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EDEXCEL A LEVEL PSYCHOLOGY: QUESTIONS BY TOPIC

Biological Psychology (Topic 3)

AS and A Level Psychology Topic 3

63 questions · 461 marks · Mark schemes included

Pearson Edexcel AS (8PS0) and A Level (9PS0) Psychology, June 2016 - June 2025

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 Piccadilly Business Centre, Unit C, Aldow Enterprise Park
Blackett Street, Manchester, M12 6AE

HOW TO USE THIS BOOKLET

Questions are grouped by sub-topic and run from the lowest mark tariff to the highest.

Click any heading or question row below to jump straight to it.

On every question page, click ANSWER in the top-right corner to jump to its mark scheme.

Diagrams, graphs, tables and data are printed exactly as they appeared in the original papers.

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EVOLUTION, GENES AND PERSONALITY

10 questions · 69 marks

48

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45. Q3	AS Paper 2 June 2022	8	58
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METHODS, STUDIES AND PRACTICAL INVESTIGATION

17 questions · 135 marks

60

47. Q9	A Level Paper 1 June 2024	2	61
48. Q8	A Level Paper 1 November 2021	4	62
49. Q11	A Level Paper 1 June 2024	5	63
50. Q8	A Level Paper 1 June 2017	6	65
51. Q9	A Level Paper 1 June 2018	6	68
52. Q1	AS Paper 2 October 2020	6	70
53. Q3	AS Paper 2 October 2020	6	71
54. Q9	A Level Paper 1 June 2025	6	73
55. Q4	AS Paper 2 June 2018	8	75
56. Q10	A Level Paper 1 June 2018	8	76
57. Q4	AS Paper 2 June 2023	8	77
58. Q10	A Level Paper 1 June 2025	8	78
59. Q2	AS Paper 2 June 2018	10	79
60. Q3	AS Paper 2 June 2023	10	81
61. Q2	AS Paper 2 June 2022	14	83
62. Q2	AS Paper 2 June 2024	14	86
63. Q2	AS Paper 2 June 2025	14	90



QUESTIONS

63 questions · 461 marks · grouped by sub-topic, lowest tariff first



SUB-TOPIC

THE CENTRAL NERVOUS SYSTEM, NEUROTRANSMITTERS AND DRUGS

10 questions in this booklet



SECTION 3: BIOLOGICAL PSYCHOLOGY

- 7** Describe how recreational drugs change the way neurotransmitters operate within the brain.

(2)

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SECTION 3: BIOLOGICAL PSYCHOLOGY

8 Describe the process of synaptic transmission.



Biological Psychology

6 Amelia is using a correlational research method to investigate whether there is a relationship between recreational drug use and aggression. She intends to study individuals who have been arrested for violent offences.

- (a) Describe how Amelia could use a random sampling technique to gather a sample of 30 participants for her correlational research.

(2)

- (b) Explain **one** weakness of Amelia using a correlational research method for her investigation about recreational drug use and aggression.

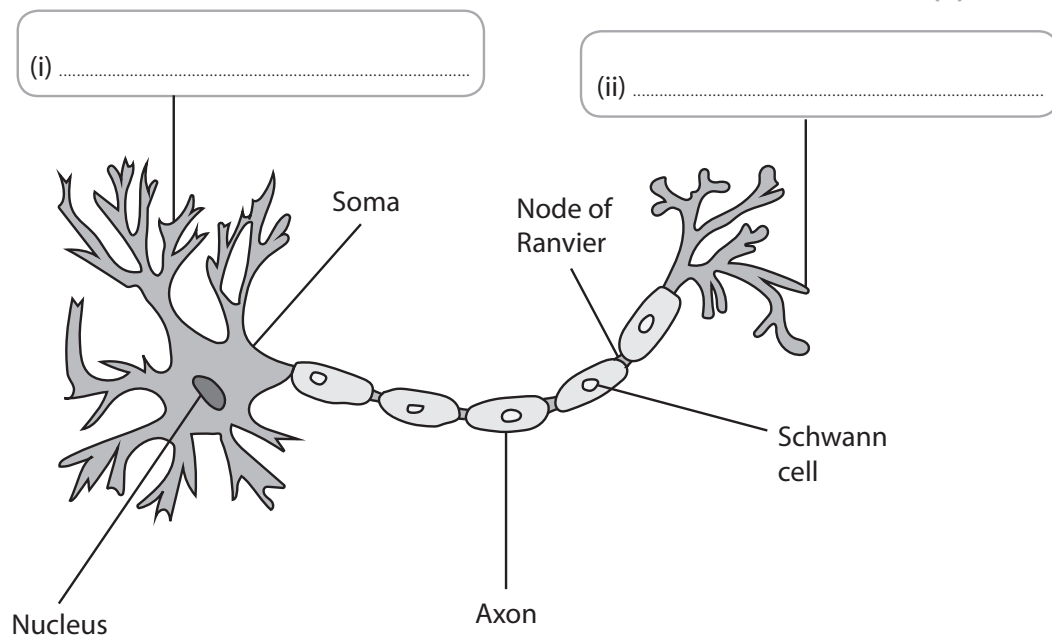
(2)



3 The diagram below shows a typical neuron.

(a) Identify the areas of the diagram.

(2)



(b) Tina begins taking recreational drugs as she feels stressed due to her forthcoming examinations.

Explain the effects the recreational drugs may have on the transmission process in Tina's central nervous system.

You must refer to the context in your response.

(3)

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- 1 (a) Complete **Table 1** with the name of the correct part of the central nervous system (CNS) in the space provided. (3)

Definition	Part of the central nervous system (CNS)
These can be sensory, motor or relay. They transmit signals to different parts of the body.	
The process by which one neuron / nerve cell communicates with another.	
These are chemical messengers that support communication within the nervous system (NS).	

Table 1

- (b) Explain **two** weaknesses of the PET brain-scanning technique. (4)

1

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- 2 Hinnah is interested in finding out if there is a relationship between drug taking and aggressive behaviour. To investigate this, she puts posters up around her college on Wednesday asking for people interested in participating in the study to attend a meeting on Friday lunchtime. Ten participants attended her meeting and gave self-report data on how many times they consumed drugs each week and how aggressive they were on a scale of 0 to 100.

(a) (i) Identify the sampling method used in Hinnah's study.

(1)

- (ii) Explain **one** strength and **one** weakness of using this sampling method for Hinnah's study.

(4)

Strength

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Weakness

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(b) **Figure 1** shows a scatter diagram with the results of Hinnah's correlational study.

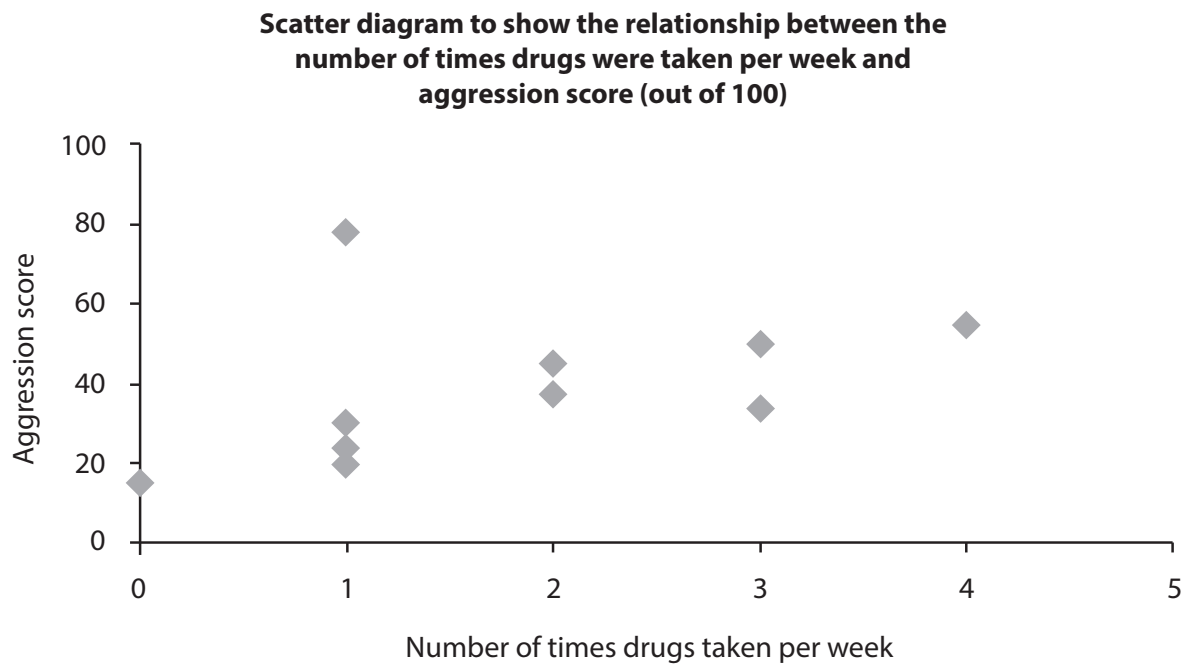


Figure 1

Using **Figure 1**, identify the anomaly (outlier) on the scatter diagram by **circling** the relevant data point.

(1)

(c) Explain **one** conclusion Hinnah could make from the results in the scatter diagram.

(2)

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- 8** Jinal wants to find out about recreational drug use and early childhood experiences. She has decided to focus on nicotine as the recreational drug.

She intends to see how often people use nicotine and find out about any negative life experiences they had experienced during early childhood.

Jinal believes that the more negative life experiences a person has, the more nicotine they will use.

Discuss how Jinal could use a correlational research method for her investigation.

You must make reference to the context in your answer.

(8)

12 In your studies of biological psychology, you will have learned about the effect of recreational drugs on the transmission process in the central nervous system.

Discuss the effects of recreational drugs on the transmission process in the central nervous system.

You must make reference to examples of recreational drugs in your answer.

(8)



8 *'Taking recreational drugs is purely a choice and to stop using drugs is easy.'*

To what extent do the learning and biological approaches agree with the above statement?

(12)



11 To what extent do classical conditioning, the process of synaptic transmission and neurotransmitter functioning explain human behaviour?

(12)



SUB-TOPIC

THE BRAIN, HORMONES AND AGGRESSION

26 questions in this booklet



- 9 Compare the biological explanation of aggression with Freud's psychodynamic explanation of aggression.

(2)



SECTION C: BIOLOGICAL PSYCHOLOGY

- 6** Charles is 14 years old and has been displaying aggressive behaviour.

Recently he has shouted insults at other students and broken classroom equipment in his science lessons. Charles has also been in a fight with the football captain after Charles let in an important goal during the last match of the season.

Describe how hormones could account for Charles's behaviour.

(3)

Biological Psychology

8 You will have learned about one of the following contemporary studies in biological psychology:

- Li et al. (2013)
- Brendgen et al. (2005)
- Van den Oever et al. (2008)

(a) State **one** finding of your chosen contemporary study.

(1)

Chosen study

(b) Explain **one** weakness of your chosen contemporary study.

(2)

Chosen study

SECTION 7: BIOLOGICAL PSYCHOLOGY

- 1** You will have learned about the classic study by Raine et al. (1997).

Explain **two** strengths of Raine et al.'s (1997) study.

Strength 1

Strength 2



10 Lauren is a Psychology student at university. For her research project, Lauren wants to investigate whether aggression could be related to hunger. She has permission from her tutor to conduct her investigation on the university campus.

Describe how Lauren could use a correlational research method to investigate whether aggression could be related to hunger.

- 2 Claus is a 14-year-old teenager who has been getting into trouble in basketball matches. He frequently pushes opposition players over during games when his team is losing. As a result, the coach asks Claus to sit out of the game, and then Claus reacts in a rude manner to the coach.

(a) Describe how **one** hormone could explain Claus's aggressive behaviour.

(2)

(b) Explain **one** strength of hormones as an explanation for aggression.

(2)

7 Explain **two** strengths of brain structure as an explanation of aggression.

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10 Dan is 15 years old and is playing in a school football match.

During the football match, an opposition player tripped Dan over when he was about to try and score a goal. The referee awarded a penalty kick to Dan's team. In response, the opposition player shouted and swore.

Dan took the penalty kick and scored a goal. He laughed at the opposition player and made offensive gestures towards him. Dan and the opposition player then started to fight each other and both of them were sent off the pitch.

Describe how hormones could account for the football players' aggression.

4 Amanda is struggling to control her aggression. Her doctor is considering sending Amanda for an fMRI scan to find out if her brain may be influencing her aggression.

(a) Explain **two** reasons for Amanda's doctor sending her for an fMRI scan.

(4)

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(b) Name **one** brain scanning technique other than fMRI.

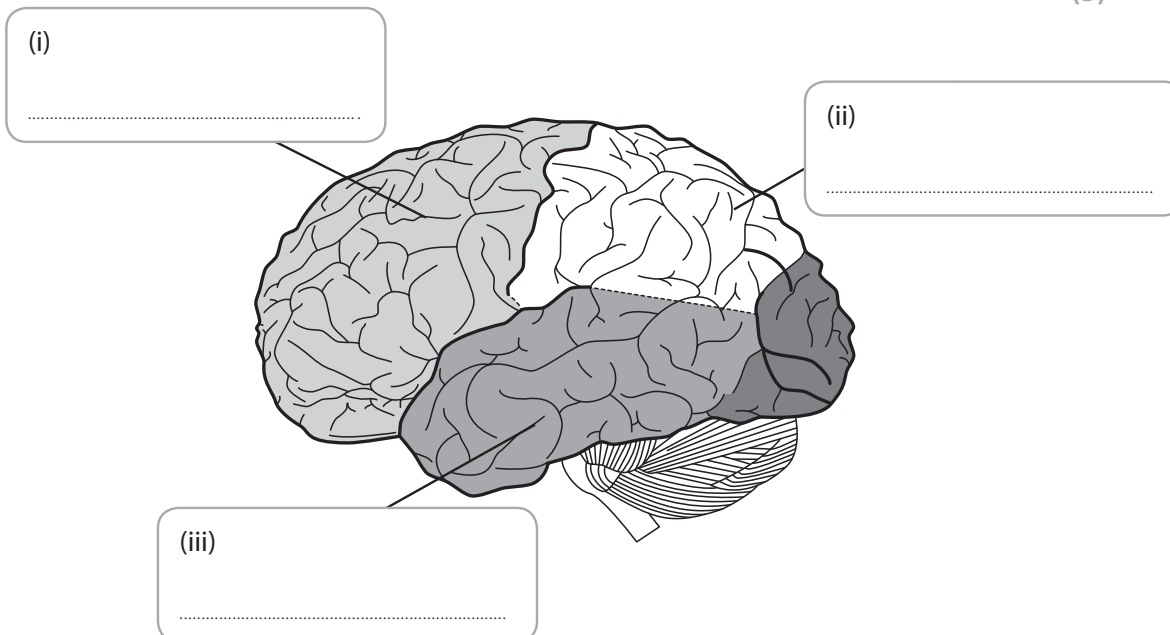
(1)

(Total for Question 4 = 5 marks)



- 1 (a) Identify the **three** lobes highlighted on the diagram of the brain below.

(3)



- (b) Brain scanning can be used to investigate the brain.

Explain **two** weaknesses of the fMRI scanning technique.

(4)

1

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- 3** Belinda is an 11-month-old child whose parents were recently contacted by her nursery staff. They informed Belinda's parents that Belinda is aggressive towards other children. She has pushed other children over, taken their toys, and has shouted at the nursery staff.

(a) Describe how Freud's psychodynamic theory could explain Belinda's aggressive behaviour.

(3)

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(b) Explain **one** strength and **one** weakness of Freud's psychodynamic explanation of aggression.

(4)

Strength

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Weakness

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- 1 When studying biological psychology, you will have learned about the structure and function of the brain.

(a) Complete **Table 1** with the name of the correct lobe in the space provided.

(3)

Lobe	Function of the lobe
	This lobe is involved in higher executive functioning, motor skills, planning, reasoning and problem solving.
	This lobe is involved in interpreting visual stimuli, depth and distance.
	This lobe is involved in interpreting sensory information, including touch, temperature, pain and pressure.

Table 1

- (b) Explain **one** strength and **one** weakness of brain functioning as an explanation of aggressive human behaviour.

(4)

Strength

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Weakness

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Biological Psychology

1 Brain-scanning techniques can be used to investigate the brain.

(a) Describe how an fMRI scan can be used to investigate the brain.

(3)

(b) Explain **one** strength and **one** weakness of fMRI as a brain-scanning technique.

(4)

Strength

Weakness

4 Evaluate the use of brain scanning techniques to investigate human behaviour.

(8)



7 As part of your psychology course, you were required to carry out a practical investigation when studying biological psychology.

(a) State the research hypothesis for your practical investigation in biological psychology.

(2)

(b) As part of your practical investigation when studying biological psychology, you were required to carry out a statistical test.

Describe the results of the statistical test you carried out for your practical investigation in biological psychology.

(2)



(c) Explain **one** strength of the practical investigation you carried out when studying biological psychology.

(2)

(d) Explain **one** improvement you could make to the practical investigation you carried out when studying biological psychology.

(2)



8 During the course you will have learned about the classic study by Raine et al. (1997).

Evaluate the classic study by Raine et al. (1997).

(8)



5 Assess whether the role of hormones can explain human behaviour such as aggression.

(8)



- 9 Rachael is in prison for assault. She has a history of aggressive behaviour such as fighting and shouting abuse at people.

Rachael was exercising with a group of other prisoners, but has been placed in solitary confinement for pushing over another prisoner who had tried to take her trainers.

She told a prison officer that she often feels very stressed and angry with other people, but is unable to manage her aggression.

Discuss the role of hormones as an explanation of Rachael's behaviour.

(8)

8 Assess whether hormones can fully explain human behaviour such as aggression.

(8)



3 Evaluate the classic study by Raine et al. (1997).

(8)



Research biological psychology

- 7** Tabitha wanted to investigate whether there is a difference in brain activity when people are exposed to aggressive stimuli and non-aggressive stimuli. She decided to gather a sample of female participants aged between 20 years old and 30 years old.

