
PSYCHOLOGY

9990/21

Paper 2 Research Methods

May/June 2019

MARK SCHEME

Maximum Mark: 60

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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This document consists of **14** printed pages.



Cambridge Assessment
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Generic Marking Principles

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GENERIC MARKING PRINCIPLE 1:

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- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

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- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
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GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

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Question	Answer	Marks
1	From the study by Milgram (obedience):	
1(a)	Outline the sampling technique used in this study. 1 mark for naming volunteer/self selected sampling 1 mark for explaining how it was done by Milgram volunteer/self selected = 1 mark participants gained by asking through adverts offering money / adverts in newspapers / direct mail requests = 1 mark	2
1(b)	Suggest <u>one</u> advantage of using this sampling technique in this study. Both marks are for one advantage. At least one point must be linked to the study. participants are easy to find as they come to the researcher = 1st mark ('easier' is not sufficient – opportunity is easier) e.g. Milgram only had to wait for replies to the ad/request = 2nd mark participants are likely to be more willing/committed/less likely to drop out = 1st mark e.g. would have been prepared to do a study on punishment = 2nd mark	2

Question	Answer	Marks
2(a)	Explain what is meant by a 'covert observation'. 1 mark for 'hidden'/'unaware' 1 mark for detail (can be of 'observation' or of 'covert' e.g. how they are going to be hidden e.g. in disguise) observation is watching behaviour (and listening) and recording it = 1 mark covert is where the participants are unaware of the observer = 1 mark because they are physically hidden/ not present / not apparent = 1 mark e.g. by using one-way mirrors / cameras = 1 mark	2
2(b)	Suggest <u>one</u> disadvantage of <u>conducting</u> a covert observation. Both marks are for one disadvantage of conducting being covert may make it hard to see all behaviours = 1st mark e.g. restricted by moving around conspicuously/ by video camera angle = 2nd mark may make it hard to record behaviour at the time / need to remember record and write it down after = 1st because if you are spotted taking notes it would break your cover = 2nd mark Max 1 for any response about ethics as these are about the consequences not the conduct of a covert observation	2

Question	Answer	Marks
3	An experiment is testing the aim that smiling affects helpfulness. The procedure is to investigate whether people leaving a shop will hold a door open for people who are smiling.	
3(a)	Write an operationalised directional (one-tailed) hypothesis for this experiment. 1 mark for a one-tailed hypothesis 2 marks for an operationalised hypothesis Components: Smiling (IV1) not smiling (IV2) holding door/helping (DV) ‘more than’ (one tailed) People help more when they are smiled at = 1 mark People help more when they are smiled at but don’t when they are not = 2 marks. This has smiling (IV1) and not smiling (IV2) there is the DV (help more) and there is ‘helping more when smiled at’ so is one tailed. People are more helpful so hold doors open more often when they are smiled at = 2 marks [more helpful/hold doors (DV) when smiled at (IV1) but no IV2 so this can only be 1 mark] People are more helpful than when they are not smiled at = 1 mark. More helpful (in what way?) than when (with no detail) not smiled at? People are more helpful so hold doors open more often when they are smiled at than when they are not smiled at = 2 [2 marks. Has IV1, IV2, DV and tail (i.e. more) People help when they are smiled at = 0 marks (too vague) People leaving a shop will hold the door open for people who smile = 0 marks (too vague)	2
3(b)	Write a null hypothesis for this experiment. Has to have two levels of IV but DV does not have to be operationalised Any difference between how helpful people when they are smiled at or not is due to chance. = 1 mark There is no difference between helpful people when they are smiled at or not. = 1 mark No marks for statements that are not hypotheses, or are experimental/ alternative hypotheses.	1

Question	Answer	Marks
4	The study by Saavedra and Silverman (button phobia) raised ethical issues. Explain <u>two</u> ethical guidelines that are relevant to this study. } 1 mark for identifying an issues (whether resolved or not) } ×2 1 mark for describing the situation in the study the need for informed consent; this was obtained both from the boy and the parents; avoiding psychological harm ; he was distress by the desensitisation procedure; the researchers kept the sessions short/used a staged procedure to avoid too much distress; they used food which might encourage bad eating habits; maintaining confidentiality; we know the boy's ethnicity but few other details (so not identifiable); ensure privacy; the boy may have been asked questions he didn't want to answer (so not followed); boys' mother may have said things the boy didn't want other people to know; giving the right to withdraw; there were several adults in the room so he may have felt unable to leave;	4

