OXFORD
INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL AS
PSYCHOLOGY
PS02

Unit 2 Biopsychology, Development and Research Methods 1

Mark scheme

January 2022

Version: 1.0 Final Mark Scheme

221xps02/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	Below are five statements describing the role of adrenaline in the fight or flight response. Identify the **two** statements that are correct. **A** Adrenaline increases the breathing rate. **B** Adrenaline leads to storage of energy. **C** Adrenaline lowers blood pressure. **D** Adrenaline lowers the heart rate. **E** Adrenaline narrows blood vessels. **1 mark** for each correct answer: **A, E**	**2** **AO1 = 2**
02	Briefly outline the function of endocrine glands. **2 marks** for a clear outline of the function of glands. **1 mark** for a limited/vague/muddled outline of the function of glands. **Possible content:** • To produce/secrete hormones into the bloodstream. • To monitor/control/regulate the body's internal environment/organs/cells. • To initiate changes in body function, eg initiate the fight and flight response by releasing adrenaline. Credit answer embedded in example. Credit other relevant content.	**2** **AO1 = 2**
03	Describe the process of inhibition in relation to synaptic transmission. **Possible content:** • Inhibition decreases/dampens neural activation in the postsynaptic neuron. • If there is more inhibition than excitation a new action potential is *not* created in the postsynaptic neuron. • Some neurotransmitters (eg GABA) have an inhibitory effect making the receiving neuron less likely to fire. • Inhibition is vital in order to maintain a balance between excitation and inhibition, needed for normal brain functioning. • Inhibition closes certain pathways to direct the flow of information appropriately. Credit other relevant content. Award up to 2 marks for a response describing synaptic transmission without reference to inhibition.	**4** **AO1 = 4**

	<table><tr><th>Level</th><th>Descriptor</th><th>Marks</th></tr><tr><td>2</td><td>Description of inhibition is detailed and appropriate. The answer is clear with appropriate use of terminology.</td><td>3–4</td></tr><tr><td>1</td><td>Description of inhibition is muddled and vague. The answer lacks clarity in places.</td><td>1–2</td></tr><tr><td>0</td><td>No creditable content.</td><td>0</td></tr></table>	
04	Some functions are only found in one hemisphere of the brain. What word is used to describe this? **1 mark** for correctly identifying lateralisation (or localisation).	**1** **AO1 = 1**
05.1	Explain why Benji was unable to describe the bird. Use your knowledge of split-brain research and language centres. **1 mark each** for any **three** of the following points: • The image of the bird perceived in the left visual field is processed by Benji's right hemisphere. • For most people, including Benji, the language centres are found in the left hemisphere. • Due to the hemispheres being separated Benji's hemispheres cannot exchange information. • The information cannot be transferred to his language centres and is therefore unable to describe the bird.	**3** **AO2 = 3**
05.2	Briefly explain **one** limitation of split-brain research. **2 marks** for a clear and effective explanation of limitation of split-brain research. **1 mark** for a limited/vague/muddled explanation. **Possible limitation:** • Most research involves a small sample which leads to generalisation issues. Eg Sperry used 10–15 individuals. • Most samples include individuals with great individual differences; participants are an extremely varied group, differing in age, handedness, degree of brain damage before operation and how the operation was carried out. • Most research often involves artificial setups, eg Sperry carefully controlled that the stimuli were only delivered to one hemisphere. This would not happen in real life as split-brain patients could move their eyes and process information in both hemispheres. Credit other relevant limitations.	**2** **AO3 = 2**

06.1

Chiara's grandfather had an accident. A brain scan shows damage to his Wernicke's area.

Describe how this damage might affect her grandfather's ability to use language.

Possible application:

- Wernicke's area is in charge of language comprehension, therefore Chiara's grandfather may suffer from Wernicke's (receptive) aphasia.
- Chiara's grandfather will have problems understanding language and might fail to follow instructions.
- While he will be able to produce fluent speech, the content of it may be bizarre and disconnected. For example the grandfather might produce nonsense words or jumbled speech.

Credit other relevant content.