(a) Describe how Tabitha could use a volunteer sampling technique to gather participants for her investigation.

(2)

- (b) Tabitha decides to use a PET brain-scanning technique for her investigation.

Describe how Tabitha could use a PET brain-scanning technique for her investigation.

(3)

(c) Explain **one** strength of Tabitha using a PET brain-scanning technique for her investigation.

(2)

(d) Explain **one** improvement that could be made to Tabitha's choice of participants.

(2)

SECTION 3

- 9 Harrison and two of his friends were arrested for fighting whilst watching their local football club play against a rival team. During the fight Harrison's friends cheered him on and encouraged him to fight supporters from the opposing team. Harrison was arrested by the police and did not see the rest of the football match.

Evaluate how operant conditioning and brain functioning could explain Harrison's aggressive behaviour. You must make reference to the context in your answer.

(12)

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- 8 Alik and Joshua are competitive teenage brothers. When preparing for tests in school, they revise extra hard to try and achieve higher marks than each other. Their parents give them rewards of money for their high marks in tests.

Both brothers train with a local athletics club competing in the 100 m sprint. Their parents praise them when they do well in sports competitions. In a recent competition Alik came first and Joshua was second. Alik was applauded by lots of female spectators. Joshua became very angry and pushed his brother over.

Evaluate how far operant conditioning and the role of hormones could explain Joshua's and Alik's behaviour.

You must make reference to the context in your answer.

(12)



- 9 Evaluate the classic studies by Raine et al. (1997) and Watson and Rayner (1920) in terms of validity and generalisability.

(12)



10 To what extent do operant conditioning and hormones explain human behaviour?

(12)



- 2 Joel was interested in the relationship between environmental temperature and aggression. He noted down the average temperature for his school year and recorded the number of aggressive incidents that took place.

Table 1 below shows the data Joel collected.

Month	Average temperature (degrees Celsius)	Number of aggressive incidents
September	20	11
October	13	20
November	10	4
December	7	18
January	7	11
February	8	11
March	9	14
April	11	6
May	14	18

Table 1

- (a) State a null hypothesis for this study.

(2)

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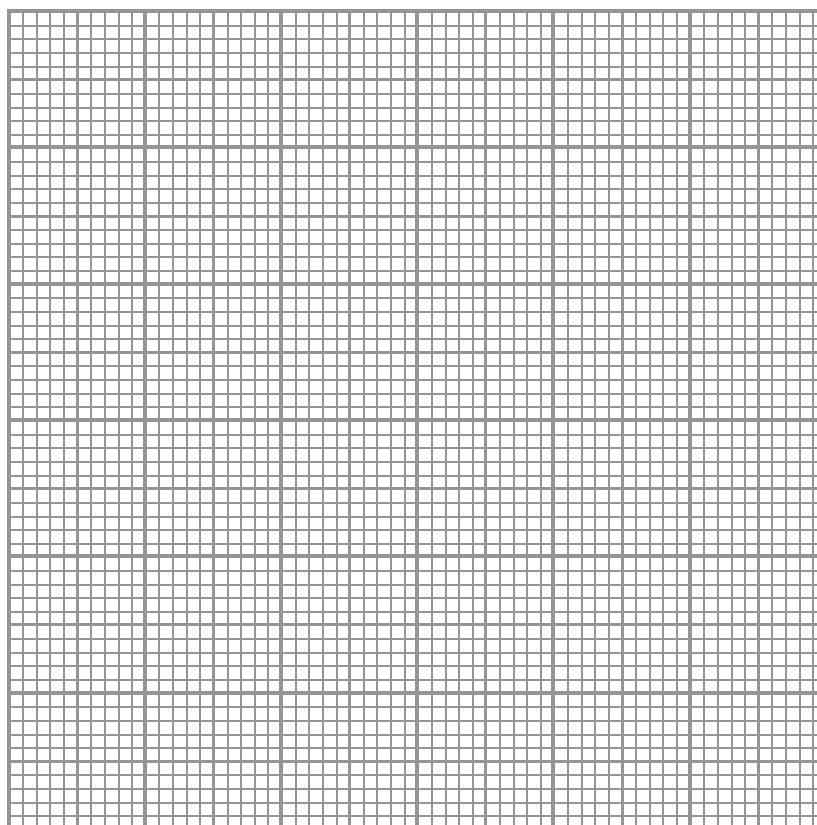
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(b) Draw a suitable graph to display the data in **Table 1**.

(3)

Title:



(c) State the type of relationship shown in the graph you have drawn.

(1)

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- (d) Complete **Table 2** and calculate Spearman's rank correlation coefficient between average temperature and number of aggressive incidents.

(4)

Average temperature (degrees Celsius)	Rank 1	No. of aggressive incidents	Rank 2	D	d ²
20	9	11	4		
13	7	20	9		
10	5	4	1		
7	1.5	18	7.5		
7	1.5	11	4		
8	3	11	4		
9	4	14	6		
11	6	6	2		
14	8	18	7.5		
Total:					

Table 2

SPACE FOR CALCULATIONS

Spearman's rank correlation coefficient



- (e) Explain **one** strength and **one** weakness of using the correlational research method, as it is used in biological psychology, to inform our understanding of aggression.

(4)

Strength

Weakness



SUB-TOPIC

EVOLUTION, GENES AND PERSONALITY

10 questions in this booklet



2 Max has been learning about evolution and natural selection. He has been asked by his psychology teacher to prepare a presentation to show how evolution and natural selection explain human aggressive behaviour. His teacher has suggested he includes:

- a reference to gene selection
- a short video
- a reference to inherited traits
- a research study.

Describe what Max could include in his presentation to show how evolution and natural selection explain human aggressive behaviour.

- 9 David was in a restaurant with his girlfriend who was talking to another man. He felt the other man was being too friendly towards his girlfriend. David got into a fight with the other man.

(a) Describe how evolution and natural selection could account for David's aggression.

(2)

(b) Explain **one** weakness of the role of evolution and natural selection as an explanation of David's aggression.

(2)

- 7 Oscar investigated whether there was a relationship between attitudes to recreational drug use and parts of the personality (id, ego and superego) according to Freud.

Participants completed a personality questionnaire to determine how strongly they were dominated by the 'id'. The questionnaire was scored out of 10, with 10 being strongly dominated by the 'id'.

They also completed a questionnaire about how they felt about recreational drug use in society. The questionnaire was scored out of 10, with 10 being completely in favour of recreational drug use.

- (a) Complete **Table 1** and calculate the Spearman's rank correlation coefficient for Oscar's study.

(4)

Personality score	Rank 1	Attitude to recreational drug use score	Rank 2	d	d ²
2	1	3	1.5		
8	6	9	7		
5	3	6	4		
6	4.5	7	6		
9	7.5	10	8		
3	2	3	1.5		
6	4.5	6	4		
9	7.5	6	4		
Total:					

Table 1

SPACE FOR CALCULATIONS

Spearman's rank correlation coefficient



- (b) Using the critical values table for Spearman's rank, determine the lowest level of significance Oscar could use for his results to be significant for a directional (one-tailed) hypothesis.

(2)



1 When studying biological psychology, you will have learned about Freud's psychodynamic explanation of aggression.

- (a) Complete **Table 1** with the name for the different parts of the personality in the space provided.

(3)

Definition	Part of the personality
This part of the personality is rational and tries to balance the conflicting demands of other parts of the personality. It operates according to reality (the 'reality principle') and tries to satisfy pleasure (the 'pleasure principle') in a socially responsible way.	
This part of the personality tries to impose moral standards on the individual and includes the conscience and what a person should be like (the 'ego ideal'). It operates according to morality (the 'morality principle') and tries to impose right and wrong in relation to pleasure, including forbidden behaviour such as aggression.	
This part of the personality focuses on pleasure and satisfying instinctual urges an individual may have. It operates according to pleasure (the 'pleasure principle') and does not understand logic, so it becomes frustrated, potentially leading to aggressive urges if denied pleasure.	

Table 1

- (b) Explain **two** weaknesses of Freud's psychodynamic explanation of aggression.

(4)

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3 Assess how far evolution and natural selection can be used to explain aggression.

(8)



- 1 (a) Describe the procedure of **one** twin study that you have learnt about in biological psychology.

(4)

Name of study

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- (b) Explain **one** strength and **one** weakness of the twin study you have learnt about in biological psychology.

(4)

Strength

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Weakness

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10 Twin studies are used as a research method to investigate human behaviour in biological psychology.

Evaluate **one** twin study you have covered in biological psychology.

(8)



11 Evaluate Freud's psychodynamic explanation of aggression.

(8)



3 Evaluate the role of evolution in human development.

(8)



3 Evaluate **one** twin study that you have learned about in biological psychology.

(8)



SUB-TOPIC

METHODS, STUDIES AND PRACTICAL INVESTIGATION

17 questions in this booklet



Biological Psychology

- 9 Jude's manager at work shouted at her for a mistake that another employee made. When Jude tried to explain this, the manager just shouted louder and made nasty comments. Jude was very angry and upset, but felt she could not say anything to the manager as she was worried she may lose her job.

Jude decided to go to the gym to take part in a kickboxing session after work. After taking part in the kickboxing session, Jude felt much calmer.

Using catharsis, describe why Jude felt calmer after the kickboxing session.

- 8 In your studies of biological psychology, you will have learned about **one** adoption study.

Explain **one** strength and **one** weakness of your chosen adoption study.

(4)

Chosen study

Strength

Weakness



11 Amari carried out a correlational study to investigate whether there was a relationship between the hours someone spends on social media in a day and the hours of sleep they get per night.

The results from Amari’s investigation are shown in **Table 1**.

- (a) Complete **Table 1** and calculate the Spearman’s rank correlation coefficient for Amari’s investigation.

(4)

Hours spent on social media	Rank 1	Hours of sleep per night	Rank 2	d	d ²
4	2.5	9	5.5		
6	4	8	4		
3	1	9	5.5		
8	6	7	2.5		
7	5	6	1		
9	7	7	2.5		
4	2.5	10	7		
Total:					

Table 1

SPACE FOR CALCULATIONS

Spearman’s rank correlation coefficient

- (b) Using the Spearman's rank correlation coefficient that you calculated for 11(a), determine whether Amari's data were significant at $p \leq 0.05$ for a non-directional (two-tailed) hypothesis.

(1)

(Total for Question 11 = 5 marks)



- 8 Nadiya and Tamal are analysing data they have gathered about students' exam scores and the number of missed classes.

Table 3 shows the raw data from Nadiya and Tamal's study.

Exam score	Number of missed classes
70	8
80	6
40	18
20	20
95	3
100	4
50	14
65	10
65	12
55	12

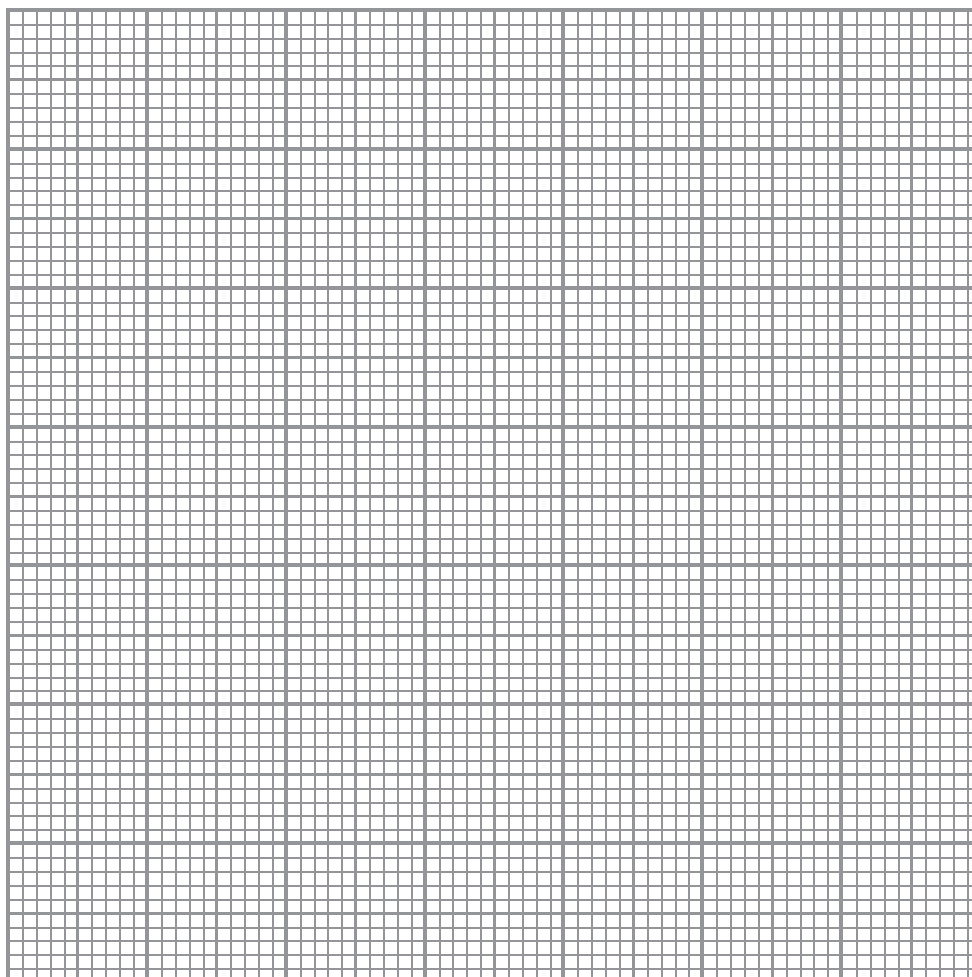
Table 3



(a) Draw a scatter diagram to show Nadiya and Tamal's data.

(3)

Title



(b) Identify the type of correlation displayed in the diagram you have drawn.

(1)

Nadiya and Tamal used Spearman's rho to analyse their data.

(c) State **two** reasons why they used Spearman's rho.

(2)

1

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2

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(Total for Question 8 = 6 marks)



- 9 Rafiq carried out a correlational study to investigate whether there was a relationship between age and number of hours of sleep per night.

(a) Complete **Table 2** and calculate the Spearman's rank correlation coefficient for Rafiq's study.

(4)

Age	Rank 1	Number of hours sleep	Rank 2	d	d ²
17	2.5	10	6		
17	2.5	11	7		
20	4	6	2.5		
24	6	7	4		
21	5	4	1		
16	1	9	5		
40	7	6	2.5		
Total:					

Table 2

SPACE FOR CALCULATIONS

Spearman's rank correlation coefficient.....



(b) Rafiq used a non-directional (two-tailed) hypothesis.

Explain whether Rafiq's data were significant at $p < 0.05$ and if the research hypothesis should be accepted.

(2)



1 When studying biological psychology you will have learned about different types of correlations.

(a) State what is meant by a positive and a negative correlation.

(2)

Positive correlation

Negative correlation

(b) Explain **one** strength and **one** weakness of the correlational research method.

(4)

Strength

Weakness



- 3** Isaac is a psychologist who has investigated whether alcohol affected the ability of participants to complete a task successfully. The task consisted of participants walking 20 steps along a straight line whilst balancing a book on their head after drinking alcohol.

Isaac gathered an opportunity sample from his local university. He asked them to drink 2 units of alcohol (units being a measurement of alcohol) on day one and 4 units on day two.

Table 1 shows the results for Isaac's investigation.

Participants	Number of mistakes made on day one (2 units of alcohol)	Number of mistakes made on day two (4 units of alcohol)
A	6	6
B	12	11
C	4	14
D	8	19

Table 1

- (a) Calculate the percentage of mistakes made by participant C on day one from the total of mistakes made by all participants on day one.

You must give your answer to **one** decimal place.

(1)

SPACE FOR CALCULATIONS

Percentage



- (b) Calculate the mean number of mistakes made on day two.

You must give your answer to **one** decimal place.

(1)

SPACE FOR CALCULATIONS

Mean number of mistakes made on day two

- (c) Explain **one** strength of the opportunity sampling technique used by Isaac in his investigation.

(2)

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- (d) Explain **one** improvement that Isaac could make to his investigation.

(2)

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- 9 Mandy is investigating whether there is a relationship between time spent outdoors and quality of sleep. She used a volunteer sampling technique to gather her participants from her university campus.

The students were required to complete a questionnaire to state how many hours they had spent outdoors in the previous week. They also had to give a self-rated score for quality of sleep, with 0 being very poor sleep and 10 being excellent sleep.

- (a) Describe how Mandy could use a volunteer sampling technique to gather participants for her investigation.

(2)

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- (b) Mandy analysed her results using Spearman's rho.

State **two** reasons why Mandy used Spearman's rho to analyse her data.

(2)

1

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2

.....

(c) Explain **one** improvement that Mandy could make to her investigation.

(2)



4 Evaluate **one** adoption study that you have learned about in biological psychology.

(8)



10 Discuss the key question you have studied from biological psychology.

(8)



- 4** Biological psychology has been used to explain key questions of relevance to today's society.

Discuss the key question for society you have studied using concepts, theories and / or research from biological psychology.

(8)

Key question

10 In your studies of biological psychology, you will have learned about an adoption study.

Evaluate **one** adoption study you have learned about in biological psychology.

(8)



2 You were required to carry out a practical investigation in biological psychology.

(a) State the hypothesis for your practical investigation in biological psychology.

(2)

(b) Describe **one** ethical consideration you accounted for during your practical investigation in biological psychology.

(2)

(c) Describe the outcome of your Spearman's rho test for your practical investigation in biological psychology.

(2)

(d) Explain **two** improvements you could make to your practical investigation in biological psychology.

(4)



3 You were required to carry out a practical investigation in biological psychology.

(a) State the aim of your practical investigation in biological psychology.

