or escape the threat • The hypothalamus recognizes the threat and sends a message to the adrenal gland (adrenal medulla) • This triggers the release of adrenaline (to the endocrine system) and noradrenaline in the brain • This prompts physical changes to help deal with the threat OR to escape. Changes include: increased heart and breathing rate; muscle tension, sweating; reduction in digestion etc • Perception of threat switches control from parasympathetic to sympathetic nervous system. Credit the use of a diagram to outline the steps. **Application:** • Sienna's heart is beating very fast – increased heart rate speeds up blood flow • She feels sweaty – sweat is produced to regulate temperature • She feels sick – one effect of the increase in adrenaline • She wants to run away – blood flow diverted to muscles to aid flight.	**9** **AO1=5** **AO2=4**

Level	Description	Marks
3	Knowledge of the fight or flight response is accurate. The application is effective. The answer is clear and organised. There is some effective use of specialist terminology.	**9–7**
2	Knowledge of the fight or flight response is evident but there are occasional inaccuracies/omissions. There is likely to be some appropriate application. The answer lacks clarity and organisation in places. There is some appropriate use of specialist terminology.	**6–4**
1	Knowledge of the fight or flight response is either limited or very limited. There may be limited or no application. The answer lacks clarity and is poorly organised. Specialist terminology is either absent or inappropriately used.	**3–1**
0	No creditable content.	

Question	Marking guidance	Total marks
04	Describe what research has shown about the two language centres in the brain. Refer to Tami and Si in your answer. **Possible A01 includes:** • Language is usually based in the left hemisphere and there are two specific language areas known as Broca's and Wernicke's • From a case study Broca identified an area at the base of the left frontal lobe that seemed to be responsible for putting words together and the production of speech. This area is now known as Broca's area • Broca's aphasia (expressive) is when speech production is lost but comprehension is intact • Wernicke noticed that patients with damage in the left hemisphere at the top of the temporal lobe (close to the auditory cortex) had specific language impairments such as the inability to comprehend language and anomia. This is now known as Wernicke's area • Wernicke's area seems to have a specific function; helping an individual understand language and use the correct words • Wernicke's aphasia (receptive) is when the individual appears to speak fluently but has lost speech comprehension. **A02 – possible application:** • Tami's head injury is likely to have been on the left side as it affected her language • She now has difficulty speaking although she does understand language. It is likely that Tami has damage to the Broca's area as this would result in an inability to produce language – Broca's aphasia • Si's operation has probably caused damage in the left hemisphere near the auditory cortex in an area known as Wernicke's as this would result in the specific language impairment • Si's problem seems to be Wernicke's aphasia as he speaks in sentences, but his words make no sense. Credit the use of a diagram of the brain illustrating Broca's and Wernicke's areas. Credit other relevant points.	**12** **AO1=6** **AO2=6**

Level	Description	Marks
4	Knowledge of the two language centres in the brain (Broca's and Wernicke's) is accurate and generally well detailed. Application is effective with reference to the left hemisphere **and** detail of Broca's/Wernickes' aphasia. The answer is clear, organised and focused. Specialist terminology is mostly used effectively.	**12–10**
3	Knowledge of the two language centres in the brain (Broca's and Wernicke's) is evident but there are occasional inaccuracies/omissions. There is some appropriate application. The answer is mostly clear and organised. Specialist terminology is mostly used appropriately.	**9–7**
2	Limited knowledge of the two language centres in the brain (Broca's and/or Wernicke's) is present. There is some limited application. The answer lacks clarity, accuracy and organisation in places. Specialist terminology is occasionally used appropriately.	**6–4**
1	Knowledge of the two language centres in the brain (Broca's and/or Wernicke's) is very limited. Application is limited, poorly focused or absent. The answer lacks clarity, has many inaccuracies and is poorly organised. Specialist terminology is either absent or inappropriately used.	**3–1**
0	No creditable content.	