Level	Description	Marks
2	Description of the effects of damage is applied to the stem in some detail. The answer is clear with appropriate use of terminology.	3–4
1	Description of the effects of damage is applied to the stem, but the application lacks detail and /or includes inaccuracies. The answer lacks clarity. Use of terminology is sometimes inappropriate.	1–2
0	No creditable content	0

4

AO2 = 4

06.2

Explain how Chiara's grandfather may recover from the damage to his Wernicke's area. Use your knowledge of plasticity and functional recovery.

Possible application:

- Due to plasticity of the brain, it might be possible for Chiara's grandfather to recover some function.
- Some recovery early on might be due to swelling of the brain going down.
- Rehabilitation and brain reorganisation might also contribute to the recovery of some speech comprehension ability.
- It is possible that axonal sprouting from surviving neurons as well as neurogenesis in neighbouring areas to the Wernicke's area aid this process.
- The less severe the damage of the Wernicke's area, the sooner he starts with rehabilitation (speech therapy) and the more he practises speaking and comprehension of speech, the better the chance of recovery.
- He may be old therefore less chance of functional recovery.

Credit other relevant content.

4

AO2 = 4

	<table><tr><th>Level</th><th>Description</th><th>Marks</th></tr><tr><td>2</td><td>Explanation of functional recovery is detailed and applied appropriately to the stem. The answer is clear with appropriate use of terminology.</td><td>3–4</td></tr><tr><td>1</td><td>Explanation of functional recovery is applied to the stem, but the application lacks detail and/or includes inaccuracies. The answer lacks clarity. Use of terminology is sometimes inappropriate.</td><td>1–2</td></tr><tr><td>0</td><td>No creditable content</td><td>0</td></tr></table>	
07	Describe the structure and function of the divisions of the nervous system. **Possible content:** • The nervous system can be divided into central nervous system (CNS) and peripheral nervous system (PNS). • The CNS is made up of brain and spinal cord. • The PNS is made up of spinal nerves containing the sensory (afferent) and motor (efferent) pathways which connect the CNS with receptors, organs, muscles in the body. • The PNS is further divided into somatic (SNS) and autonomic nervous system (ANS). • The SNS is made up of sensory pathways from the sensory receptors (eg touch, pain, pressure) and motor pathways. The sensory pathways send information from the environment to the brain. The motor pathways control skeletal muscles which enable a response to sensory stimulus from the environment. The SNS maintains communication between CNS and outside world. • The ANS is also made up of motor pathways which control the activity of the internal body systems, eg heart and circulatory system. It is central to homeostasis. • The ANS is further subdivided into sympathetic and parasympathetic branches. Activity in the sympathetic branch leads to bodily arousal while activity in the parasympathetic branch reverses the effect and leads to relaxation. The ANS is in charge of the fight or flight response. Credit information about the structure presented in the form of a diagram. Credit other relevant material.	**8** **AO1 = 8**

Level	Description	Marks
4	Description of the structure and function of the divisions of the nervous system is mostly accurate and generally well detailed. The answer is clear and focused. Specialist terminology is mostly used effectively.	7–8
3	Description of the structure and function of the divisions of the nervous system is evident but there are occasional inaccuracies/omissions. The answer is mostly clear and organised but occasionally lacks focus. Specialist terminology is mostly used appropriately.	5–6
2	Limited description of the structure and function of the divisions of the nervous system is present. The answer lacks clarity, accuracy and organisation in places. Specialist terminology is occasionally used appropriately. OR either description of structure or function at level 3/4.	3–4
1	Description of the divisions of the structure and function of the nervous system is very limited. The answer as a whole lacks clarity, has many inaccuracies and is poorly organised in places. Specialist terminology is either absent or inappropriately used. OR either description of structure or function at level 2.	1–2
0	No creditable content	0

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

<table>
<tr><th>Question</th><th>Marking guidance</th><th>Total marks</th></tr>
<tr><td>08</td><td>Aliya is 4 years old and she has never brushed her own teeth independently. Her father wants to teach her how to brush her teeth.

Using your knowledge of scaffolding, explain what her father could do to help Aliya learn to brush her teeth.