(1)

(b) Describe how you gathered the sample for your practical investigation in biological psychology.

(2)

(c) Describe the results of your practical investigation in biological psychology.

(3)



- (d) Explain **one** strength and **one** weakness of your practical investigation in biological psychology.

(4)

Strength

Weakness



- 2 Phil wanted to find out if there was a relationship between drinking coffee and alertness.

He randomly selected six doctors at a local hospital who worked on a busy Friday night and who all drank coffee. At the end of a 12-hour shift he asked the doctors to record how many cups of coffee they had drunk and their alertness.

Phil asked the doctors to rate their alertness on a scale of one to five (where one was low alertness and five was high alertness).

The results of Phil's study are shown in **Table 2**.

Doctor	Total number of cups of coffee drunk	Self-reported alertness score
A	6	5
B	3	4
C	5	5
D	2	1
E	4	4
F	3	4

Table 2

- (a) Complete **Table 3** and calculate Spearman's rank correlation coefficient between the total number of cups of coffee drunk in one 12-hour shift and the self-reported alertness score.

(4)

Total number of cups of coffee drunk	Rank 1	Self-reported alertness score	Rank 2	d	d ²
6	6	5	5.5		
3	2.5	4	3		
5	5	5	5.5		
2	1	1	1		
4	4	4	3		
3	2.5	4	3		
Total:					

Table 3**SPACE FOR CALCULATIONS**

Spearman's rank correlation coefficient



- (b) Explain **one** strength of Phil using a random sampling technique in his investigation.

(2)

- (c) Phil also decided to interview the doctors after their shift. He analysed the quantitative data gathered from the doctor's self-reports and the qualitative data from the interviews.

Justify why Phil gathered both qualitative and quantitative data in his investigation.

(4)

- (d) Explain **two** improvements that Phil could make to his investigation.

(4)

1

2 Margaret is a social worker and wants to find out if the time spent in a children’s care home before being adopted is linked to how affectionate a child is.

Margaret selected six children from her case files. She counted the number of months each of the children had been in the children’s care home and how many affectionate acts had been recorded by their care worker in the first week of adoption.

Margaret’s results are shown in **Table 1**.

Participants	Number of months spent in a children’s care home	Number of affectionate acts recorded in the first week of adoption
A	10	5
B	14	7
C	16	9
D	8	3
E	14	9
F	12	7

Table 1

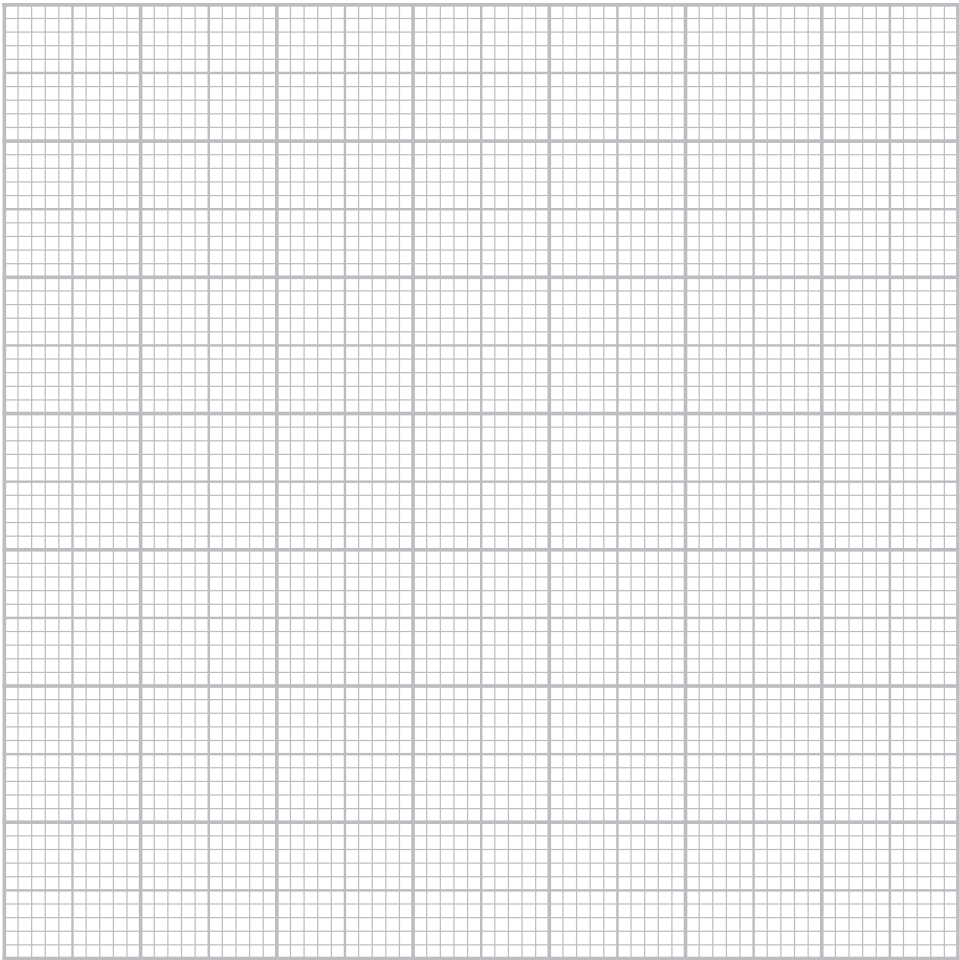
(a) State a fully operationalised directional (one-tailed) alternative hypothesis for Margaret’s study.

(2)

(b) Draw a suitable graph to display the data in **Table 1**.

(3)

Title



(c) State the type of correlation shown in the graph you have drawn in 2(b).

(1)



(d) Complete **Table 2** and calculate Spearman’s rank correlation coefficient for the relationship between the number of months spent in a children’s care home and the number of affectionate acts recorded by the care worker in the first week of adoption.

(4)

Number of months spent in a children’s care home	Rank 1	Number of affectionate acts recorded in a week	Rank 2	d	d ²
10	2	5	2		
14	4.5	7	3.5		
16	6	9	5.5		
8	1	3	1		
14	4.5	9	5.5		
12	3	7	3.5		
				Total:	

Table 2

SPACE FOR CALCULATIONS

Spearman’s rank correlation coefficient

(e) Explain **one** weakness of Margaret using quantitative data for her study.

(2)

(f) Explain **one** improvement that could be made to the sample gathered by Margaret for her study.

(2)



2 Amari investigated whether the time of year influenced a person’s emotional wellbeing. She decided to recruit female students from her college to complete her investigation.

Using a self-report questionnaire, Amari asked the participants to rate their emotional wellbeing in the middle of summer. Their emotional wellbeing was rated on a scale of 1 to 10, where 1 was extremely positive and 10 was extremely negative.

They were then asked to repeat the questionnaire again in the middle of winter.

(a) Describe how Amari could use a volunteer sampling technique to gather her sample.

(2)

The results of Amari’s investigation are shown in **Table 2**.

Participant	Emotional wellbeing score in the middle of summer (1–10)	Emotional wellbeing score in the middle of winter (1–10)
A	3	7
B	3	6
C	5	7
D	6	8
E	4	5
F	2	4

Table 2

(b) Complete **Table 3** and calculate Spearman’s rank correlation coefficient for the relationship between the scores out of 10 in the middle of summer and the scores out of 10 in the middle of winter for emotional wellbeing.

You must give your answer to **one** decimal place.

(4)

Emotional wellbeing score in the middle of summer (1–10)	Rank 1	Emotional wellbeing score in the middle of winter (1–10)	Rank 2	d	d ²
3	2.5	7	4.5		
3	2.5	6	3		
5	5	7	4.5		
6	6	8	6		
4	4	5	2		
2	1	4	1		
Total:					

Table 3
SPACE FOR CALCULATIONS

Spearman’s rank correlation coefficient

(c) Explain **two** strengths of Amari's investigation.

(4)

1

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(d) Explain **two** improvements that Amari could make to her investigation.

(4)

1

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MARK SCHEMES

official Pearson Edexcel mark schemes



7	One mark for each point describing how recreational drugs change how neurotransmitters operate. For example: Recreational drugs work by increasing or decreasing neurotransmitters at the synaptic gap. (1) If a drug increases the level of dopamine, the user experiences an intense feeling of pleasure or euphoria (1). Look for other reasonable marking points.	(2)
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Question Number	Answer	Mark
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8	AO1 (3 marks) Up to three marks for description of synaptic transmission. For example: • An electrical impulse travels along the pre-synaptic neuron (1). The impulse reaches the synaptic vesicles to release a neurotransmitter (1). These diffuse across the synaptic gap and attach receptors (1). Look for other reasonable marking points.	(3)
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6 (a)	AO2 (2 marks) Up to two marks for describing how to use a random sampling technique to gather participants in relation to the scenario. For example: Amelia could firstly approach the police for a list of violent offenders which she could put into a computer database (1) and then use a random number generator to select the first 30 violent offenders for her research into drug use and aggression (1). Look for other reasonable marking points. Generic answers score 0 marks. Answers must relate to the scenario.	(2)
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Question Number	Answer	Mark
6 (b)	AO2 (1 mark), AO3 (1 mark) One mark for identification of a weakness of a correlational research method in relation to the scenario (AO2) One mark for justification of the weakness (AO3) For example: By using a correlational research method Amelia cannot be certain that violence is the result of recreational drug use as the data she gathers will only tell her if there is a relationship between her covariables of aggression and drug use (1) which means Amelia would not be able to determine any cause and effect that drug taking results in violent behaviour, so limiting the usefulness of her findings (1). Look for other reasonable marking points. Generic answers score 0 marks. Answers must relate to the scenario.	(2)

Question Number	Answer	Mark
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3(a)(i)	AO1 (1 mark) • Dendrite Look for other reasonable marking points.	(1)
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Question Number	Answer	Mark
3(a)(ii)	AO1 (1 mark) • Synapse / synaptic terminal / axon terminal Look for other reasonable marking points.	(1)

Question Number	Answer	Mark
3(b)	AO2 (3 marks) Up to three marks for explanation of the effects of recreational drugs in relation to Tina's scenario. For example: • Tina could consume drugs which will affect her synaptic functioning by increasing or decreasing neurotransmitters which will impact on her level of stress (1). Alcohol would increase serotonin to make Tina feel happier about her situation (1). However, alcohol would also increase GABA which would make Tina's memory less efficient and could make her revision for her exams more difficult (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(3)

1(a)

AO1 (3 marks)

Up to three marks for completing Table 1 with the part of the central nervous system (CNS).

(3)

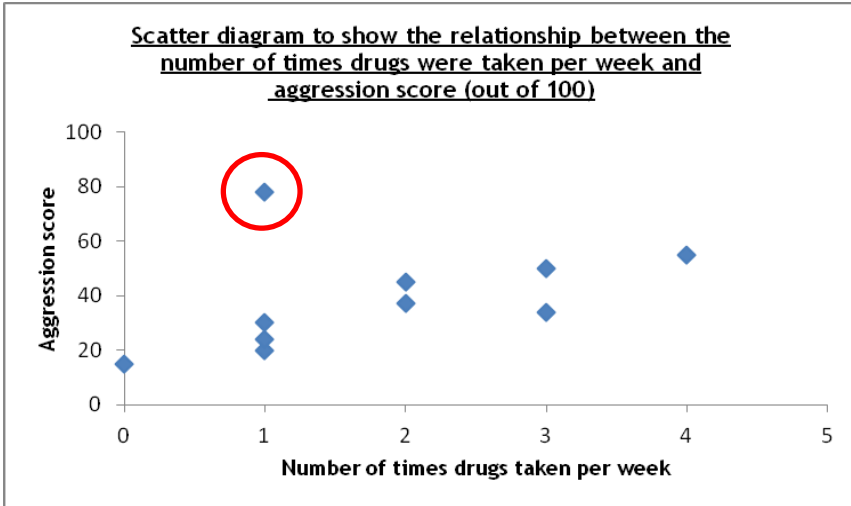
Definition	Part of the central nervous system (CNS)
These can be sensory, motor or relay. They transmit signals to different parts of the body.	Neuron
The process by which one neuron / nerve cell communicates with another.	Synaptic transmission
These are chemical messengers that support communication within the nervous system (NS).	Neurotransmitter

(3)

Question Number	Answer	Mark
1(b)	AO1 (2 marks), AO3 (2 marks) One mark for identification of each weakness (AO1). One mark for justification of each weakness (AO3). For example: Weakness one - PET scans usually take place in an artificially controlled environment (1) which lacks ecological validity therefore is likely to be an unrealistic measurement of brain activity that takes place in everyday settings (1). Weakness two - Each PET scans involves exposing participants to an injection of a radioactive glucose tracer which could be dangerous (1) therefore practically limiting the number of times that it can be used with the same participant (1). Look for other reasonable marking points.	(4)

2(a)(i)	AO2 (1 mark) One mark for identification of the sampling method used. For example: The sampling method is volunteer sampling (1). Look for other reasonable ways of expressing the sampling method.	(1)
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Question Number	Answer	Mark
2(a)(ii)	AO2 (2 marks), AO3 (2 marks) One mark for each strength/weakness identified from Hinnah's study (AO2). One mark for justification of each strength/weakness (AO3). For example: - One strength is that Hinnah's participants put themselves forward to take part in the study about drugs (1) so Hinnah will not have to spend as much time selecting her participants compared to random sampling (1). - One weakness is that participants may only want to participate if they do not take drugs/take legal drugs (1). This would mean her sample may not be representative of the students in Hinnah's college which means the study would lack generalisability (1). Look for other reasonable marking points. Generic answers score 0 marks.	(4)

Question Number	Answer	Mark
2(b)	AO2 (1 mark) One mark for identification of the outlier. <u>Scatter diagram to show the relationship between the number of times drugs were taken per week and aggression score (out of 100)</u>  Look for other reasonable ways of identifying the outlier.	(1)

Question Number	Answer	Mark
2(c)	AO2 (1 mark), AO3 (1 mark) One mark for identification of an appropriate conclusion for Hinnah's study (AO2) One mark for justification of the conclusion (AO3). For example: Hinnah could conclude that taking drugs influences levels of aggression (1) because more frequent consumption of drugs is correlated with greater levels of aggression (1). Look for other reasonable marking points.	(2)

8

AO1 (4 marks), AO2 (4 marks)

(8)

AO1

- Correlational research measures two variables to see if there is a relationship between them.
- Correlations can use the same individual participants where each participant will be measured on both co-variables.
- The results of correlation research can be plotted on a scatter diagram to show a direction, such as positive correlation, which is when one variable increases the other variable increases.
- A correlation can be considered strong or weak, which shows the strength of the relationship between the covariables being tested.

AO2

- Jinal could measure nicotine through cigarette use or vaping and count the number of negative life experiences in childhood to see if one increases alongside the other.
- She could give a questionnaire to participants to gather data on how many cigarettes are smoked per day and measure the number of negative childhood experiences the same participants had at different ages.
- Jinal may use a scatter diagram to plot her data about the volume of recreational drug use and how many negative childhood experiences they had to see if there is a positive correlation.
- She could determine the strength of the relationship between nicotine and negative childhood experiences, if this is weak she could then investigate other factors involved in nicotine use.

Look for other reasonable marking points.

Level	Mark	Descriptor
AO1 (4 marks), AO2 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs application in their answer		
	0	No rewardable material
Level 1	1–2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Provides little or no reference to relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 2	3–4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Discussion is partially developed but is imbalanced or superficial occasionally supported through the application of relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 3	5–6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning. Candidates will demonstrate a grasp of competing arguments, but discussion may be imbalanced or contain superficial material supported by applying relevant evidence from the context (scientific ideas, processes, techniques and procedures (AO2)
Level 4	7–8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical balanced discussion, containing logical chains of reasoning. Demonstrates a thorough awareness of competing arguments supported throughout by sustained application of relevant evidence from the context (scientific ideas, processes, techniques or procedures). (AO2)

Learning Theories

Question Number	Answer	Mark
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12	AO1 (4 marks), AO2 (4 marks) AO1 • Recreational drugs are taken by a person for the purpose of a pleasurable reaction, they can be illegal, legal or prescription drugs. • Drugs hijack the reward systems, such as the basal ganglia which plays an important role in positive forms of motivation, to produce pleasurable feelings of euphoria. • Some drugs mimic the role of a neurotransmitter and can bind to the receptor sites of the post-synaptic neuron in order to increase neurotransmission functions. • Other drugs can cause the neurons to release large amounts of natural neurotransmitters or prevent the normal recycling of these brain chemicals by interfering with transporters. AO2 • Phencyclidine (PCP), known as 'Angel Dust' acts at the NMDA glutamate receptor to block the effects of glutamate inducing symptoms of psychosis and cognitive dysfunction. • Amphetamine (speed) is a psychostimulant which stimulates dopamine synapses, leading to increased concentrations of dopamine and glutamate, which enhances excitatory neurotransmission by reducing the clearance of glutamate from the brain. • Heroin sufficiently resembles the chemical structure of the brain's natural opioids and binds to the opioid receptor sites which results in increases in natural endorphin levels. • When cocaine attaches to dopamine transporters, the dopamine cannot re-enter the neuron, building up in the synapse and stimulating D-receptors to increase the effect at the post-synaptic neuron. Look for other reasonable marking points.	(8)
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Level	Mark	Descriptor
AO1 (4 marks), AO2 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs application in their answer		
	0	No rewardable material
Level 1	1–2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Provides little or no reference to relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 2	3–4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Discussion is partially developed but is imbalanced or superficial occasionally supported through the application of relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 3	5–6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning. Candidates will demonstrate a grasp of competing arguments, but discussion may be imbalanced or contain superficial material supported by applying relevant evidence from the context (scientific ideas, processes, techniques and procedures) (AO2)
Level 4	7–8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical balanced discussion, containing logical chains of reasoning. Demonstrates a thorough awareness of competing arguments supported throughout by sustained application of relevant evidence from the context (scientific ideas, processes, techniques or procedures). (AO2)