Question	Answer	Marks
5	State <u>one</u> advantage of using the mean as a measure of central tendency. 1 mark for the advantage. the mean takes all the data points into account; it is more representative than the median/mode; the median/mode ignore the effect of outliers; 'it works out the average' = 0 marks (description not advantage)	1

Question	Answer	Marks
6	Define extraneous variables and uncontrolled variables, using any examples. Award 1 mark for each definition, up to a maximum of 2, for each type of variable. Award 1 mark for each example that is linked to one type of variable, up to a maximum of 2, for each type of variable. Examples can include examples from any studies or including imagined ones. extraneous variables are any variables that can affect the DV (other than the IV); and this effect can be random; e.g. if some participants in a study were hungry and worked faster to get home; which is less of a problem; or it can be systematic; and affect one level of the IV more than the other, resulting in a biased result/ error; e.g. if one condition was before lunch and all the participants were hungry so worked harder (and the other condition was after lunch so they were not hungry and worked more slowly); e.g. in Bandura's study the children's aggression was an extraneous variable (that was controlled); these are called confounding variables / ie they confound the results; these variables can be controlled (if they are identified); uncontrolled variables are variables that have not been identified as a problem; or have not been /cannot be successfully eliminated; so limit validity; because they can affect one level of the IV (more than the other); e.g. the weather; demand characteristics can cause uncontrolled variables; e.g. if it is obvious to one people in one level of the IV but not the other that they are in an experiment;	6

Question	Answer	Marks
7	Dan is looking for a correlation between the amount children play and how aggressive they are. He is not sure whether children who play more will be more aggressive or will be less aggressive.	
7(a)(i)	Suggest how ‘playing’ could be operationalised using a quantitative measure. 1 mark for a suggested play behaviour or definition with a quantification. How often they participated in a game with other children; How much time they spent playing with other children; The number of times they jumped rope/skipped; Skipping, running, football; Number of times they played = 0 Checklist of play behaviours = 0	1
7(a)(ii)	Suggest <u>one</u> problem with measuring ‘playing’. 1 mark for a suggested problem. Play fighting might be hard to tell from real fighting; Children may start to play but end up fighting so hard to break the stream of behaviour;	1
7(b)	Suggest how ‘aggression’ could be operationalised using a quantitative measure. 1 mark for a suggested fighting behaviour or definition with a quantification. How often they punched other children; How much time they spent fighting with other children; The number of times they pinched/bit another child; Behaviours like punching, kicking, pinching, fighting; (at least 2) Number of times they are aggressive = 0 Checklist of aggressive behaviours = 0	1
7(c)	Dan finds that children who play more are also more aggressive. Explain why Dan <u>cannot</u> conclude that playing causes aggression. 1 mark for identifying that it is because it is a correlation 1 mark for explanation. It’s a correlation so you don’t know which (if either of the two) variables are causal factors = 2 marks In a correlation a third factor might be the cause = 2 marks A correlation only allows you to say that two variables are related, not which one is making the other change = 2 marks	2

Question	Answer	Marks
8	Zho is investigating how quickly fish learn to respond to different coloured lights. She trains fish in two tanks to swim to the end of the tank for food in response to a light. She uses a red light with one tank and a green light with the other tank. She times how quickly the fish swim to the end of the tank.	
8(a)	Identify the dependent variable in this experiment. 1 mark for identification of the DV How quickly the fish learn to respond to the light / swim to the end of the tank / work out that they must swim to get food; How quickly the fish swims / time to end of tank;	1
8(b)	Identify the independent variable in this experiment. 1 mark for identification of the IV colour (of light) / red or green	1