Possible application:
• Scaffolding is the help or support given to Aliya by her father, who is the more knowledgeable person, which will enable Aliya to brush her teeth independently.
• Aliya's father could show her how to brush her teeth by demonstrating it.
• He could also give Aliya prompts by guiding her verbally through the process and commenting on what Aliya should be doing using specific instructions of how to move the toothbrush in her mouth.
• He should encourage her with general verbal instructions like praising her for brushing her teeth and asking her to do it again.
• Initially, her father will need to give Aliya more assistance, however, the level of help the father needs to offer will decline the more Aliya practises and progresses.
• Eventually she will no longer need scaffolding as she will have learned to brush her teeth without needing any more help from her father.

Credit other relevant application.

<table><tr><th>Level</th><th>Description</th><th>Marks</th></tr><tr><td>3</td><td>Knowledge of scaffolding is detailed and applied appropriately to the stem. The answer is clear with appropriate use of terminology.</td><td>5–6</td></tr><tr><td>2</td><td>Knowledge of scaffolding is applied to the stem in some detail. The answer lacks clarity in places. Specialist terminology is mostly used appropriately.</td><td>3–4</td></tr><tr><td>1</td><td>Knowledge of scaffolding is applied to the stem, but the application lacks detail and/ or includes inaccuracies. The answer lacks clarity. Specialist terminology is either absent or inappropriately used.</td><td>1–2</td></tr><tr><td>0</td><td>No creditable content</td><td>0</td></tr></table></td><td>6

AO2 = 6</td></tr>
<tr><td>09</td><td>Explain the role of the mirror neuron system in social cognition.

Possible content:
• Mirror neurons are nerve cells that fire equally when an animal/person performs an action or observes/hears/sees the same action being performed by another animal/person.
• They appear to play a role in several areas of social cognition, including action, understanding, empathy, and imitation.
• The neural 'mirroring' action could enable the observer to identify the intention of the other carrying out the action.</td><td>4

AO1 = 4</td></tr>
</table>

<table>
<tr><td></td><td>

- The mirror neuron system is important for social communication and interaction. It is believed that a defective mirror system is the basis of autistic problems with social interaction.

Credit other relevant content.

<table>
<tr><th>Level</th><th>Description</th><th>Marks</th></tr>
<tr><td>2</td><td>Explanation of the role of the mirror neuron system in social cognition is detailed and appropriate. The answer is clear with appropriate use of terminology.</td><td>3–4</td></tr>
<tr><td>1</td><td>Explanation of the role of the mirror neuron system in social cognition lacks detail. The answer lacks clarity/is limited/is muddled.</td><td>1–2</td></tr>
<tr><td>0</td><td>No creditable content</td><td></td></tr>
</table>

</td><td></td></tr>
<tr><td>10</td><td>

Describe and evaluate Baillargeon's violation of expectation research.

Possible content:

- Method of assessing infants' understanding of the physical world.
- Use of eye tracking technology to measure how long the child looks at the object/event.
- Based on visual preference technique assuming that the longer an infant looks at a stimulus, the more interested/less familiar it is to the child.
- Two stages of violation of expectation (VoE) research:

1. Habituation to expected event – child is repeatedly exposed to particular event so that it stops responding to it, eg a train goes into a tunnel and re-emerges.
2. For second part children are divided up into two groups: group one watches the expected event and group two watches an unexpected event (eg train goes into tunnel and does not re-emerge or another object re-emerges instead) which violates the child's expectation.

- Description of research by Baillargeon et al (1985) using the drawbridge and hidden blocks of wood; resting object research.
- Description of different events investigated: occlusion, containment, covering and support.
- Theory of innate object knowledge and innate fast learning.

Credit other relevant content.

Possible evaluation:

- Improved method researching understanding of children compared to Piaget – could show that children as young as 3.5 months old understand object permanence without needing to be able to reach for objects.
- Eye tracking technology measures – objective and scientific measurement.
- Use of inference assuming that children look at something because it violates their expectation.
- Alternative explanation: preference of full circle (Bogartz/Rivera) or presence of an afterimage of blocks (Haith).
- Research support eg by Kaufman et al using brain scans etc.

</td><td>20

AO1 = 8
AO3 = 12</td></tr>
</table>

- Influential work that has led to the development of several connectionist models of brain development.

Credit other relevant evaluation.