Learning Theories

Question Number	Answer	Mark
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8	AO1 (6 marks), AO3 (6 marks) AO1 • Drug-taking role models would influence taking recreational drugs • Positive reinforcement in terms of rewarding drug effects will repeat the drug taking • Rewarding effects of the drugs could stimulate the dopamine reward pathway • Heroin increases dopamine and endorphins which blocks pain and gives euphoric feelings • Association of pleasure from recreational drugs with drug equipment/friends as proposed by classical conditioning • Individuals may inherit a genotype predisposing them to taking recreational drugs AO3 • Studies show that aggression is modelled (e.g. Bandura, 1961, 1963) so people may imitate drug taking behaviour which is a choice • Choice of role models (SLT) is influenced by a number of factors (e.g. gender, status) which could indicate it is a choice • The positive effects of drugs encourages more drug taking to continue getting the positive effects so is a choice • Use of recreational drugs may be treated by choice using aversion therapy by pairing a drug with a negative stimulus • Drug taking is not a choice due to physical changes in the brain caused by repeated stimulation of the dopamine reward pathway • Raine et al. (1997) showed murderer brains functioned differently so this might be the case with drug addicts so it is not a choice • Studies (e.g. Lynskey et al., 2002) indicate drug (e.g. cannabis) dependence could be (somewhat) accounted for by genetic factors which is not a choice Look for other reasonable marking points.	(12)
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Level	Mark	Descriptor
Candidates must demonstrate an equal emphasis between knowledge and understanding vs judgement/conclusion in their answer.		
	0	No rewardable material.
Level 1	1–3 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A judgement/decision may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	4–6 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material leading to a judgement/decision being presented. Candidates will demonstrate a grasp of competing arguments but response may be imbalanced. (AO3)
Level 3	7–9 Marks	Demonstrates accurate knowledge and understanding. (AO1) Displays a mostly developed and logical argument, containing mostly coherent chains of reasoning. Demonstrates an awareness of competing arguments, presenting a judgement/decision which may be imbalanced. (AO3)
Level 4	10–12 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical argument, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments and presents a balanced response, leading to a balanced judgement/decision. (AO3)

10	A01 (6 marks), A03 (6 marks) A01 • Classical conditioning assumes that learned phobic behaviour in humans is by association. • Natural reflexes are paired with neutral stimuli to create a phobic learned behaviour in classical conditioning. • Repeated association of the UCS and NS leads to the NS becoming the CS, causing the CR to increase the likelihood of a phobic response. • Neurotransmitters like acetylcholine can influence muscle movement, memory and learning. • Cocaine is a recreational drug that can stimulate the central nervous system within the brain's main reward system affecting dopamine release. • Genetic predisposition may be one of the influences that affects how sensitive or responsive an individual's central nervous system is to recreational drugs. A03 • Studies like Watson and Rayner (1920) showed that classical conditioning can alter behaviour in terms of a child's emotional reactions to various objects like a rat. • Pavlov's (1927) study used dogs, which has limited generalisability to humans suggesting classical conditioning may not be a representative explanation of human behaviour. • Gilroy et al. (2003) used systematic desensitisation, which is based on classical conditioning principles to treat patients who had a spider phobia showing altered behaviour is possible in terms of a treatment. • Acetylcholine imbalances are known to be caused by low choline, a vitamin B complex-related nutrient found mainly in fatty animal foods, therefore human behaviour differences have other explanations. • Experimental treatments, such as the TA-CD vaccine, have been trialled to inhibit the pleasurable effects of recreational drugs such as cocaine so could be used as a form of treatment for addiction. • Dawes et al. (2000) suggested that stress is one of the strongest predictors of relapse in drug users, suggesting an interplay of different factors can influence human behaviour differences. Look for other reasonable marking points.	(12)
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Level	Mark	Descriptor
AO1 (6 marks), AO3 (6 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs judgement/conclusion in their answer.		
	0	No rewardable material.
Level 1	1-3 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A judgement/decision may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	4-6 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material leading to a judgement/decision being presented. Candidates will demonstrate a grasp of competing arguments but response may be imbalanced. (AO3)
Level 3	7-9 Marks	Demonstrates accurate knowledge and understanding. (AO1) Displays a mostly developed and logical argument, containing mostly coherent chains of reasoning. Demonstrates an awareness of competing arguments, presenting a judgement/decision which may be imbalanced. (AO3)
Level 4	10-12 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical argument, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments and presents a balanced response, leading to an effective nuanced and balanced judgement/decision. (AO3)



9	One mark for an appropriate similarity between the two explanations of aggression. One mark for an appropriate difference between the two explanations of aggression. For example: A similarity is that they both share that there is an internal component of aggression Freud says this is an unconscious processes but biological psychology claims it is testosterone (1). However, a difference is that the biological approach to aggression is supported by objective findings whereas the psychodynamic approach is based on subjective material (1) Look for other reasonable marking points.	(2)
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Question Number	Indicative content	Mark
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Question Number	Answer	Mark
6	A02 (3 marks) Up to three marks for description of how hormones could account for Charles's behaviour. For example: Charles may have an imbalance of testosterone to cortisol (T/CRT ratio) which could have contributed to him being aggressive when shouting insults at his peers (1). Charles may have been exposed to more testosterone in the womb and during puberty which could have lead to him becoming more aggressive in his science class (1). Letting in an important goal may cause stress but his cortisol levels may not have increased enough to inhibit his aggression and stop the fight with the captain (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(3)



8(a)	AO1 (1 mark)	(1)
	One mark for stating a finding. For example: Li et al. (2013) • Heroin users showed significantly greater activation in the posterior cingulate cortex (PCC) during exposure to drug related cues compared to controls (1). • Heroin users showed a significant increase in subjective craving scores after being exposed to the cue-induced craving task from around 3.21 (1). Brendgen et al. (2005) • It was found that social aggression had a weak genetic link, with 60% attributed to non-shared environment, 20% to shared environment, and 20% to genes (1). • It was found there was a strong positive correlation for a genetic link between social and physical aggression ($r = 0.79$ teacher ratings) (1). Van den Oever et al. (2008) • Out of 417 proteins there were 6 that had changed significantly after cue exposure of the rats exposed to cues when compared with control rats (1). • Rats that received the GluR2-blocking peptide in the (ventral medial) PFC made significantly fewer nose-pokes for heroin cues compared to rats that received a control peptide (1). Look for other reasonable marking points.	

Question Number	Answer	Mark
8(b)	AO1 (1 mark), AO3 (1 mark) One mark for identification of a weakness (AO1) One mark for justification of the weakness (AO3) For example: Li et al. (2013) - The researchers only used 14 male participants aged 25-47 years from a drug rehab centre in China which reduces generalisability of the results to the target population of heroin addicts (1) as the sample used is not fully representative as it does not include female participants, as they were recruited from a single country and were selected from a restricted age group (1). Brendgen et al. (2005) - In Brendgen et al.'s (2005) study not all the twins were DNA tested for identicalness as they were only judged by their physical resemblance to decide if they were identical or not (1) which means some of the twins may not have been appropriately allocated and so in the wrong group, making the results regarding the genetic contribution to aggression less valid (1). Van den Oever et al. (2008) - The study used male Wistar rats so may not be generalisable to human heroin addicts in terms of the injection used to prevent relapse to heroin (1) because there are differences in aspects of human and animal behaviour in relation to drug seeking so the synaptic changes that happened in the brain of the rats may not fully apply to humans (1). Look for other reasonable marking points.	(2)

Question Number	Answer	Mark
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1	AO1 (2 marks), AO3 (2 marks) One mark for each strength identified (AO1). One mark for justification of each strength (AO3). For example: Strength one - Raine et al. (1997) study used a large sample size of 41 murderers (1) which is generalisable to the target population of murderers pleading not guilty by reason of insanity (1). Strength two - Raine et al. (1997) put in place a number of standardised controls, including eliminating any medication for 2 weeks prior to the scan (1) in case this affected the measurements which increased the reliability of the results (1). Look for other reasonable marking points.	(4)
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Question Number	Answer	Mark
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10	AO2 (4 marks) Up to four marks for a description of a correlational research method in relation to the scenario. For example: Lauren could advertise for students on campus to take part in her study on aggression and select a sample from any students and staff who volunteer (1). She could ask her participants to give a self-reported aggression score on a scale from 0 (not aggressive) to 10 (very aggressive) (1). Lauren would also ask the participants to rate their level of hunger at the time they complete their aggression score (1). Lauren would compare the aggression scores with hunger levels for each participant to see if there is a relationship between hunger and aggression (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(4)
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Question Number	Indicative Content	Mark
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Question Number	Answer	Mark
2(a)	AO2 (2 marks) Up to two marks for a description of how one hormone could explain Claus's aggressive behaviour. For example: As a teenager going through puberty Claus's increased testosterone might explain his rude aggressive behaviour towards his coach (1). When playing in a basketball match Claus's testosterone may heighten resulting in him pushing over the opposition players (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
2(b)	AO1 (1 mark), AO3 (1 mark) One mark for identification of a strength (AO1). One mark for justification of the strength (AO3). For example: Dabbs and Hargrove's (1997) positive correlation showed higher levels of testosterone were found in female prisoners who were more violent (1) therefore supporting the idea that higher levels of the hormone testosterone has been associated with an increase in violent and aggressive behaviour (1). Look for other reasonable marking points.	(2)

Question Number	Answer	Mark

7	AO1 (2 marks), AO3 (2 marks) One mark for identification of each strength (AO1) One mark for justification of each strength (AO3) For example: • Real-life case studies indicate that damage to brain structure can result in individuals becoming aggressive which increases the plausibility of the explanation that brain structures affect aggression (1). Damasio et al. (1994) studied the case of Phineas Gage who suffered damage to his pre-frontal cortex that resulted in a personality change that made him irresponsible and aggressive, so brain structure can influence aggression (1). • Considering brain structure as a factor in human aggression could help inform the way violent offenders are perceived by the criminal justice system by including considerations of a person's pre-disposition to violence (1). Wong et al. (1997) used MRI scans with 19 violent male criminals, they found the volume of the amygdala was smaller in the violent criminals compared to controls, supporting brain structure as a factor involved in violent offending (1). Look for other reasonable marking points.	(4)
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Question Number	Indicative Content	Mark
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10	AO2 (4 marks) Up to four marks for a description of hormones in relation to the scenario. For example: • A football match may increase adrenaline in both players arousing a reactionary fight or flight response where the opposition player tripped Dan over to defend his team from conceding a goal (1) and when the penalty was awarded, the opposition player may not have had sufficient cortisol to deal with the stress immediately and swore at the referee (1). Both male players may have high testosterone resulting in the impulsive aggression of getting into a fight even though it caused them to be sent off the pitch (1). Dan and the opposition player may have had an imbalance of testosterone to cortisol (T/CRT ratio) which could have contributed to them being aggressive in the match (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(4)
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Question Number	Answer	Mark
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4a	A02 (2 marks), A03 (2 marks) One mark for identification of each reason (A02). One mark for justification of each reason (A03). For example: • Amanda's doctor may consider that an fMRI scanner can show good spatial resolution of potential aggressive brain areas (1) which could then provide a valid identification of areas of Amanda's brain that might be involved in her aggression (1). • Amanda's doctor may consider that an fMRI is a non-invasive method of looking at aggression in her brain (1) which is ethically more acceptable than sending Amanda for surgery or any other form of invasive treatment (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(4)
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Question Number	Answer	Mark
4b	A01 (1 mark) One mark for naming a brain scanning technique. For example: • PET scan (1) Look for other reasonable marking points.	(1)

1(a)(i)	AO1 (1 mark) • Frontal lobe / frontal (1) Look for other reasonable ways of expressing the frontal lobe.	(1)
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Question Number	Answer	Mark
1(a)(ii)	AO1 (1 mark) • Parietal lobe / parietal (1) Look for other reasonable ways of expressing the parietal lobe.	(1)

Question Number	Answer	Mark
1(a)(iii)	AO1 (1 mark) • Temporal lobe / temporal (1) Look for other reasonable ways of expressing the temporal lobe.	(1)



Question Number	Answer	Mark
1(b)	AO1 (2 marks), AO3 (2 marks) One mark for each weakness identified (AO1). One mark for justification of each weakness (AO3). For example: • fMRI scanning takes place in an artificial setting which lowers ecological validity (1). This means that participants may not show natural behaviour due to the situation being different to everyday life (1). • fMRI scanning is not practical for those with pace makers (1) as the magnetic field can cause physical disruption (to the heart) (1) Look for other reasonable marking points.	(4)

Question Number	Answer	Mark

3(a)	AO2 (3 marks) Up to three marks for relevant description of how Freud's psychodynamic theory explains Belinda's aggressive behaviour (AO2). For example: Belinda's id is dominant, influencing her to be aggressive toward the other children (1). Belinda takes the other children's toys because her id needs to be satisfied immediately as it is impulsive (1). Belinda has not yet developed her ego so has not yet learned that pushing the other children over is not acceptable (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(3)
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Question Number	Answer	Mark
3(b)	AO1 (2 marks), AO3 (2 marks) One mark for each strength/weakness identified (AO1). One mark for justification of each strength/weakness (AO3). For example: Strength - Freud's explanation of aggression can be applied to treat those with aggressive behaviour through psychoanalysis (1) during which the client explores their unconscious causes of aggression in a safe context with support from their therapist (1) Weakness - Freud's explanation of aggression may be viewed as unscientific (1) as the concepts of id, ego and superego underpinning his theory cannot be accurately measured (1). Look for other reasonable marking points.	(4)

Question Number	Answer	Mark								
1(a)	AO1 (3 marks) Up to three marks for completing Table 1 with the name of the correct lobe. <table><tr><th>Lobe</th><th>Function of the lobe</th></tr><tr><td>Frontal lobe</td><td>This lobe is involved in higher executive functioning, motor skills, planning, reasoning and problem solving.</td></tr><tr><td>Occipital lobe</td><td>This lobe is associated with interpreting visual stimuli, depth and distance.</td></tr><tr><td>Parietal lobe</td><td>This lobe involves interpreting sensory information, including touch, temperature, pain and pressure.</td></tr></table>	Lobe	Function of the lobe	Frontal lobe	This lobe is involved in higher executive functioning, motor skills, planning, reasoning and problem solving.	Occipital lobe	This lobe is associated with interpreting visual stimuli, depth and distance.	Parietal lobe	This lobe involves interpreting sensory information, including touch, temperature, pain and pressure.	(3)
Lobe	Function of the lobe									
Frontal lobe	This lobe is involved in higher executive functioning, motor skills, planning, reasoning and problem solving.									
Occipital lobe	This lobe is associated with interpreting visual stimuli, depth and distance.									
Parietal lobe	This lobe involves interpreting sensory information, including touch, temperature, pain and pressure.									

Question Number	Answer	Mark
1(b)	AO1 (2 marks), AO3 (2 marks) One mark for identification of a strength/weakness (AO1). One mark for justification of the strength/weakness (AO3). For example: Strength - Raine et al. (1997) found that the murderers who pleaded not guilty by reasons of insanity had lower activity in prefrontal regions of the brain (1) suggesting that the damage to their PFC may have caused loss of self-control which resulted in an increase in their aggressive human behaviour (1). Weakness - Higher levels of hormones such as testosterone have been known to increase aggressive tendencies in murderers (1) so factors other than lower activity in the PFC may equally explain an increase in aggressive human behaviour (1). Look for other reasonable marking points.	(4)

1(a)	AO1 (3 marks) Up to three marks for describing how an fMRI scan can be used to investigate the brain. For example: An fMRI scan measures blood flow in the brain whilst a person is completing a task (1). When a particular area of the brain becomes more active when completing the task there is an increased demand for oxygen (1). The brain responds by increasing blood flow which allows researchers to produce images showing the levels of activity in the brain (1). Look for other reasonable marking points.	(3)
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Question Number	Answer	Mark
1(b)	AO1 (2 marks), AO3 (2 marks) One mark for identification of a strength/weakness (AO1). One mark for justification of the strength/weakness (AO3). For example: Strength - fMRI scans are a reliable measurement of blood flow in the brain as they have a good spatial resolution (1) allowing psychologists to understand different brain regions activity with more accuracy than an EEG (1). Weakness - An fMRI does not provide an explanation of actual brain activity as it only measures changes to blood flow in the brain (1) therefore we cannot accurately determine if the blood flow is actually caused by a specific brain function (1). Look for other reasonable marking points.	(4)

4.	AO1 (4 marks), AO3 (4 marks) AO1 • PET scans investigate brain activity when a human is doing a task • PET involves injecting a radioactive tracer into the participant • fMRI records brain activity and produces an anatomical picture of the brain • CAT scans use multiple X-rays to produce a cross-sectional image of brain regions AO3 • Brain scanning lacks ecological validity as it takes place in an artificial setting • Frequent exposure to radiation could mean brain scanning could be unethical • Raine et al. (1997) found differences in murderer brain activity using PET scans showing their contribution • Brain scans can be repeated easily to test for reliability in findings about human behaviour Look for other reasonable marking points.	(8)
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Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

SECTION B

Question Number	Answer	Mark
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Question Number	Answer	Mark
7(a)	AO2 (2 marks) One mark for a partially operationalised hypothesis. Two marks for a fully operationalised hypothesis. For example: • There will be a negative correlation between age and attitude to drug use (1). • There will be a negative correlation between the participant's age in years and a lenient attitude to drug use measured on a scale out of 10 (2). Look for other reasonable marking points. Answers must relate to their practical investigation. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
7(b)	AO2 (2 marks) Up to two marks for description of the results of their Spearman's rank correlation coefficient/statistical test. For example: My Spearman's value was -0.985 which means there was a very strong correlation because this is very close to -1 (1). The value is also negative so this showed that as age increased, lenient attitudes to drug use decreased (1). Look for other reasonable marking points. Answers must relate to their practical investigation. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
7(c)	AO2 (1 mark), AO3 (1 mark) One mark for identification of a strength of the practical investigation (AO2). One mark for justification of the strength of the practical investigation (AO3). For example: My correlational study into age and attitudes to drug use was controlled using the same questions for everybody so it can be tested for reliability (1) because I can replicate the study multiple times to check for consistency in the results about attitudes and drug use (1). Look for other reasonable marking points. Answers must relate to their practical investigation. Generic answers score 0 marks.	(2)