Section B: Cognitive development **Total for this section: 30 marks**

Question	Marking guidance	Total marks
05	Which of the following terms is the name of Piaget's fourth stage of intellectual development? Answer: **B**	**1** **AO1=1**

Question	Marking guidance	Total marks
06	For each definition, choose the correct term from **Table 1** and write it next to the definition in **Table 2**. **Table 1** **Accommodation** **Assimilation** **Conservation** **Egocentrism** **Equilibration** **Table 2** **Definition** / **Term used by Piaget** Adding new experiences to an existing schema. / Assimilation Changing a schema or developing a new schema. / Accommodation The inability to see the world from another's perspective. / Egocentrism Understanding quantity remains the same even if appearance changes. / Conservation	**4** **AO1=4**

Question	Marking guidance	Total marks
07	Briefly discuss **one** strength and **one** limitation of Piaget's theory of cognitive development. **Possible strengths include:** • Piaget's theory stimulated interest in developmental psychology and cognitive development and paved the way for further research • Cross-cultural research suggests the stages of development are universal offering support for the process of biological maturation • Piaget's research studies were innovative and creative • Piaget provided evidence to support his theory • Piaget has had a major influence on education eg with child-centred learning. **Possible limitations include:** • Piaget's stage theory was considered too rigid and led him to introduce the concept of horizontal decalage • Cross-cultural evidence does not always support Piaget's age-related stages. The formal operational stage has proved particularly controversial • Other developmental psychologists have questioned Piaget's view of independent discovery learning and some, eg Vygotsky, have argued for the essential guidance of a more knowledgeable other (MKO) in cognitive development • Piaget's research to support his theory of cognitive development has been criticized • Piaget believed that the rate of a child's cognitive development could not be accelerated as a child learns when 'biologically ready' but others have found that direct tuition, for example, can speed up development. Credit other relevant strengths and limitations.	**6** **AO3=6**

For a strength award marks as follows:

Level	Description	Marks
3	A strength is explained in detail. The answer is clear with appropriate use of terminology.	**3**
2	A strength is explained but detail is lacking. The answer lacks clarity in places.	**2**
1	A strength is briefly presented but there is little or no explanation. The answer is very limited/vague/muddled.	**1**
0	No creditable content.	

For a limitation award marks as follows:

Level	Description	Marks
3	A limitation is explained in detail. The answer is clear with appropriate use of terminology.	**3**
2	A limitation is explained but detail is lacking. The answer lacks clarity in places.	**2**
1	A limitation is briefly presented but there is little or no explanation. The answer is very limited/vague/muddled.	**1**
0	No creditable content.	

Question	Marking guidance	Total marks
08	Briefly outline what is meant by Vygotsky's concept of the zone of proximal development. **2 marks** for a clear, coherent outline of the zone of proximal development. **1 mark** for a limited or muddled outline. The zone of proximal development is the gap between the child's current level of development (what the child can perform unaided) and what the child could potentially do with the help of a more knowledgeable other (more experienced peer/adult).	**2** **AO1=2**

Question	Marking guidance	Total marks
09	Briefly explain how the zone of proximal development could be involved when Mai helps her younger brother with the 12-piece wooden block task. **2 marks** for a clear, coherent explanation. **1 mark** for a limited or muddled explanation. Adam's current ability is a 4 piece wooden block task but with the help of Mai his potential is a 12 piece wooden block task. Mai as an expert (more knowledgeable other) helped (scaffolded) Adam to work within the zone of proximal development (ZPD). Credit answers from Mai's point of view.	**2** **AO2=2**

Question	Marking guidance	Total marks
10	With reference to Baillargeon's violation of expectation research, explain the findings in **Table 3**. **2 marks** for a clear explanation of the findings. **1 mark** for a limited, vague or muddled explanation. **Possible Content:** • The findings show that the infants looked twice as long at the impossible event (tall carrot) than the possible event (short carrot) which shows they were more interested/surprised • The infants expected the tall carrot to appear at the window and were surprised that it did not. This was a violation of expectation • Infants aged 4 months were able to remember/represent/visualise the object and reason about hidden objects/show object permanence.	**2** **AO2=2**