Level	Description	Marks
4	Knowledge of Baillargeon's VoE research is mostly accurate and generally well detailed. Evaluation is mostly effective. Minor detail and/or expansion of argument is sometimes lacking. The answer is clear and focused. Specialist terminology is mostly used effectively.	16–20
3	Knowledge of Baillargeon's VoE research is evident but there are occasional inaccuracies/omissions. There is some effective evaluation. The answer is mostly clear and organised but occasionally lacks focus. Specialist terminology is mostly used appropriately.	11–15
2	Limited knowledge of Baillargeon's VoE research is present. Any evaluation is of limited effectiveness. The answer lacks clarity, accuracy and organisation in places. Specialist terminology is occasionally used appropriately.	6–10
1	Knowledge of Baillargeon's VoE 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.	1–5
0	No creditable content	0

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

Question	Marking guidance	Total marks
11	Identify the sampling technique used in this study. Explain **one** problem that might occur when using this sampling technique. **1 mark** for correct identification of sampling technique: opportunity sample (accept stratified). **PLUS** **2 marks** for a clear and detailed description of the problem with application. **1 mark** for a limited/vague/muddled description of the problem. **Possible problems:** • The researchers may subconsciously/consciously be biased in their sample selection and only approach a certain type of mother. • The researchers may fail to recruit a varied sample as they only go to one local playground and might only access a certain type of mother who tends to visit the playground at the time of recruitment. • The researchers might get a biased sample as not every mother they approach will agree to participate in the observation. Credit any other relevant problem. Award up to 2 marks for applied and detailed description of a problem if incorrect sampling technique has been identified.	**3** **AO2 = 3**
12	Explain why it would be useful to carry out a pilot study for this observation. **3 marks** for an applied, clear and effective explanation with elaboration. **2 marks** for an applied explanation that lacks detail. **1 mark** for a limited/vague/muddled explanation. **Possible application:** • To check if the observational method is suitable to investigate mother–child play. • To check if the behavioural categories of play are clearly defined, measurable and comprehensive. • To check if the camera is put in an appropriate place enabling clear recording of the mother–child interaction. • To check if the selection of toys, the time interval (30 minutes) and instructions to mothers are appropriate. Credit other relevant application. Credit other relevant information including use of an example.	**3** **AO2 = 3**
13	Identify **one** ethical issue in this observation. Explain how the researchers could have dealt with this issue. **1 mark** for naming an appropriate ethical issue. **PLUS**	**4** **AO2 = 4**

	3 marks for an applied, clear and effective explanation how researchers could have dealt with the issue. **2 marks** for an applied explanation that lacks detail. **1 mark** for a limited/vague/muddled explanation. Explanation must refer back to the scenario. • Right to withdraw – as part of consent/brief the mother must be made aware of the right to withdraw during and after the observation. • Consent – the researchers have to obtain fully informed and parental consent (eg aims, tasks, duration…) • Privacy/confidentiality – mothers must be made aware of the recording and the issues with anonymity. • Protection from harm – the researchers have to ensure that neither the mother nor the child experiences any harm; in case of mother or child displaying signs of distress mother must be reminded of the possibility to withdraw. • Deception – as part of the debrief the researchers must ensure that they tell the mothers the aim of their study. Accept other relevant ethical issues.	
14	The researchers decided to use behavioural categories in their observation. What is meant by the term 'behavioural categories'? **2 marks** for a clear description of what behavioural categories are. **1 mark** for a limited/vague/muddled description. **Possible content:** • Behavioural categories are a list of clearly defined, unambiguous, observable behaviours to be recorded during an observation. • These should be agreed and operationalised before recording takes place.	**2** **AO1 = 2**
15	Give **one** operationalised behavioural category that the researchers could have used in this observation. **Possible content**: • mother offers a toy to child • mother reads a book to child • mother smiles at child • child offers a toy to mother • child points at a toy. Credit any other operationalised and relevant behavioural category.	**1** **AO2 = 1**
16	Briefly explain **two** strengths of conducting an observation. For **each** strength award marks as follows: **2 marks** for a clear and effective explanation of a strength. **1 mark** for a limited/vague/muddled explanation.	**4** **AO3 = 4**