Question Number	Answer	Marks
7(d)	AO2 (1 mark), AO3 (1 mark) One mark for identification of an improvement of their practical investigation (AO2). One mark for justification of the improvement for their practical investigation (AO3). For example: I could have used open-ended questions so the participants would be able to explain their attitudes towards using drugs (1) which would have increased validity by gaining more in-depth data about why they held their beliefs about drug use (1). Look for other reasonable marking points. Answers must relate to their practical investigation. Generic answers score 0 marks.	(2)

Question Number	Indicative content	Marks
8	AO1 (4 marks) AO3 (4 marks) AO1 - Raine et al. (1997) examined the brains of 41 people who pleaded Not Guilty by Reason of Insanity (NGRI) and compared these to 41 controls. - The participants were matched for sex, had a similar age (31.7 years), and did not take medication for a period before the study. - A PET scan was used to measure the brain activity of the participants. - They found that NGRIs had less activity in their prefrontal and parietal brain regions compared to controls. AO3 - The sample of participants charged with murder was unique and a large amount of this select population was used, which increases generalisability. - The controls used in terms of sex, age, medication mean that the study was able to compare the groups reliably with few extraneous variables. - The PET scans of murderers took place in an artificial setting so the participants may have acted differently when committing their crime in real life so the study lacks ecological validity. - The findings could be used to screen the population and identify individuals who match the NGRI brain activity which is a socially sensitive issue. Look for other reasonable marking points.	(8)

Level	Mark	Descriptor
AO1 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs evaluation/conclusion in their answer.		
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

Section D – Learning theories



5	A01 (4 marks), A03 (4 marks) A01 • The body's endocrine glands secrete hormones such as cortisol directly into the blood stream targeting key organs responsible for our fight-or-flight response. • Testosterone is a male sex hormone that can influence areas of the brain such as the frontal cortex, amygdala and hypothalamus associated with aggression. • Higher levels of the female sex hormones estradiol (oestradiol) have been associated with lower levels of aggressive behaviour in children and female offenders. • Females usually have higher levels of the hormone oestrogen and lower levels of testosterone, however changes to female testosterone levels may result in aggression. A03 • Many studies, for example Lidberg et al. (1985) show that the influence of hormones on the body's responses is correlational so we cannot be certain which hormone is responsible for human aggressive behaviour. • Maletzky et al. (2006) found that depo-Provera, a drug that lowers testosterone, is important in explaining aggressive human behaviour as it showed a reduction in the levels of sexually aggressive behaviour in some offenders. • Social learning theory suggests human aggressive behaviour is the result of imitating violent role models and does not consider the role different male and female hormones. • Dabbs and Hargrove (1997) found a positive correlation between the hormone testosterone and the degree of violent crime in 87 female prisoners, suggesting that the hormone may be involved in explaining aggressive behaviour. Look for other reasonable marking points.	(8)
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Level	Mark	Descriptor
AO1 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs assessment/conclusion in their answer.		
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Generic assertions may be presented. Limited attempt to address the question. (AO3)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a generic or superficial assessment being presented. (AO3)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning leading to an assessment being presented which considers a range of factors. Candidates will demonstrate understanding of competing arguments/factors but unlikely to grasp their significance. The assessment leads to a judgement but this may be imbalanced. (AO3)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical assessment, containing logical chains of reasoning throughout. Demonstrates an awareness of the significance of competing arguments/factors leading to a balanced judgement being presented. (AO3)

SECTION B



9

AO1 (4 marks), AO2 (4 marks)

(8)

AO1

- Hormones are produced by the endocrine system in glands across the body to transmit information that results in behaviours.
- Testosterone is a hormone produced in the adrenal gland in females and high levels have been associated with aggression.
- Cortisol is produced when faced with stressors and low levels of cortisol have been associated with aggression.
- Adrenaline is a hormone linked to a 'flight or fight' reaction to a stimuli that triggers a need to be physically fast or strong.

AO2

- There may be an imbalance in the hormones, such as adrenaline or testosterone, produced by Rachael resulting in her history of aggressive tendencies and abusive behaviours.
- Rachael would not be able to control excessive testosterone in her body, which would explain why she feels unable to manage her levels of aggression.
- She may not be producing sufficient cortisol to combat her feelings of stress explaining why she continues to feel angry at people around her.
- An increase in adrenaline may have triggered Rachael's 'fight' response where she pushed the other prisoner over rather than reasoning with that person.

Look for other reasonable marking points.

Level	Mark	Descriptor
AO1 (4 marks), AO2 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs application in their answer		
	0	No rewardable material
Level 1	1–2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Provides little or no reference to relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 2	3–4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Discussion is partially developed but is imbalanced or superficial occasionally supported through the application of relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 3	5–6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning. Candidates will demonstrate a grasp of competing arguments, but discussion may be imbalanced or contain superficial material supported by applying relevant evidence from the context (scientific ideas, processes, techniques and procedures) (AO2)
Level 4	7–8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical balanced discussion, containing logical chains of reasoning. Demonstrates a thorough awareness of competing arguments supported throughout by sustained application of relevant evidence from the context (scientific ideas, processes, techniques or procedures). (AO2)

Learning Theories

Question Number	Answer	Mark
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8	AO1 (4 marks), AO3 (4 marks) AO1 • Testosterone is a hormone found in males more than females and is responsible for sex drive, body muscle mass and mood. • The hormone estradiol plays a role in dominance, motivation for power and physical aggression among females. • Low levels of cortisol, a hormone secreted in response to stress, is associated with persistent aggressive behaviour beginning in childhood. • The combination of high levels of testosterone, low levels of cortisol and low levels of serotonin have been associated with impulsive aggression. AO3 • Dabbs (1995) found higher levels of testosterone in adult male prison inmates who had committed violent crimes compared to property crime, so hormones may explain aggressive behaviour. • It may be that when faced with a situation that leads to aggression, estradiol levels increase in response to the situation, therefore hormones may not be the cause of aggression, but the result of aggression. • McBurnett et al. (2000) found that boys who had lower levels of cortisol in their saliva were three times more aggressive than boys with higher levels of cortisol, so cortisol does seem to play a role in aggressive behaviour. • A focus just on hormones could be considered reductionist as it excludes the role of neurotransmitters along with genetics or brain functioning, so hormones on their own cannot fully explain human behaviour such as aggression. Look for other reasonable marking points.	(8)
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Level	Mark	Descriptor
AO1 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs assessment/conclusion in their answer.		
	0	No rewardable material.
Level 1	1–2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Generic assertions may be presented. Limited attempt to address the question. (AO3)
Level 2	3–4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a generic or superficial assessment being presented. (AO3)
Level 3	5–6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning leading to an assessment being presented which considers a range of factors. Candidates will demonstrate understanding of competing arguments/factors but unlikely to grasp their significance. The assessment leads to a judgement but this may be imbalanced. (AO3)
Level 4	7–8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical assessment, containing logical chains of reasoning throughout. Demonstrates an awareness of the significance of competing arguments/factors leading to a balanced judgement being presented. (AO3)

Learning Theories

Question Number	Answer	Mark
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Question Number	Indicative Content	Mark
3	A01 (4 marks), A03 (4 marks) A01 • Raine et al.'s (1997) study examined the brains of 41 people who pleaded Not Guilty by Reason of Insanity (NGRI) and compared these to 41 controls. • The participants in Raine et al.'s (1997) study were matched for sex, had a mean age of 31.7 years for the control and 34.3 years for the NGRI group who also did not take their medication for a period before the PET scan. • A PET scan was used to measure the brain activity in the four cortical and sub-cortical regions of the participants in Raine's et al.'s (1997) study when completing the continuous performance task (CPT). • Raine et al. (1997) found that those pleading NGRI had less activity in their prefrontal and parietal brain regions compared to the control group. A03 • The sample of participants charged with murder in Raine's et al.'s (1997) study was a unique representation of the target population, which is only generalisable to those pleading NGRI. • The matched controls used in terms of sex, age, medication indicate that Raine's et al.'s (1997) study was not influenced by these participant variables therefore increasing the validity of the results. • The PET scans in Raine's et al.'s (1997) study measured the brains of participants whilst completing a continuous performance task (CPT) which is unrealistic compared to committing a real-life event such as murder therefore reducing the validity of the scan results to real life. • The findings could be applied to society and used to screen the population in order to identify those who match the NGRI groups brain activity which is seen as a sensitive issue and could be used as a form of negative social control. Look for other reasonable marking points.	(8)



Level	Mark	Descriptor
AO1 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs evaluation/conclusion in their answer.		
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning, leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

SECTION B



7 (a)	AO2 (2 marks) Up to two marks for describing how Tabitha could use a volunteer sampling technique. For example: Tabitha could post a notice on social media advertising for female participants aged between 20 years old and 30 years old (1) and provide her contact details for them to respond and offer to take part in her research about brain activity and aggression (1). Look for other reasonable marking points. Generic answers score 0 marks. Answers must relate to the scenario.	(2)
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Question Number	Answer	Mark
7 (b)	AO2 (3 marks) Up to three marks for describing the use of a PET brain-scanning technique in the investigation. For example: Tabitha would give the female participants a radioactive tracer before they took part so the PET scan can measure their brain activity in response to the stimuli (1). Tabitha would need to take a measure of the resting brain activity prior to any aggressive or non-aggressive stimuli being presented to the participants (1). She would then show each participant the film scenes, such as an aggressive car chase or calm walk in a park to measure the brain activity in response to each scene (1). Look for other reasonable marking points. Generic answers score 0 marks. Answers must relate to the scenario.	(3)

Question Number	Answer	Mark
7 (c)	AO2 (1 mark), AO3 (1 mark) One mark for identification of a strength in relation to the scenario (AO2) One mark for justification of the strength (AO3) For example: A PET scan will give Tabitha an image of the participant's brain activity when they are watching the scenes from the films that can be checked by other researchers (1) which increases the reliability of her findings about aggression as multiple researchers can interpret the scan to achieve consistency (1). Look for other reasonable marking points. Generic answers score 0 marks. Answers must relate to the scenario.	(2)

Question Number	Answer	Mark
7 (d)	AO2 (1 mark), AO3 (1 mark) One mark for identification of an improvement in relation to scenario (AO2) One mark for justification of the improvement (AO3) For example: Tabitha could use a more representative sample of participants by including different ages from 18 years old to 75 years old (1), which would improve the generalisability of her findings about brain activity and aggression to a wider target population of different generations of people (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Indicative Content	Mark
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9	AO1 (4 marks), AO2 (4 marks), AO3 (4 marks) AO1 • Positive reinforcement in operant conditioning strengthens a behaviour by providing a consequence an individual finds rewarding. • Operant conditioning's punishment involves applying an unpleasant stimulus or removing a potentially pleasant stimulus. • The prefrontal cortex in the brain relates to emotions, a lack of regulation in the prefrontal cortex could lead to traits like aggression because our emotions are out of control and aggression results. • The limbic system in the brain is involved in controlling our fight-or-flight response which is an emotional arousal to danger when it occurs. AO2 • Harrison was verbally praised by those around him for fighting the first time so he continued to fight for a second time. • Harrison was punished as he was arrested and not allowed to see the rest of the football match. • Harrison may have had low functioning in his prefrontal cortex which caused him to act aggressively and fight during and after the football match. • Harrison's limbic system may not have been working properly on the day of the football match so instead of getting away from the fight – flight; he stayed and fought – fight; which resulted in his arrest. AO3 • Supporting evidence comes from Skinner (1948) who found in his rat experiments that the consequence of receiving food if they pressed the lever ensured that they would repeat the action again and again. • Skinner and Thorndike's studies supporting operant conditioning were tested on animals and then applied the findings to humans, but because animals and humans are cognitively different the evidence and findings of these studies are not directly generalisable to humans. • Phineas Gage in 1848 suffered an unfortunate accident resulting in a change in his character, becoming irresponsible and unreliable which his doctor said was likely to be due to the severing of his prefrontal cortex during the accident. • Brain functioning as an explanation of aggression does not consider other possibilities like Social Learning Theory which suggests people imitate and copy the aggression you see around you and is not to do with neural brain explanations. Look for other reasonable marking points.	(12)
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Level	Mark	Descriptor
(AO1 (4 marks), AO2 (4 marks), AO3 (4 marks)) Candidates must demonstrate an equal emphasis between knowledge and understanding vs application vs evaluation / conclusion in their answer.		
	0	No rewardable material.
Level 1	1-3 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Provides little or no reference to relevant evidence from the context (scientific ideas, processes, techniques & procedures). (AO2) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	4-6 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Line(s) of argument occasionally supported through the application of relevant evidence from the context (scientific ideas, processes, techniques & procedures). (AO2) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	7-9 Marks	Demonstrates accurate knowledge and understanding. (AO1) Line(s) of argument supported by applying relevant evidence from the context (scientific ideas, processes, techniques & procedures). Might demonstrate the ability to integrate and synthesise relevant knowledge. (AO2) Arguments developed using mostly coherent chains of reasoning leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO1)
Level 4	10-12 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Line(s) of argument supported throughout by sustained application of relevant evidence from the context (scientific ideas, processes, techniques or procedures). Demonstrates the ability to integrate and synthesise relevant knowledge. (AO2) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

Question Number	Indicative content	Mark
8	AO1 (4 marks), AO2 (4 marks), AO3 (4 marks) AO1 • Operant conditioning suggests that the consequence of a behaviour can be encouraged or discouraged. • Positive reinforcement takes place when something desired is introduced following a behaviour. • Testosterone is a male hormone which may increase competitive behaviour leading to aggressive behaviour. • If cortisol levels are too low then inhibition is lowered leading to aggressive behaviour. AO2 • Alik and Joshua are positively encouraged through praise and money by their parents for doing well in school and in their sports competitions. • Alik was rewarded with pleasant positive attention from the female spectators for winning the race. • Joshua is a teenage boy who has increased levels of testosterone due to puberty so may account for aggressive competitive behaviour towards his brother. • Joshua became more aggressive as his cortisol levels may have been too low to inhibit his behaviour towards his brother when he pushed him over. AO3 • Skinner (1948) using positive reinforcement in his "Skinner Box" studies found that he could get animals to press a level for the consequence of a food pellet. • Some operant conditioning research on positive reinforcement was carried out on animals which may not be representative of humans as animal brains are qualitatively different. • Dabbs et al (1987) measured male prisoners involved in crime and found they had higher levels of testosterone, suggesting a link between aggression and testosterone changes. • Research into cortisol and aggressive behaviour is correlational so does not show causation. Look for other reasonable marking points.	(12)

Level	Mark	Descriptor
AO1 (4 marks), AO2 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs application vs evaluation/conclusion in their answer.		
	0	No rewardable material.
Level 1	1-3 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Provides little or no reference to relevant evidence from the context (scientific ideas, processes, techniques & procedures). (AO2) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	4-6 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Line(s) of argument occasionally supported through the application of relevant evidence from the context (scientific ideas, processes, techniques & procedures). (AO2) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	7-9 Marks	Demonstrates accurate knowledge and understanding. (AO1) Line(s) of argument supported by applying relevant evidence from the context (scientific ideas, processes, techniques & procedures). Might demonstrate the ability to integrate and synthesise relevant knowledge. (AO2) Arguments developed using mostly coherent chains of reasoning leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	10-12 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Line(s) of argument supported throughout by sustained application of relevant evidence from the context (scientific ideas, processes, techniques or procedures). Demonstrates the ability to integrate and synthesise relevant knowledge. (AO2) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

Question Number	Indicative content	Mark
9	A01 (6 marks), A03 (6 marks) A01 • Raine et al.'s (1997) study examined the brains of 41 people who pleaded Not Guilty by Reason of Insanity (NGRI) and compared these to 41 controls. • The participants in Raine's study were matched for sex, had a mean age of 31.7 years for the control and 34.3 for NGRI group, and did not take their medication for a period before the study. • A PET scan was used to measure the brain activity in the 4 cortical and sub-cortical regions of the participants in Raine's study when completing the CPT task. • Watson and Rayner's (1920) sample consisted of one boy who was 9 months old at the start and 12 months 21 days at the end of the study. • Little Albert was presented with a variety of objects such as a white rat, a rabbit, a monkey amongst other stimuli during the procedure. • In the laboratory procedure every time the rat was placed in his hand, they banged the hammer on the metal bar behind him. A03 • The sample of participants charged with murder in Raine's study was a unique representation of the target population, which increases generalisability to those pleading NGRI. • The matched controls used in terms of sex, age, medication indicate that Raine's study was not influenced by these individual differences therefore increasing the validity of the results. • The PET scans in Raine's study measured the brains of participants whilst completing a Continuous Performance task (CPT) which is unrealistic compared to committing a real-life event such as murder therefore reducing the validity of the scan results to real life. • The study used only Little Albert in the sample which is not generalisable to the entire population as his	(12)

	behaviour would not represent those of females or adults. • Little Albert initially showed no fear to the white rat, so the researchers could be sure that the emotional responses shown after pairing the rat with the loud noise were due to the associative learning, increasing validity. • The laboratory that Little Albert was tested in reduced ecological validity as this artificial setting is not a natural environment to test how phobias would be conditioned in real life. Look for other reasonable marking points.	
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Level	Mark	Descriptor
AO1 (6 marks), AO3 (6 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs evaluation/conclusion in their answer.		
	0	No rewardable material.
Level 1	1-3 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	4-6 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	7-9 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning, leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	10-12 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

10	AO1 (6 marks), AO3 (6 marks) AO1 • Operant conditioning refers to the process of learning through consequences such as positive punishment. • Thorndike suggested that if people are rewarded as a consequence for a particular behaviour, then they are more likely to continue the behaviour. • Positive reinforcement results in people being rewarded for a desirable behaviour which they are more likely to repeat. • Testosterone is a male sex hormone that can influence areas of the brain such as the frontal cortex, amygdala and hypothalamus associated with aggression. • Females usually have higher levels of the hormone oestrogen and lower levels of testosterone, however changes to female testosterone levels may result in aggression. • The body's endocrine glands secrete hormones such as cortisol directly into the blood stream targeting key organs when our fight-or-flight response is activated. AO3 • Skinner's (1948) animal studies showed that rats would stop pressing a lever when it produced an electric shock, suggesting how human behaviour could also be learned through consequences. • Thorndike (1911) provides support for positive reinforcement; however cats were used in many of the experiments which may limit the generalisability of the results to explaining human behaviour. • Mestel and Concar (1994) found a token economy programme to be successful in treating the human behaviour of cocaine addicts who were given shopping vouchers as rewards for staying "clean". • Research into hormones as an explanation of human aggressive behaviour is reductionist and does not consider nurture factors influencing human behaviour. • Dabbs and Hargrove (1997) found a positive correlation between the hormone testosterone and the degree of violent crime in 87 female prisoners,	(12)
	suggesting that the hormone may be involved in explaining human aggressive behaviour. • Many studies provide incomplete explanations of human behaviour, for example Lidberg et al. (1985) show that the influence of hormones on the body's responses is correlational so we cannot be certain which hormone if any is responsible for human aggressive behaviour. Look for other reasonable marking points.	