Question	Marking guidance	Total marks
11	Suggest **one** problem with the violation of expectation method of investigating infants' understanding of the physical world. **1 mark** for one identifiable problem. **Possible Content:** • Investigating infants is problematic as they are unable to speak • Conclusions rely on inference • 'Looking for longer' does not necessarily mean expecting something different • Infants may 'look longer' because they are tired/bored etc. Accept other relevant problems.	**1** **AO3=1**

Question	Marking guidance	Total marks
12	Discuss the role of the mirror neuron system in social cognition. **Possible A01 includes:** • Mirror neurons are a specific type of neuron in the brain that 'fire' both when an action is performed and when an action performed by someone else is observed • Mirror neurons play a role in several areas of social cognition eg action, empathy, imitation, intention. When we see someone carry out an action eg drink water, our mirror neurons are activated as though we had drunk the water • Scans have shown that observing someone in pain activates the same brain systems as if we were in pain – which is the foundation of empathy • Research has shown that the mirror neuron system in humans is less activated in people low in empathy or who are autistic. **A03 – possible discussion points include:** • There is evidence to support the role of mirror neurons in social cognition • Research into mirror neurons suggests a biological explanation for autism and may lead to a greater understanding of social deficits in ASD • Social cognition is too complex to be explained simply by mirror neurons • The explanation based on mirror neurons is reductionist – reducing social cognition to a low-level explanation (brain) rather than behavioural/family/social levels • Research using fMRI scanning have shown differences in mirror neurons of typically developing and autistic children eg Dapretto et al (2006) • Research has largely been carried out on animals (macaque monkeys) and there is a problem with extrapolation • Research that might be used to support/refute the role of the mirror neuron in social cognition: Gazzola et al (2006); Oberman et al (2005); Dinstein et al (2010); Heyes (2012); Hadjikhani (2007); Haker et al (2012) etc. Credit other relevant points.	**12** **AO1=6** **AO3=6**

Level	Description	Marks
4	Knowledge of the role of the mirror neuron system in social cognition is accurate and generally well detailed. Discussion is effective. The answer is clear, organised and focused. Specialist terminology is mostly used effectively.	**12–10**
3	Knowledge of the role of the mirror neuron system in social cognition is evident but there are occasional inaccuracies/omissions. There is some appropriate discussion. The answer is mostly clear and organised. Specialist terminology is mostly used appropriately.	**9–7**
2	Limited knowledge of the role of the mirror neuron system in social cognition is present. There is some limited discussion. The answer lacks clarity, accuracy and organisation in places. Specialist terminology is occasionally used appropriately.	**6–4**
1	Knowledge of the role of the mirror neuron system in social cognition is very limited. Discussion is limited, poorly focused or absent. The answer lacks clarity, has many inaccuracies and is poorly organised. Specialist terminology is either absent or inappropriately used.	**3–1**
0	No creditable content.	

Section C: Research: methods 1 **Total for this section: 30 marks**

Question	Marking guidance	Total marks
13	What type of sample was used in this study? Answer: **A**	**1** **AO2=1**

Question	Marking guidance	Total marks
14	Write a suitable hypothesis for this study. There is a (negative) correlation between age (in years) and number of words recalled. Credit null version.	**3** **AO2=3**

Level	Description	Marks
3	For an appropriate directional or non-directional correlational hypothesis:	**3**
2	For a correlational statement with both co-variables that lacks clarity or where only one variable is operationalised.	**2**
1	For a muddled correlational statement.	**1**
0	No creditable content.	

<table>
<tr><th>Question</th><th>Marking guidance</th><th>Total marks</th></tr>
<tr><td>15</td><td>Explain at least one reason for using a pilot study in this research.