	Possible strengths: • High ecological validity if covert observation takes place in natural environment which increases external validity. • Training observers and operationalising variables increases internal validity. • Participants are often unaware that they are being observed which makes demand characteristics less likely to occur, increasing internal validity. • Using more than one observer and recording observation enables checking for inter-observer reliability. Answer can refer to a specific type of observation. It does not need to be contextualised. Credit other relevant strengths.	
17	Identify **one** extraneous variable that the researchers controlled in this observation. Explain why it was important to control this variable. **1 mark** for naming an extraneous variable that has been controlled in this observation. **PLUS** **2 marks** for an applied, clear and effective explanation of why it was important to control the variable. **1 mark** for a limited/vague/muddled explanation of why it was important to control the variable. • Age of infants (2 years) – to ensure children engage in similar age appropriate activities. • Same selection of toys – to ensure that the children were not exposed to different attractive toys which might change the interactions with their mother. • Use of laboratory – control the environment in which observation took place. • Time interval (30 minutes) – to ensure that there was sufficient time to engage in play, but not too long so that the child won't become bored. • Use of recording – to rule out researcher effect and to enable more precise data analysis. • Each mother-child pair was observed separately. Credit other relevant variables**.**	**3** **AO2 = 3**
18	The researchers were concerned about demand characteristics. Describe what is meant by demand characteristics. Description of demand characteristics • Participants (unconsciously) try to guess the purpose of a study and change their behaviour accordingly. • Participants pick up subtle clues that make them aware of what they think the researchers expect to find/how the participant is supposed to behave. • Participants might try to please the researcher (socially desirable behaviour), they might be nervous or try to sabotage the study (screw-you effect). • Demand characteristics are confounding variables that can alter the outcome of the study.	**4** **AO1 = 4**

<table>
<tr><td></td><td>Answer does not need to be contextualised.

<table><tr><th>Level</th><th>Description</th><th>Marks</th></tr><tr><td>2</td><td>Description of demand characteristics is detailed and appropriate. The answer is clear with appropriate use of terminology.</td><td>3–4</td></tr><tr><td>1</td><td>Description of demand characteristics lacks detail. The answer lacks clarity/is limited/is muddled.</td><td>1–2</td></tr><tr><td>0</td><td>No creditable content</td><td>0</td></tr></table></td><td></td></tr>
<tr><td>19</td><td>Briefly explain one way in which the researchers could have reduced the risk of demand characteristics in this observation.

2 marks for an applied and clear explanation of one way in which demand characteristics could be reduced.
1 mark for a limited/vague/muddled explanation.
• Use of a cover story/deception, eg they could tell the mothers that they are investigating popularity of certain types of toys instead of telling them the true aim of the study.
• Reducing interaction between researchers and mothers (video recording).
• They could have told the mothers that there is no right or wrong behaviour.
• Using an observer who does not know that the aim of the study is to investigate differences in mother–child play.

Credit any other relevant content.</td><td>2

AO2 = 2</td></tr>
<tr><td>20</td><td>The researchers used 52 mother–child pairs in their study. 25% of the 52 mother-child pairs were mothers with their sons. Calculate the number of mother–son pairs that took part in the study.

3 marks: Correct result of 13 mother–son pairs. Credit 3 marks even if calculations are not shown.
2 marks: Credit 2 marks for two correct steps even though result is incorrect.
1 mark: Credit 1 mark for one correct step even though result is incorrect.

Calculation:
• Step 1: 25 ÷ 100 = 0.25
• Step 2: 0.25 x 52 = 13

OR

• Step 1: 25 x 52 = 1300
• Step 2: 1300 ÷ 100 = 13

Answer: 13 mother–son pairs.</td><td>3

AO2 = 3</td></tr>
<tr><td>21</td><td>The researchers wanted to follow up their research using a self-report technique. Name one self-report technique.

1 mark for naming questionnaire or interview.</td><td>1

AO1 = 1</td></tr>
</table>

PS02 grid

	AO1	AO2	AO3	Total
Section A				
01	2			**2**
02	2			**2**
03	4			**4**
04	1			**1**
05.1		3		**3**
05.2			2	**2**
06.1		4		**4**
06.2		4		**4**
07	8			**8**
Section B				
08		6		**6**
09	4			**4**
10	8		12	**20**
Section C				
11		3		**3**
12		3		**3**
13		4		**4**
14	2			**2**
15		1		**1**
16			4	**4**
17		3		**3**
18	4			**4**
19		2		**2**
20		3		**3**
21	1			**1**
Unit total	**36**	**36**	**18**	**90**