Level	Mark	Descriptor
AO1 (6 marks), AO3 (6 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs judgement/conclusion in their answer.		
	0	No rewardable material.
Level 1	1-3 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A judgement/decision may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	4-6 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material leading to a judgement/decision being presented. Candidates will demonstrate a grasp of competing arguments but response may be imbalanced. (AO3)
Level 3	7-9 Marks	Demonstrates accurate knowledge and understanding. (AO1) Displays a mostly developed and logical argument, containing mostly coherent chains of reasoning. Demonstrates an awareness of competing arguments, presenting a judgement/decision which may be imbalanced. (AO3)
Level 4	10-12 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical argument, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments and presents a balanced response, leading to an effective nuanced and balanced judgement/decision. (AO3)

2(a)	AO2 (2 marks) One mark for a partially correct operationalised null hypothesis. Two marks for a fully correct operationalised null hypothesis. For example: • There will be no relationship between temperature and aggression and any relationship will be due to chance. (1) • There will be no relationship between average temperature (in degrees Celsius) and the number of aggressive incidents. Any relationship will be due to chance. (2) Look for other reasonable marking points.	(2)
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Question Number	Answer	Mark
2(b)	AO2 (3 marks) One mark for correct/appropriate title (see graph below for suitable example) One mark for correct/appropriate labelling of axes (see graph below for suitable example) One mark for correct plots of data points (see graph below for correct plotting) <u>Scattergraph to show the relationship between average temperature and number of aggressive incidents</u> Average temperature (degrees Celsius)	(3)

Question Number	Answer	Mark
2(c)	AO2 (1 mark) One mark for correctly stating the relationship shown. For example: There is no relationship between average temperature and number of aggressive incidents. (1) Look for other reasonable marking points.	(1)

Question Number	Answer	Mark																																																																		
2(d)	AO2 (4 marks) <table><tr><th>Average temperature (degrees Celsius)</th><th>Rank 1</th><th>No. of aggressive incidents</th><th>Rank 2</th><th>D</th><th>d²</th></tr><tr><td>20</td><td>9</td><td>11</td><td>4</td><td>5</td><td>25</td></tr><tr><td>13</td><td>7</td><td>20</td><td>9</td><td>-2</td><td>4</td></tr><tr><td>10</td><td>5</td><td>4</td><td>1</td><td>4</td><td>16</td></tr><tr><td>7</td><td>1.5</td><td>18</td><td>7.5</td><td>6</td><td>36</td></tr><tr><td>7</td><td>1.5</td><td>11</td><td>4</td><td>-2.5</td><td>6.25</td></tr><tr><td>8</td><td>3</td><td>11</td><td>4</td><td>-1</td><td>1</td></tr><tr><td>9</td><td>4</td><td>14</td><td>6</td><td>-2</td><td>4</td></tr><tr><td>11</td><td>6</td><td>6</td><td>2</td><td>4</td><td>16</td></tr><tr><td>14</td><td>8</td><td>18</td><td>7.5</td><td>0.5</td><td>0.25</td></tr><tr><td colspan="4"></td><td>Total:</td><td>108.5</td></tr></table> One mark for accurate completion of column d (minus signs can be present or not for the mark). One mark for accurate completion of d². One mark for substituting into equation $1 - \frac{6 \times 108.5}{9 (81 - 1)}$ One mark for 0.096 (to 3 d.p.) / 0.10 (to 2 d.p.) Look for other reasonable marking points.	Average temperature (degrees Celsius)	Rank 1	No. of aggressive incidents	Rank 2	D	d²	20	9	11	4	5	25	13	7	20	9	-2	4	10	5	4	1	4	16	7	1.5	18	7.5	6	36	7	1.5	11	4	-2.5	6.25	8	3	11	4	-1	1	9	4	14	6	-2	4	11	6	6	2	4	16	14	8	18	7.5	0.5	0.25					Total:	108.5	(4)
Average temperature (degrees Celsius)	Rank 1	No. of aggressive incidents	Rank 2	D	d²																																																															
20	9	11	4	5	25																																																															
13	7	20	9	-2	4																																																															
10	5	4	1	4	16																																																															
7	1.5	18	7.5	6	36																																																															
7	1.5	11	4	-2.5	6.25																																																															
8	3	11	4	-1	1																																																															
9	4	14	6	-2	4																																																															
11	6	6	2	4	16																																																															
14	8	18	7.5	0.5	0.25																																																															
				Total:	108.5																																																															

Question Number	Answer	Mark
2(e)	AO1 (2 marks), AO3 (2 marks) One mark for each strength/weakness identified (AO1). One mark for justification of that strength/weakness (AO3). For example: Strength - Correlations may show a relationship between two variables that was not expected (1). This can then lead to further research into aggression and possible experimentation of aggressive responses to different stimuli (1). Weakness - The correlation method lacks cause and effect (1) because the researcher cannot be confident that environmental temperature actually led to a direct change in the level of aggression (1). Look for other reasonable marking points.	(4)



2	A02 (4 marks) Up to four marks for a description of evolution and natural selection to explain aggressive behaviour in relation to Max's presentation. For example: Max could include in his presentation Darwin's suggestion that only the fittest genes, like those involving aggression, were passed on to aid human survival (1). Max could then explain that in prehistoric times these inherited aggressive behavioural traits could be used in hunting, to provide food for others (1). Max could include a short video clip from a popular television programme showing two men fighting for the attention of a woman, which would aid their survival (1). Max could include a research study such as Dobash and Dobash (1979) who found that violence against woman often came about through jealousy, which is an aggressive trait that could lead to gene survival (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(4)
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Question Number	Answer	Mark
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9(a)	AO2 (2 marks) Up to two marks for a description of evolution and natural selection in relation to the scenario. For example: • Evolution and natural selection would suggest that David got into the fight because his aggression is a characteristic to aid his survival (1) as David needed to protect his girlfriend to reproduce with her and pass on his genes (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)
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Question Number	Answer	Mark
9(b)	AO2 (1 mark), AO3 (1 mark) One mark for identification of a weakness in relation to the scenario (AO2). One mark for justification of the weakness (AO3). For example: • There are alternative explanations for David's reaction to the man talking to his girlfriend that suggests his behaviour was learned and not biological (1). He may have learned his aggressive behaviour towards the man from observing and imitating other people fighting rather than an instinctive survival characteristic (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
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7 (a)	AO2 (4 marks)						(4)
	Personality score	Rank 1	Attitude to recreational drug use score	Rank 2	d	d ²	
	2	1	3	1.5	-0.5	0.25	
	8	6	9	7	-1	1	
	5	3	6	4	-1	1	
	6	4.5	7	6	-1.5	2.25	
	9	7.5	10	8	-0.5	0.25	
	3	2	3	1.5	0.5	0.25	
	6	4.5	6	4	0.5	0.25	
	9	7.5	6	4	3.5	12.25	
	Total:						17.5
	One mark for working out column d						
	One mark for calculating column d²						
	One mark for substituting into equation $1 - \frac{6 \times 17.5}{8 \times (64 - 1)}$						
	One mark for calculating Spearman's rank correlation coefficient 0.792						
	Look for other reasonable marking points.						

Question Number	Answer	Mark
7 (b)	AO2 (2 marks) Up to two marks for determining the lowest level of significance that could be used For example: To be significant $P=0.025$ is the lowest level of significance Oscar can use for a one-tailed test (where $N=8$) (1) as Oscar's calculated value (0.792) will still exceed the critical value (0.738) at this level (1). Look for other reasonable marking points.	(2)

Question Number	Answer	Mark
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Question Number	Answer	Mark								
1(a)	AO1 (3 marks) Up to three marks for completing Table 1 with the name of the different parts of the personality. <table><tr><th>Definition</th><th>Part of the Personality</th></tr><tr><td>This part of the personality is rational and tries to balance the conflicting demands of other parts of the personality. It operates according to reality (the 'reality principle') and tries to satisfy pleasure (the 'pleasure principle') in a socially responsible way.</td><td>Ego</td></tr><tr><td>This part of the personality tries to impose moral standards on the individual and includes the conscience and what a person should be like (the 'ego ideal'). It operates according to morality (the 'morality principle') and tries to impose right and wrong in relation to pleasure, including forbidden behaviour such as aggression.</td><td>Superego</td></tr><tr><td>This part of the personality focuses on pleasure and satisfying instinctual urges an individual may have. It operates according to pleasure (the 'pleasure principle') and does not understand logic, so it becomes frustrated, potentially leading to aggressive urges if denied pleasure.</td><td>Id</td></tr></table>	Definition	Part of the Personality	This part of the personality is rational and tries to balance the conflicting demands of other parts of the personality. It operates according to reality (the 'reality principle') and tries to satisfy pleasure (the 'pleasure principle') in a socially responsible way.	Ego	This part of the personality tries to impose moral standards on the individual and includes the conscience and what a person should be like (the 'ego ideal'). It operates according to morality (the 'morality principle') and tries to impose right and wrong in relation to pleasure, including forbidden behaviour such as aggression.	Superego	This part of the personality focuses on pleasure and satisfying instinctual urges an individual may have. It operates according to pleasure (the 'pleasure principle') and does not understand logic, so it becomes frustrated, potentially leading to aggressive urges if denied pleasure.	Id	(3)
Definition	Part of the Personality									
This part of the personality is rational and tries to balance the conflicting demands of other parts of the personality. It operates according to reality (the 'reality principle') and tries to satisfy pleasure (the 'pleasure principle') in a socially responsible way.	Ego									
This part of the personality tries to impose moral standards on the individual and includes the conscience and what a person should be like (the 'ego ideal'). It operates according to morality (the 'morality principle') and tries to impose right and wrong in relation to pleasure, including forbidden behaviour such as aggression.	Superego									
This part of the personality focuses on pleasure and satisfying instinctual urges an individual may have. It operates according to pleasure (the 'pleasure principle') and does not understand logic, so it becomes frustrated, potentially leading to aggressive urges if denied pleasure.	Id									

Question Number	Answer	Mark
1(b)	AO1 (2 marks), AO3 (2 marks) One mark for identification of each weakness (AO1). One mark for justification of each weakness (AO3). For example: - Freud suggested that only early childhood experiences may shape aggressive human behaviour in adulthood which is reductionist (1) because it ignores alternative explanations such as hormones like testosterone being influential in someone's aggressive behaviour (1). - Freud's concepts of the id, ego and superego underpinning his theory of aggression cannot be seen to be measured objectively (1) therefore his explanation of aggressive behaviour can be viewed as unscientific because these concepts are unfalsifiable (1). Look for other reasonable marking points.	(4)

3.	AO1 (4 marks), AO3 (4 marks) AO1 • Definition of evolution (e.g. evolution is the process of change in all forms of life over generations) • Genetic link to aggression (e.g. genetic changes lead to differences in observable and unobservable traits such as aggressive behaviour) • 'Survival of the fittest' linked to aggression (e.g. aggression has been passed on by those who have been successful in reproduction and survival) • Epigenetic principle applied to aggression (e.g. a combination between the genotype and environment has led to aggression being observable in the phenotype) • Aggression as an evolved solution to adaptive problems (e.g. prevention of infidelity, access otherwise inaccessible partners, social status) AO3 • Supporting research for genetic link to aggression, e.g. ◦ Chester et al. (2015): Low functioning MAOA genotype ('warrior gene') was linked to greater aggression ◦ Mertins et al. (2011): High functioning MAOA genotype was associated with greater prosocial behaviour • Supporting research for aggression as an evolved solution to adaptive problems, e.g. ◦ Daly, Wilson, Weghorst (1982): Domestic abuse to dissuade romantic partners from infidelity; ◦ Thornhill & Palmer (2000): Hypothesise humans have evolved adaptations to rape to obtain otherwise inaccessible partners although evidence is limited (e.g. Buss, 2003); ◦ Hill & Hurtado (1996): Aggression leads to increase in social status in the Yanomamö tribe in Venezuela • Alternative theories, e.g. ◦ Learning theory as an alternative - aggressive behaviour may be observed and imitated from same-sex role models; ◦ Instinct theory as an alternative - aggressive energy is an instinctive drive that builds up until it explodes Look for other reasonable marking points.	(8)
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Level	Mark	Descriptor
Candidates must demonstrate an equal emphasis between knowledge and understanding vs assessment/conclusion in their answer.		
	0	No rewardable material.
Level 1	1–2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Generic assertions may be presented. Limited attempt to address the question. (AO3)
Level 2	3–4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a generic or superficial assessment being presented. (AO3)
Level 3	5–6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning leading to an assessment being presented which considers a range of factors. Candidates will demonstrate understanding of competing arguments/factors but unlikely to grasp their significance. The assessment leads to a judgement but this may be imbalanced. (AO3)
Level 4	7–8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical assessment, containing logical chains of reasoning throughout. Demonstrates an awareness of the significance of competing arguments/factors leading to a balanced judgement being presented. (AO3)

SECTION B

Question Number	Answer	Mark
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1(a)	AO1 (4 marks) One mark for each point about the procedure of a twin study. For example: Gottesman and Shields (1966) Case histories for twins were collected for twins born between 1893 and 1945 from the Maudsley and Bethlem Royal Joint Hospital (1). Zygosity was determined by a combination of blood tests, finger-print analysis and resemblance in appearance (1). Tape-recorded 30 minute samples from semi-structured interviews were conducted to assess signs of schizophrenia, attitudes toward self, parents and twin, and ego strength (1). Concordance rates were assessed for MZ and DZ twins of Grade 1 (both twins schizophrenic), or Grade 2 or 3 where only one twin had schizophrenia (1). Look for other reasonable marking points.	(4)
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Question Number	Answer	Mark
1(b)	AO1 (2 marks), AO3 (2 marks) One mark for each strength/weakness identified (AO1). One mark for justification of that strength/weakness (AO3). For example: Gottesman and Shields (1966) - A strength of the Gottesman and Shields study was that it assessed zygosity using primary data (1). Using finger print analysis and blood samples are a valid way of assessing zygosity of twins (1). - One weakness is that the study excluded participants from Ghana, Jamaica, and Barbados (1). This means the sample lacks generalisability as the participants would not be representative of non-Western cultures (1). Look for other reasonable marking points.	(4)

10	AO1 (7 marks), AO3 (7 marks) For example: Gottesman and Shields (1966) AO1 • Twins were assessed for their zygosity (e.g. blood grouping). • There was a higher concordance rate for MZ twins for schizophrenia compared to DZ twins. • To determine the presence of a mental disorder qualitative and quantitative methods were used (e.g. case histories) • Twins were sampled using opportunity sampling from twins seen by the Maudsley and Bethlem Royal Joint hospital. AO3 • While twins share genetic information it is difficult to separate environmental factors so studies cannot establish genetics as a causal factor for behaviour. • The predisposition of schizophrenia was not 100% twin studies are not able provide conclusive evidence of genetic influences on human behaviour. • If the same measures of schizophrenia (e.g. MMPI) are used then a twin study could be easily replicated. • Twin studies have small sample sizes as twins are not common, so findings may not be representative of a wider population. Look for other reasonable marking points.	(8)
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Level	Mark	Descriptor
AO1 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs evaluation / conclusion in their answer.		
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

SECTION D LEARNING THEORIES

Question Number	Answer	Mark
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11	AO1 (4 marks), AO3 (4 marks) AO1 • Freud stated that the ego employs a range of defence mechanisms to deal with conflict and problems in life. • In Freud's view aggression originates from the redirection of self-destructive death instincts away from the self towards others. • Catharsis is a way of venting aggression, it involves releasing internal emotions such as anger or frustration. • Displacement is when a person uses an alternative object to satisfy an impulse, such as a punch bag to displace aggression. AO3 • Components of personality such as the ego are difficult to measure as they do not exist as a specific region of the brain so Freud's ideas lack scientific credibility. • Biological psychology provides evidence that aggression is not a death instinct but has biological roots, for example Dabbs et al. (1995) found high levels of testosterone in 692 male prisoners. • Verona and Sullivan (2008) found that people reacting with aggression when frustrated had a reduced heart rate compared to those not reacting aggressively, providing partial support for catharsis theory. • Bresin et al. (2013) found that adaptive forms of aggression could create a calming effect and empower participants with the skills to regulate anger in the future, so psychodynamic explanations have practical application. Look for other reasonable marking points.	(8)
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Level	Mark	Descriptor
AO1 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs evaluation/conclusion in their answer		
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