Possible content includes:

• The researcher carried out the study on a small sample of 10 participants to check the timing, in this case 2 minutes and 4 minutes, procedures etc before the real study, in order to modify the study if necessary

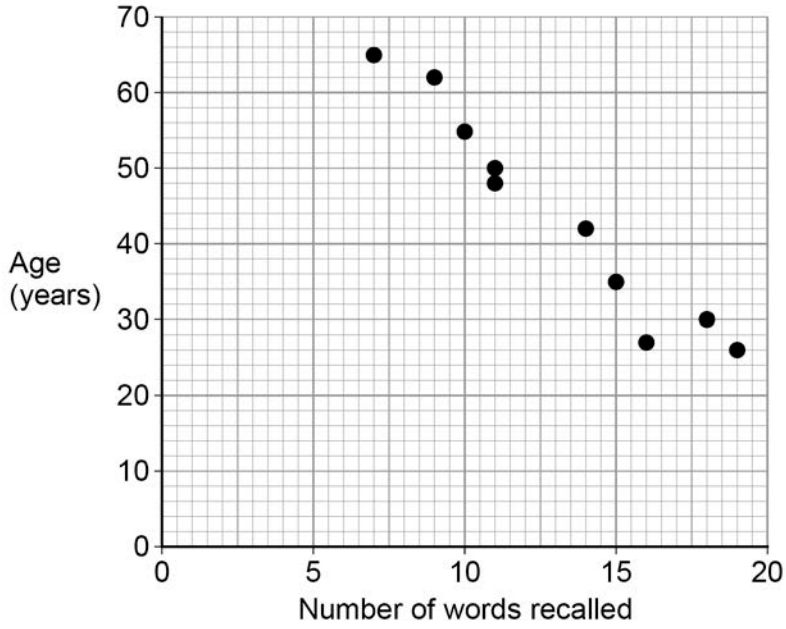
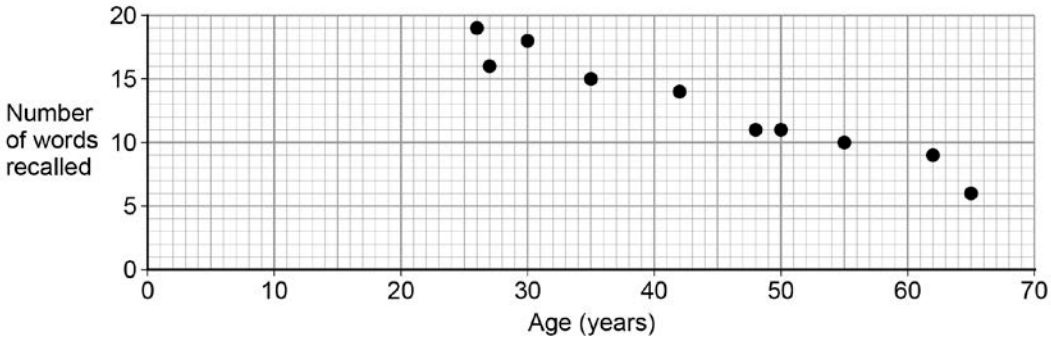
• Testing the materials, in this case word lists, on a small sample of 10 participants saves time and resources before a large-scale investment.

Credit other relevant reasons for using a pilot study.

<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>2</td><td>At least one relevant reason is explained in some detail. The answer is clear with appropriate use of terminology.</td><td>4–3</td></tr>
<tr><td>1</td><td>Explanation of at least one reason is limited, vague or muddled. The answer lacks clarity.</td><td>2–1</td></tr>
<tr><td>0</td><td>No creditable content.</td><td></td></tr>
</table>
</td><td>4

AO2=4</td></tr>
</table>

Question	Marking guidance	Total marks
16	Calculate the mean age of participants from the data in **Table 4**. Show your calculations. **2 marks** for correctly calculated mean 44. **1 mark** if the answer is incorrect but there are some appropriate calculations eg if scores are added correctly or if an incorrect total is divided correctly. 440 / 10 = 44; mean age of participants is 44.	**2** **AO2=2**

Question	Marking guidance	Total marks
17	Draw a scattergram using the data in **Table 4**. Label the axes. You do not have to provide a title for your graph. Use the graph paper below.   **1 mark** for operationalised horizontal axis label. **1 mark** for operationalised vertical axis label. **1 mark** for using appropriate scales. **1 mark** for plotting the scattergram.	**4** **AO2=4**