Section D - Learning Theories

Question Number	Answer	Mark
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Question Number	Indicative Content	Mark
3	A01 (4 marks), A03 (4 marks) A01 • Darwin's evolutionary theory suggests that humans have evolved many traits that aid their survival. • Natural selection is the process by which a species changes and develops over time in response to its environment. • Evolutionary theory suggests that men have evolved to be more aggressive towards other men in order to protect and/or attract a female mate. • In puberty hormones like testosterone influence gender development in determining male and female characteristics. A03 • Evolutionary theory has been accused of being reductionist and not considering some situational factors that may influence human development such as social learning theory. • Explanations for human development were explained by Darwin through his observations on non-human species such as his finches in which they developed over time to fit in with their habitat to aid their survival which lacks generalisability to humans. • Buss (2005) found that when men give in to women (debasement) and threaten any males around them it aids their survival of the gene pool and ensures their human development. • Pubertal blocking medication such as gonadotropin-releasing hormone (GnRH) analogues can be used as a therapy with transgender patients to suppress the body's release of sex hormones therefore disrupting the natural evolutionary process during puberty. Look for other reasonable marking points.	(8)

Level	Mark	Descriptor
AO1 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs evaluation/conclusion in their answer.		
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning, leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

SECTION B

Question Number	Answer	Mark



Question Number	Indicative Content	Mark
3	AO1 (4 marks), AO3 (4 marks) For example: Gottesman and Shields (1966) AO1 • 57 sets of twins seen at the Maudsley and Bethlem Royal Joint hospital between 1948-1964 made up the final sample. • There was a higher concordance rate for MZ twins for schizophrenia compared to DZ twins suggesting there may be a genetic link. • The twins zygosity was determined by using blood testing, fingerprint testing and physical resemblance. • A range of methods were used such as hospital records, case histories and semi-structured interviews to establish the mental health of the twins. AO3 • Twin studies such as Gottesman and Shields' (1966) study usually have small sample sizes as twins are not common in the population therefore the findings about schizophrenia may not have been representative of a wider population. • The results can be applied to families with a likelihood of a predisposition to developing schizophrenia and take medical advice to avoid any typical triggers such as drug abuse, high stress professions. • DNA testing is the most accurate way of determining zygosity which was not available in 1966 therefore Gottesman and Shields (1966) may have placed twin participants into the wrong category undermining the reliability of the results. • By using multiple methods to gather data on the mental health of the twins such as the MMPI (Minnesota Multiphasic Personality Inventory) reliability was established as comparisons could be made. Look for other reasonable marking points.	(8)

Level	Mark	Descriptor
AO1 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs evaluation/conclusion in their answer.		
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning, leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

SECTION B

Question	Answer	Mark
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9	AO2 (2 marks) Up to two marks for a description of catharsis in relation to the scenario. For example: The kickboxing is a more appropriate way for Jude to use aggression to regulate her worry and anger about the manager shouting at her and being nasty than attacking the manager (1) and may have helped Jude release her emotions about the manager's behaviour, so her energy is not spent on repressing her anger and she is calmer (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)
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Question Number	Answer	Mark
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8	AO1 (2 marks), AO3 (2 marks) One mark for identification of a strength and a weakness (AO1) One mark for justification of each strength and weakness (AO3) e.g. Heston (1966) For example: Strength - The 47 participants born to schizophrenic mothers were carefully matched with a control group on sex, type of eventual placement, and length of time in child care (1) which meant that Heston (1966) could be more confident that having a schizophrenic mother was the only difference affecting the participants and controls (1). Weakness - Heston (1966) only found a 10.6% concordance rate which does not provide cause and effect conclusions for genetic predisposition and schizophrenia rates for adopted children (1) as there are other variables, such as drug use, that could have influenced the mental health of the children who were adopted away from their birth family (1). Look for other reasonable marking points.	(4)
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Question Number	Indicative Content	Mark
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11(a)

AO2 (4 marks)

(4)

Hours spent on social media	Rank 1	Hours of sleep per night	Rank 2	d	d ²
4	2.5	9	5.5	-3	9
6	4	8	4	0	0
3	1	9	5.5	-4.5	20.25
8	6	7	2.5	3.5	12.25
7	5	6	1	4	16
9	7	7	2.5	4.5	20.25
4	2.5	10	7	-4.5	20.25
				Total:	98

One mark for calculating column d

One mark for calculating column d²

One mark for substituting into the equation

$$1 - \frac{6 \times 98}{7 \times (49 - 1)}$$

One mark for calculating Spearman's rank correlation coefficient **-0.750**

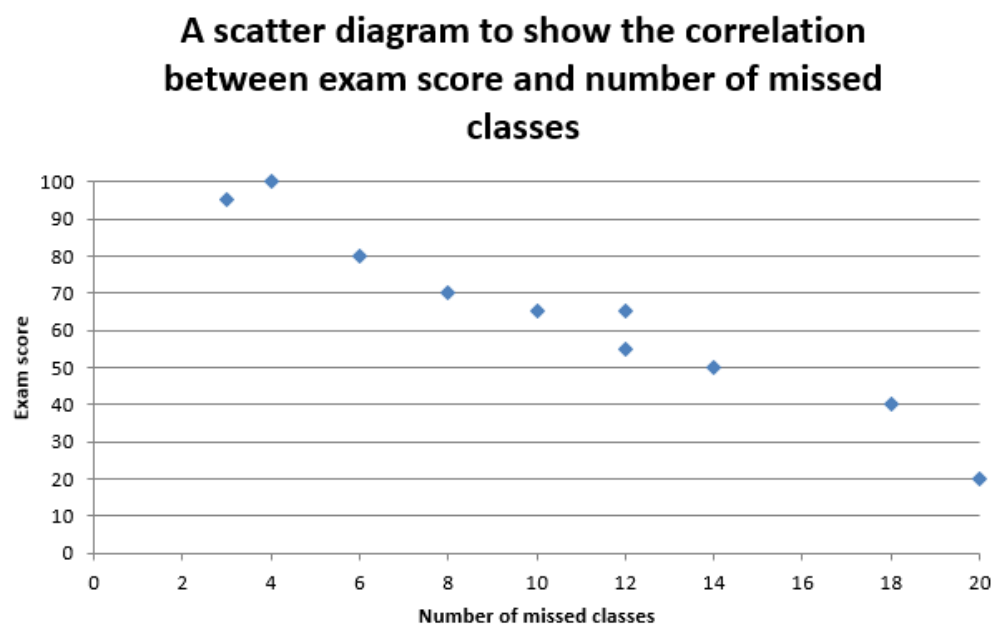
Look for other reasonable marking points.

Question Number	Answer	Mark
11(b)	AO2 (1 mark) One mark for a correct determination of significance. For example: The calculated value (0.750) is less than the critical value (0.786), so the results are not significant (1). Look for other reasonable marking points.	(1)

Question Number	Indicative Content	Mark
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8(a)**SC4 (3 marks)****(3)**

One mark for correct/appropriate title
 One mark for correct/appropriate labelling of axes
 One mark for correct plots of data points



Look for other reasonable marking points.

Question	Answer	Mark
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Number		
8(b)	AO2 (1 mark) One mark for correctly identifying the correlation they have drawn For example: Negative / Negative correlation (1) Look for other reasonable marking points.	(1)

Question Number	Answer	Mark
8(c)	AO2 (2 marks) One mark for each reason stating why Spearman's rho would be an appropriate statistical test For example: - They are looking for a relationship (1). - They have ordinal data (1). Look for other reasonable marking points.	(2)

Question Number	Answer	Mark

Question Number	Answer	Mark																																																						
9(a)	AO2 (4 marks) <table><thead><tr><th>Age</th><th>Rank 1</th><th>Number of hours sleep</th><th>Rank 2</th><th>d</th><th>d²</th></tr></thead><tbody><tr><td>17</td><td>2.5</td><td>10</td><td>6</td><td>-3.5</td><td>12.25</td></tr><tr><td>17</td><td>2.5</td><td>11</td><td>7</td><td>-4.5</td><td>20.25</td></tr><tr><td>20</td><td>4</td><td>6</td><td>2.5</td><td>1.5</td><td>2.25</td></tr><tr><td>24</td><td>6</td><td>7</td><td>4</td><td>2</td><td>4</td></tr><tr><td>21</td><td>5</td><td>4</td><td>1</td><td>4</td><td>16</td></tr><tr><td>16</td><td>1</td><td>9</td><td>5</td><td>-4</td><td>16</td></tr><tr><td>40</td><td>7</td><td>6</td><td>2.5</td><td>4.5</td><td>20.25</td></tr><tr><td colspan="5">Total:</td><td>91</td></tr></tbody></table> One mark for calculating column d One mark for calculating column d² One mark for substituting into equation $1 - \frac{6 \times 91}{7 \times (49 - 1)}$ One mark for calculating Spearman's rank correlation coefficient -0.625	Age	Rank 1	Number of hours sleep	Rank 2	d	d ²	17	2.5	10	6	-3.5	12.25	17	2.5	11	7	-4.5	20.25	20	4	6	2.5	1.5	2.25	24	6	7	4	2	4	21	5	4	1	4	16	16	1	9	5	-4	16	40	7	6	2.5	4.5	20.25	Total:					91	(4)
	Age	Rank 1	Number of hours sleep	Rank 2	d	d ²																																																		
	17	2.5	10	6	-3.5	12.25																																																		
	17	2.5	11	7	-4.5	20.25																																																		
	20	4	6	2.5	1.5	2.25																																																		
	24	6	7	4	2	4																																																		
	21	5	4	1	4	16																																																		
	16	1	9	5	-4	16																																																		
	40	7	6	2.5	4.5	20.25																																																		
	Total:					91																																																		

Question Number	Answer	Mark
9 (b)	AO2 (1 mark), AO3 (1 mark) One mark for identifying the correct critical value (AO2) One mark for accurate judgement of relationship (AO3) For example: The critical value is (0.786) at 0.05 for a two-tailed test when n=7 which more than the calculated value (of 0.625) (1) so there is no significant relationship between age and number of hours of sleep and the null hypothesis should be accepted (1). Look for other reasonable marking points. Answers must relate to the scenario.	(2)

1(a)	A01 (2 marks) Up to two marks for stating what is meant by a positive and a negative correlation. For example: • Positive correlations show that as one variable increases the other variable increases (1) • Negative correlations show that as one variable increases the other variable decreases (1). Look for other reasonable marking points.	(2)
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Question Number	Answer	Mark
1(b)	A01 (2 marks), A03 (2 marks) One mark for each strength/weakness identified (A01). One mark for a justification of each strength/weakness (A03). For example: Strength • The correlation method allows researchers to investigate naturally occurring variables (1) that may be unethical or impractical to test experimentally in a laboratory (1). Weakness • The correlation method cannot establish a cause and effect relationship between variables (1), as there may be a lack of control over the other variables that may influence the outcome of the results being measured (1). Look for other reasonable marking points.	(4)

3(a)	AO2 (1 mark) One mark for correct calculation of percentage. 13.3% Reject all other answers.	(1)
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Question Number	Answer	Mark
3(b)	AO2 (1 mark) One mark for the correct calculation of the mean. 12.5 Reject all other answers.	(1)

Question Number	Answer	Mark
3(c)	AO2 (1 mark), AO3 (1 mark) One mark for identification of strength (AO2). One mark for justification of strength (AO3). For example: Strength Isaac's opportunity sample is less time consuming as he used participants who were around when the investigation on alcohol and ability to complete a task were completed (1) therefore Isaac did not have to spend time looking for his participants such as in sampling techniques like stratified (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
3(d)	AO2 (1 mark), AO3 (1 mark) One mark for identification of an improvement (AO2). One mark for justification of the improvement (AO3). For example: Isaac could improve his investigation by using a baseline measure completed before drinking any alcohol (1) as this would allow him to compare the other conditions of alcohol consumption to see if there is a difference in the results (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark

9(a)	AO2 (2 marks) Up to two marks for a description of using a volunteer sampling technique in relation to the scenario. For example: Mandy could place adverts around the university campus asking students to put their name forward to take part in her study on sleep and time outdoors (1), she would provide details for the students to sign up to the investigation such as a QR code link to the survey (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)
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Question Number	Answer	Mark
9(b)	AO2 (2 marks) One mark for stating each reason why Mandy would use a Spearman's rho for her investigation (maximum two marks). For example: - Mandy is looking for a correlation / relationship between quality of sleep and time outdoors (1). - Mandy is using at least ordinal level data for her measurement of sleep and time outdoors (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
9(c)	AO2 (1 mark), AO3 (1 mark) One mark for identification of an improvement in relation to the scenario (AO2) One mark for justification of the improvement (AO3) For example: Mandy could recruit a more representative sample of adults from a range of demographic backgrounds who may have more or less available time than students to spend outdoors (1), this would increase the generalisability of her findings about any relationship between sleep and being outdoors to a wider population than just students at university (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Indicative Content	Mark
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4	AO1 (4 marks), AO3 (4 marks) For example Heston (1966): AO1 • Heston's (1966) adoption study matched 58 participants with a control group on sex, type of eventual placement and length of time in care. • Data on each participant's psychiatric status was gathered via psychiatric hospital records, school records and police records. • Three psychiatrists, including Heston evaluated the data collected on each participant in order to confirm a diagnosis of schizophrenia. • The psychiatric status of each participant's father's was not checked but none were known to be hospital patients. AO3 • Having a matched design minimised participant variables that could have affected the internal validity of the results. • Secondary data such as the hospital records, were collected which could be more subjective than primary data. • Heston established inter-rater reliability when analysing patient's records as he used multiple data sources in his study. • The psychiatric status of each participant's father was not checked which may have been a contributing factor to schizophrenia. Look for other reasonable marking points.	(8)
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Level	Mark	Descriptor
AO1 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs evaluation/conclusion in their answer.		
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning, leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

SECTION B

Question Number	Answer	Mark
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Question Number	Indicative content	Mark
10	AO1 (4 marks), AO2 (4 marks) For example: Key question: How effective is drug therapy for treating addiction? AO1 - Addiction to drugs costs society in terms of crime and NHS costs so needs to be treated. - Methadone is a replacement drug that reduces cravings for heroin so could stop addicts offending for access to heroin. - Methadone reduction programmes can discourage abstinence from the heroin so cost society more in economic and social costs. - Heroin changes the brain and body so any treatment needs to also have a biological basis. AO2 - Repeated exposure to recreational drugs can lead to tolerance and withdrawal symptoms which continues drug use and can lead to social and economic costs so needs to be treated. - Methadone mimics the action of heroin at the synaptic level through dopamine and endorphins. - Reduction of the methadone doses means the user will experience withdrawal symptoms such as cramps and vomiting so can lead to relapse. - Brain scanning methods such as PET could investigate the activity of methadone treatment on the brain to show if it is effective. Look for other reasonable marking points.	(8)

Level	Mark	Descriptor
AO1 (4 marks), AO2 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs application in their answer.		
	0	No rewardable material
Level 1	1–2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Provides little or no reference to relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 2	3–4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Discussion is partially developed, but is imbalanced or superficial occasionally supported through the application of relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 3	5–6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning. Candidates will demonstrate a grasp of competing arguments but discussion may be imbalanced or contain superficial material supported by applying relevant evidence from the context (scientific ideas, processes, techniques and procedures) (AO2)
Level 4	7–8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical balanced discussion, containing logical chains of reasoning. Demonstrates a thorough awareness of competing arguments supported throughout by sustained application of relevant evidence from the context (scientific ideas, processes, techniques or procedures). (AO2)

SECTION D LEARNING THEORIES



Question Number	Indicative content	Mark
4	AO1 (4 marks), AO2 (4 marks) For example: Key Question: What are the implications for society if aggression is found to be caused by nature and not nurture? AO1 • Nature could include inherited genetic traits which the individual is born with and could influence their behaviour. • The Office for National Statistics reported in 2018 a 3% increase in murders which shows violent crime is increasing in society. • A Texas marine called Charles Whitman (1966) lost self-control resulting in his killing spree from which he was implicated in the deaths of over 14 people including his wife and mother. • In 2014 Luis Suarez in Brazil bit an opposing player for the third time in his football career. AO2 • A version of the inherited MAOA gene may lead some people to react to provocation by showing aggression, a part of their nature which they are unable to control so it is not their fault. • Research into brain function of murders (e.g. Raine et al., 1997) suggests that aggressive behaviour is not just caused by a single brain region and that individuals may be predisposed to violence when triggered by nurture factors. • When stimulation occurs in or around the amygdala aggressive behaviour may happen suggesting damage to Charles Whitman's amygdala may have influenced his aggressive behaviour which was a factor out of his control. • Operant conditioning suggests that rewarding aggressive behaviour through an increased media profile for biting other players might be an important nurture factor. Look for other reasonable marking points.	(8)

Level	Mark	Descriptor
AO1 (4 marks), AO2 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs application in their answer.		
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Provides little or no reference to relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Discussion is partially developed but is imbalanced or superficial occasionally supported through the application of relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning. Candidates will demonstrate a grasp of competing arguments, but discussion may be imbalanced or contain superficial material supported by applying relevant evidence from the context (scientific ideas, processes, techniques and procedures) (AO2)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical balanced discussion, containing logical chains of reasoning. Demonstrates a thorough awareness of competing arguments supported throughout by sustained application of relevant evidence from the context (scientific ideas, processes, techniques or procedures). (AO2)

10

AO1 (4 marks), AO3 (4 marks)

(8)

For example;**Heston (1966)****AO1**

- The 58 participants were born between 1915 – 1945 to schizophrenic mothers in an American psychiatric hospital, put up for adoption by the mother, the father's psychiatric status was not checked but none were known to be hospital patients.
- The researchers checked that the mother had a diagnosis of schizophrenia, evidence of behaviour consistent with schizophrenia, no diseases and that the child and mother were separated from birth.
- Two psychiatrists independently evaluated information for each participant blindly, a third evaluation was made by Heston, with a diagnosis of schizophrenia only given when all raters agreed, and the participant was also diagnosed by a psychiatric hospital.
- The rate of schizophrenia in those born to schizophrenic mothers was 10.6% compared with 0% in the matched control group who were not born to schizophrenic mothers.

AO3

- There is a lack of internal validity in the checking of hereditary schizophrenia as the fathers were not found and checked for mental health disorders or schizophrenia.
- The controls in place increased the reliability of the study as the mothers status was confirmed to ensure that the children being evaluated contained no anomalies.
- The independent rating and confirmations from psychiatric institutions reduces any potential researcher bias in the assessment of the participants psycho-social disability.
- The results do not give a causal factor in the inheritance of schizophrenia, with Heston (1966) reporting that half of the participants born to the schizophrenic mothers were successful adults.

Ketty et al (1968)**AO1**

- The 33 adoptees diagnosed with schizophrenia (including chronic, acute, and borderline types) were identified from a cohort of 5483 adopted individuals in Copenhagen, Denmark. Each was matched with a control adoptee with no psychiatric hospitalisation history.
- All adoptees were separated from their biological families early in life, with 19 of them separated within the first month of birth, and raised by unrelated adoptive parents, using Danish national registers (Adoption, Population, and Psychiatric registers), resulting in 463 identified relatives (biological and adoptive).
- Diagnoses of mental illness among relatives were made independently by four psychiatrists using anonymised and coded summaries, such as "B1" was used to label cases diagnosed with chronic undifferentiated schizophrenia,



	- Results showed that 8.7% of biological relatives of schizophrenic adoptees had schizophrenia-spectrum disorders (e.g. schizophrenia, borderline, or inadequate personality), compared to 1.9% in biological relatives of controls. - No significant differences were found in the adoptive families of the schizophrenic adoptees versus controls, indicating genetic influence rather than environmental transmission. AO3 - The study had only 33 index cases, and some had limited separation from biological families, this may increase the risk of confounding variables on the findings in finding a genetic vs environmental contrast. - The study benefited from Denmark's high-quality population and psychiatric records, ensuring accurate tracking of individuals and diagnoses across decades increasing validity. - Ensuring Psychiatric assessments were made independently and blindly, reduced the influence of researcher bias and improving the validity of the findings. - While the findings support a genetic link, they do not pinpoint specific genes or mechanisms, and do not rule out environmental contributions entirely (e.g. stress, trauma) increasing the lack of causal certainty. Look for other reasonable marking points.	
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Level	Mark	Descriptor
A01 (4 marks), A03 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs evaluation/conclusion in their answer		
	0	No rewardable material.
Level 1	1-2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	3-4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	5-6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	7-8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

Learning Theories

Question Number	Answer	Mark
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2(a)	AO2 (2 marks) One mark for a basic hypothesis. Two marks for an operationalised hypothesis. For example: • There will a relationship between stress and aggression. (1) • There will be a relationship between life stressors (out of 20) and levels of aggression (out of 20 on a stress questionnaire). (2) Look for other reasonable marking points. Answers must relate to their practical investigation. Generic answers score 0 marks.	(2)
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Question Number	Answer	Mark
2(b)	AO1 (1 mark), AO2 (1 mark) One mark for identification of an ethical consideration (AO1) One mark for application to biological practical investigation (AO2) For example: One ethical consideration was protection of participants (1). I avoided use of distressing life events such as death of a loved one (1). Look for other reasonable marking points. Answers must relate to their practical investigation. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
2(c)	AO2 (2 marks) Up to two marks for description of Spearman's rho outcome. For example: There was a positive correlation between life stressors and aggression (1). As the number of life stressors increased, the level of aggression also increased (1). Look for other reasonable marking points. Answers must relate to their practical investigation. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
2(d)	AO2 (2 marks), AO3 (2 marks) One mark for identification of each improvement (AO2). One mark for justification of each improvement (AO3). For example: • One improvement to my biological practical could be to complete a pilot study for my self-report questionnaire (1) which would eliminate any design flaws surrounding my questions on aggression and life stressors. (1) • Another improvement could be to increase the variety of people who answered the questionnaire on life stressors and aggression (1) which would increase the generalisability of the sample used so it was more representative of people with life stressors (1). Look for other reasonable marking points. Answers must relate to their practical investigation. Generic answers score 0 marks.	(4)

3(a)	AO2 (1 mark) One mark for stating the aim of their practical investigation in biological psychology. For example: I aimed to find out if there is an association between height and self-rated aggression. Look for other reasonable marking points. Answers must relate to their biological practical investigation. Generic answers score 0 marks.	(1)
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Question Number	Answer	Mark
3(b)	AO2 (2 marks) Up to two marks for a description of how they gathered their sample for their practical investigation in biological psychology. For example: I put an advert on my local gym notice board asking for adults to volunteer to take part in my investigation on height and self-rated aggression (1). On the advert the volunteers were asked to meet me in the gym coffee shop at 1am on Monday to complete a questionnaire and have their height measured (1). Look for other reasonable marking points. Answers must relate to their biological practical investigation. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
3 (c)	AO2 (3 marks) Up to three marks for description of the results of their practical investigation in biological psychology. For example: From my scatter graph I observed a positive correlation between my two variables of height and self-reported aggression (1). My Spearman's value was +0.735 which exceeded the critical value of 0.648 when $n=10$ so I rejected the null hypothesis (1). This meant that the taller in cm a person was, the more aggressive they rated themselves (1). Look for other reasonable marking points. Answers must relate to their biological practical investigation. Generic answers score 0 marks.	(3)

Question Number	Answer	Mark
3(d)	A02 (2 marks), A03 (2 marks) One mark for identification of each strength/weakness (A02). One mark for justification of each strength/weakness (A03). For example: Strength - One strength is that by getting the gym members to fill in the self-rating aggression questionnaire themselves validity would be increased (1), as they were more likely to write down realistic answers to the aggression questions than if they had to provide verbal answers to an interviewer as they may have been embarrassed (1). Weakness - One weakness of the measure of aggression was that it was self-rated which may have been biased (1) as the answers provided by the gym members may not have been realistic as they could have provided answers that did not reflect their true aggressive behaviour (1). Look for other reasonable marking points. Answers must relate to their biological practical investigation. Generic answers score 0 marks.	(4)

Question Number	Answer	Mark																																																
2(a)	AO2 (4 marks) <table><tr><th>Total number of cups of coffee drunk</th><th>Rank 1</th><th>Self-reported alertness score</th><th>Rank 2</th><th>d</th><th>d²</th></tr><tr><td>6</td><td>6</td><td>5</td><td>5.5</td><td>0.5</td><td>0.25</td></tr><tr><td>3</td><td>2.5</td><td>4</td><td>3</td><td>-0.5</td><td>0.25</td></tr><tr><td>5</td><td>5</td><td>5</td><td>5.5</td><td>-0.5</td><td>0.25</td></tr><tr><td>2</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>4</td><td>4</td><td>4</td><td>3</td><td>1</td><td>1</td></tr><tr><td>3</td><td>2.5</td><td>4</td><td>3</td><td>-0.5</td><td>0.25</td></tr><tr><td colspan="4"></td><td>Total:</td><td>2</td></tr></table> One mark for accurate completion of column d (minus signs can be present or not for the mark). One mark for accurate completion of d². One mark for substituting into equation $1 - \frac{6 \times 2}{6(36 - 1)}$ One mark for 0.943 (to 3 d.p.) / 0.94 (to 2 d.p.) Look for other reasonable marking points.	Total number of cups of coffee drunk	Rank 1	Self-reported alertness score	Rank 2	d	d ²	6	6	5	5.5	0.5	0.25	3	2.5	4	3	-0.5	0.25	5	5	5	5.5	-0.5	0.25	2	1	1	1	0	0	4	4	4	3	1	1	3	2.5	4	3	-0.5	0.25					Total:	2	(4)
Total number of cups of coffee drunk	Rank 1	Self-reported alertness score	Rank 2	d	d ²																																													
6	6	5	5.5	0.5	0.25																																													
3	2.5	4	3	-0.5	0.25																																													
5	5	5	5.5	-0.5	0.25																																													
2	1	1	1	0	0																																													
4	4	4	3	1	1																																													
3	2.5	4	3	-0.5	0.25																																													
				Total:	2																																													

Question Number	Answer	Mark
2(b)	A02 (1 mark), A03 (1 mark) One mark for identification of a strength of using random sampling in relation to the scenario (A02) One mark for justification of the strength (A03). For example: Phil's use of random sampling ensured that all the doctors had an equal chance of taking part in his investigation on alertness (1) therefore reducing sampling bias of only some doctors being able to take part compared to volunteer sampling where only those motivated to take part would do so (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
2(c)	A02 (2 marks), A03 (2 marks) Up to two marks for identification of why Phil gathered both quantitative and qualitative data in relation to the scenario (A02) Up to two marks for justification of using both qualitative and quantitative data (A03) For example: The quantitative data gathered by Phil on whether the doctors felt the coffee helped them maintain their alertness was objective (1) therefore reducing bias as to whether the number of cups of coffee correlated with alertness making the data more reliable (1). The qualitative data gathered through the post-interviews will provide reasons why the doctors felt the coffee helped them to maintain alertness (1) providing Phil with more valid findings to understand why the doctors felt the coffee helped them to maintain alertness during their shift (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(4)

Question Number	Answer	Mark
2(d)	AO2 (2 marks), AO3 (2 marks) One mark for identification of each improvement in relation to the scenario (AO2). One mark for justification of each improvement (AO3). For example: - Phil could have improved his investigation by using a baseline measure on current coffee levels at the start of the doctor's shift (1) as this would ensure that all doctors coffee consumption prior to their shift could be factored into final self-reported alertness level, making the results more valid (1). - Phil could have improved his investigation by increasing his sample to include other professions such as lawyers (1) therefore increasing the representativeness of the findings of Phil's investigation on the effects of coffee on alertness to other professions (1) Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(4)

Number		
2(a)	AO2 (2 marks) One mark for a partially operationalised hypothesis. Two marks for a fully operationalised hypothesis. For example: • The longer a child stays in a care home the more affectionate acts recorded (1). • The higher the number of months spent in a children's care home (1) the higher the number of affectionate acts recorded in the first week of adoption (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
2(b)	A02 (3 marks) One mark for correct/appropriate title (see graph below for suitable example) One mark for correct/appropriate labelling of axes (see graph below for suitable example) One mark for correct plots of data points (see graph below for correct plotting) Scattergraph to show the number of months spent in a children's home and the number of affectionate acts recorded in the first week by the care worker Number of months spent in a children's home Look for other reasonable marking points.	(3)

Question Number	Answer	Mark
2 (c)	A02 (1 mark) One mark for stating the type of correlation shown in the graph. For example: Positive correlation (1). Look for other reasonable marking points.	(1)

Question Number	Answer	Mark																																																
2(d)	AO2 (4 marks) <table><tr><th>Number of months spent in a children's care home</th><th>Rank 1</th><th>Number of affectionate acts recorded in a week</th><th>Rank 2</th><th>d</th><th>d²</th></tr><tr><td>10</td><td>2</td><td>5</td><td>2</td><td>0</td><td>0</td></tr><tr><td>14</td><td>4.5</td><td>7</td><td>3.5</td><td>1</td><td>1</td></tr><tr><td>16</td><td>6</td><td>9</td><td>5.5</td><td>0.5</td><td>0.25</td></tr><tr><td>8</td><td>1</td><td>3</td><td>1</td><td>0</td><td>0</td></tr><tr><td>14</td><td>4.5</td><td>9</td><td>5.5</td><td>-1</td><td>1</td></tr><tr><td>12</td><td>3</td><td>7</td><td>3.5</td><td>-0.5</td><td>0.25</td></tr><tr><td colspan="4"></td><td>Total:</td><td>2.5</td></tr></table> One mark for accurate completion of column d (minus signs can be present or not for the mark). One mark for accurate completion of d². One mark for substituting into equation. $1 - \frac{6 \times 2.5}{6 (36 - 1)}$ One mark for 0.929 (to 3 d.p.) / 0.93 (to 2 d.p.) Look for other reasonable marking points.	Number of months spent in a children's care home	Rank 1	Number of affectionate acts recorded in a week	Rank 2	d	d ²	10	2	5	2	0	0	14	4.5	7	3.5	1	1	16	6	9	5.5	0.5	0.25	8	1	3	1	0	0	14	4.5	9	5.5	-1	1	12	3	7	3.5	-0.5	0.25					Total:	2.5	(4)
Number of months spent in a children's care home	Rank 1	Number of affectionate acts recorded in a week	Rank 2	d	d ²																																													
10	2	5	2	0	0																																													
14	4.5	7	3.5	1	1																																													
16	6	9	5.5	0.5	0.25																																													
8	1	3	1	0	0																																													
14	4.5	9	5.5	-1	1																																													
12	3	7	3.5	-0.5	0.25																																													
				Total:	2.5																																													

Question Number	Answer	Mark
2(e)	AO2 (1 mark), AO3 (1 mark) One mark for identification of one weakness of using quantitative data (AO2). One mark for justification of the weakness (AO3). For example: One weakness of using quantitative data on affectionate acts recorded by the care worker is that it has low validity as the data only tells us how many affectionate acts the children had (1) but does not consider what the acts actually were therefore providing an unclear picture of the impact of time the children spent in a children's care home (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
2(f)	AO2 (1 mark), AO3 (1 mark) One mark for identification of an improvement to the sample gathered in relation to the scenario (AO2). One mark for justification of the improvement (AO3). For example: One improvement that Margaret could make to the sample in her study would be to increase generalisability through using case files of children from other social workers (1) this would ensure examples of children's affectionate acts from different children's care homes to Margaret's can be included making the results representative of all children's care homes (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark
2(a)	A02 (2 marks) Up to two marks for a description of how Amari could use a volunteer sampling technique to gather her sample. For example: Amari could put up a poster in her college common room asking for volunteers to complete her investigation into emotional wellbeing and the time of year (1). She would provide details for female students to sign up to the investigation such as a QR code link to the questionnaire (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(2)

Question Number	Answer	Mark																																																
2(b)	AO2 (4 marks) <table><thead><tr><th>Emotional wellbeing score in the middle of summer (1-10)</th><th>Rank 1</th><th>Emotional wellbeing score in the middle of winter (1-10)</th><th>Rank 2</th><th>d</th><th>d²</th></tr></thead><tbody><tr><td>3</td><td>2.5</td><td>7</td><td>4.5</td><td>-2</td><td>4</td></tr><tr><td>3</td><td>2.5</td><td>6</td><td>3</td><td>-0.5</td><td>0.25</td></tr><tr><td>5</td><td>5</td><td>7</td><td>4.5</td><td>0.5</td><td>0.25</td></tr><tr><td>6</td><td>6</td><td>8</td><td>6</td><td>0</td><td>0</td></tr><tr><td>4</td><td>4</td><td>5</td><td>2</td><td>2</td><td>4</td></tr><tr><td>2</td><td>1</td><td>4</td><td>1</td><td>0</td><td>0</td></tr><tr><td colspan="4"></td><td>Total:</td><td>8.5</td></tr></tbody></table> One mark for accurate completion of column d (minus signs can be present or not for the mark). One mark for accurate completion of d². One mark for substituting into equation. $1 - \frac{6 \times 8.5}{6 (36 - 1)}$ One mark for 0.8 (to 1 d.p.) Look for other reasonable marking points.	Emotional wellbeing score in the middle of summer (1-10)	Rank 1	Emotional wellbeing score in the middle of winter (1-10)	Rank 2	d	d ²	3	2.5	7	4.5	-2	4	3	2.5	6	3	-0.5	0.25	5	5	7	4.5	0.5	0.25	6	6	8	6	0	0	4	4	5	2	2	4	2	1	4	1	0	0					Total:	8.5	(4)
Emotional wellbeing score in the middle of summer (1-10)	Rank 1	Emotional wellbeing score in the middle of winter (1-10)	Rank 2	d	d ²																																													
3	2.5	7	4.5	-2	4																																													
3	2.5	6	3	-0.5	0.25																																													
5	5	7	4.5	0.5	0.25																																													
6	6	8	6	0	0																																													
4	4	5	2	2	4																																													
2	1	4	1	0	0																																													
				Total:	8.5																																													

Question Number	Answer	Mark
2(c)	A02 (2 marks), A03 (2 marks) One mark for identification of each strength in relation to the scenario (A02). One mark for justification of each strength (A03). For example: Strength one - One strength of Amari's investigation is that she used the same emotional wellbeing questionnaire with the same questions with all female participants (1) which would enable Amari to repeat her investigation measuring the relationship between the time of year and emotional wellbeing to test for reliability (1). Strength two - One strength of Amari's investigation is that she gathered quantitative data about emotional wellbeing from the self-report questionnaire which is practically easier to analyse than qualitative data (1) therefore allowing Amari to analyse the data more easily and quickly to see if the time of year did affect emotional wellbeing in her participants (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(4)

Question Number	Answer	Mark
2(d)	A02 (2 marks), A03 (2 marks) One mark for identification of each improvement in relation to the scenario (A02). One mark for justification of each improvement (A03). For example: Improvement one - Amari could have improved her investigation by diversifying her sample to include females from other colleges (1) therefore increasing the representativeness of her findings about the influence of time of year on emotion levels to her target population of females attending college (1). Improvement two - Amari could have improved her investigation by asking whether the participants' friends agree with the emotion ratings they reported (1) which would increase the objectivity of the overall findings as the emotion levels reported are less likely to be biased (1). Look for other reasonable marking points. Answers must relate to the scenario. Generic answers score 0 marks.	(4)