Question	Marking guidance	Total marks
18	Identify the type of relationship shown in the scattergram you have drawn in your answer to **Question 17**. Explain what the researcher could conclude from this relationship. **1 mark** for identifying a negative correlation. Plus **2 marks** for a clear explanation using appropriate terminology: as age increases (people get older) the number of words recalled (memory) decreases. **1 mark** for a muddled or vague explanation. **0 marks** for an answer that refers to cause and effect.	**3** **AO2=3**

Question	Marking guidance	Total marks
19	Briefly discuss **one** limitation of correlational research. Refer to this study in your answer. **Possible content:** • Can only demonstrate relationships not cause and effect; cannot say age causes memory to deteriorate • There may be a third variable causing the effect; in this study there is a strong negative correlation between memory and age, but this does not mean age causes memory problems, this may be the effect of, for example, stress etc. Credit other relevant limitations.	**4** **AO2=2** **AO3=2**

Level	Description	Marks
2	One limitation is clear with appropriate reference to present study. Discussion has some detail with appropriate use of terminology.	**4–3**
1	Discussion is limited, vague or muddled. The answer lacks clarity. Use of terminology is either absent or inappropriate. There may be no reference to the study.	**2–1**
0	No creditable content.	

Question	Marking guidance	Total marks
20	Outline **one** ethical issue that the researcher should have considered in this study. **1st mark** for identification of ethical issue relevant to this study. **2nd mark** for outline of named ethical issue linked to this study. **Content:** **Confidentiality** – all personal data should be protected and not disclosed unless agreed beforehand; this would be important as the researcher is investigating a small sample of 10 colleagues who she knows personally. **Consent** – wherever possible this should be informed consent – the researcher's work colleagues should be told about the aims, procedures etc. **Deception** – participants should not be misled and should be informed of the true nature of the study ie the link between age and memory. **Debrief** – at the end of the study the researcher's work colleagues should be fully debriefed and informed of any details withheld during the study. **Protection from harm** – the participants should not be put at risk, physically or psychologically; in this study some work colleagues may get anxious if they cannot remember many words. Accept any relevant ethical issue eg respect.	**2** **AO2=2**

<table>
<tr><th>Question</th><th>Marking guidance</th><th>Total marks</th></tr>
<tr><td>21</td><td>Explain how the ethical issue outlined in your answer to Question 20 could have been dealt with in the design of the study.

Possible content:

Explanation will depend on issue, eg

Confidentiality – it will be stressed in the brief that all data will be kept confidential and no names will be identified on the memory recall test etc. The memory test will have ‘confidential’ on the top right-hand side. There will be no identification/discussion of individual memory test scores.

Protection from harm – it is important that the colleagues are offered a debrief and the opportunity to speak to a counsellor if they feel this might be beneficial.

<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>2</td><td>One explanation is clear with appropriate reference to present study. Explanation has some detail with appropriate use of terminology.</td><td>4–3</td></tr>
<tr><td>1</td><td>Explanation is limited, vague or muddled. The answer lacks clarity. Use of terminology is either absent or inappropriate. There may be no reference to the study.</td><td>2–1</td></tr>
<tr><td>0</td><td>No creditable content.</td><td></td></tr>
</table>
</td><td>4

AO2=2
AO3=2</td></tr>
</table>

Question	Marking guidance	Total marks
22	Outline the main features of a structured interview. **1 mark** for each relevant point (maximum 2 marks). • Questions for a structured interview are decided in advance • The same questions are given to each participant • Questions are asked in the same order • Questions cannot be missed, changed or amended. Accept other relevant features.	**2** **AO1=2**

Question	Marking guidance	Total marks
23	Write a suitable closed question that could be used in a structured interview. **1 mark** for a suitable question <u>with</u> the closed options eg Do you sometimes forget a word/phrase when you are speaking**? YES/NO**	**1** **AO2=1**