Question	Answer	Marks
8(c)	Explain <u>two</u> ethical guidelines for working with animals. describe ethical guidelines as used in to animals – replacement – species and strain – numbers – procedures – pain and distress – housing – reward – deprivation and aversive stimuli – anaesthesia – euthanasia 1 mark for identification of ethical guideline ×2 1 mark for explanation ×2 species (and strain); Choose a species that will suffer the least; minimum number (of animals); only use as many animals as is necessary to achieve the aim / e.g. 6 (or any small number); pain and distress; causing discomfort, stress etc. should be avoided; housing; the caging/environment should be the sufficient in terms of size/protection/appropriate opportunities for social behaviour; reward/deprivation/aversive stimuli; coloured lights could be an aversive stimulus;	4
8(d)	Suggest how <u>one</u> ethical guideline for working with animals could be followed in Zho’s experiment. 1 mark for explanation linked to study <i>species (and strain)</i> Choose a fish species that it suited to living in a tank; <i>minimum number</i> only use as many fish as is really necessary; <i>pain and distress</i> e.g. she should make sure the fish get enough food; <i>housing</i> e.g. the tank should be big enough / the water should be the right temperature;	1

Question	Answer	Marks
8(e)	Zho is plotting a bar chart of her results. Label the x-axis and y-axis on the graph below. 1 mark: (mean) 'speed to swim' on y-axis 1 mark: units for y-axis (e.g. seconds/ minutes/ hours) 1 mark: 'colour of light' on x-axis 1 mark: 'red' and 'green' as categories on x-axis	3

Question	Answer	Marks
9	Ella is conducting a laboratory experiment to find out whether singing helps people to relax. She is using a repeated measures design and will use pulse rate to measure relaxation.	
9(a)	Identify a suitable control <u>condition</u> for Ella's experiment. 1 mark for control condition of 'no singing' people who don't sing = 1 mark a group who talk/whistle/hum instead of singing = 1 mark NB candidates may interpret this as 'listening to singing', accept this interpretation, in which case the appropriate control may be 'silence' or 'listening to music with no lyrics'	1
9(b)	Explain why a repeated measures design is the best experimental design for Ella's study. 1 mark for idea of individual differences 2nd mark for linking this to singing 3rd mark for detail e.g. in relation to the effect on relaxation people in an independent groups design might vary = 1st mark people are different = 1st mark it avoids the effects of individual differences = 1st mark they might differ in their normal pulse rate = 2nd mark this would be an uncontrolled variable = 3rd mark it would reduce the validity of the study = 3rd mark it could make it look as if there were differences in relaxation when really there were not = 3rd mark	3

Question	Answer	Marks
9(c)	Explain <u>one</u> disadvantage of a repeated measures design in Ella's study. Both marks are for one disadvantage. At least one point must be linked to the study. there could be an order effect / a practice effect = generic mark The participants will have to have their relaxation level measured twice = link mark the second time they will know how this is done so might be more relaxed anyway = link mark they are likely to work out the aim of the study/there is a bigger risk of demand characteristics (than with an independent measures design) = generic mark so might try to relax more the second time = link mark	2
9(d)	Ella considered using a field experiment but decided to use a laboratory experiment. Explain why it could have been better for Ella to conduct a <u>field</u> experiment. 1 mark for each reason for being better as a field experiment (max 3) 2nd and 3rd mark may be for detail (including relevant use of terms) At least one mark must link directly to the study More ecologically valid = 1st mark (generic) the participants would be less likely to guess the aim/ would not know they were in a study = 1st mark (generic) so their singing would be natural rather than forced = 2nd mark (link) there would be less risk of demand characteristics = 2nd mark (generic) so it would be more valid = 3rd mark (generic)	3

Question	Answer	Marks
10	Dr Bell is interested in how aware people are of the two factors involved in emotion according to the two-factor theory. He wants to know if people are aware of the influence of both physiological and cognitive changes on their emotions. He intends to use a structured interview to investigate this, based on people's recall of emotional events.	
10(a)	Describe how Dr Bell could conduct a structured interview to investigate whether people were aware of the influence of both physiological changes and cognitive changes on their emotions. Three major omissions for a structured interview study are: What: – content of questions asked (i.e. topics, examples) How: – the interview is structured (e.g. question order/ timing/ location/ interviewer's dress, tone) – style of questions asked (e.g. open / closed / Likert / rating) The minor omissions are: where – location of participants when being interviewed who – participants Indicative content for an interview study: What: content of questions asked (i.e. topics, examples) How: open/closed questions about emotions lie questions filler questions description of how closed questions will be scored description of how quantitative data from closed questions will be analysed description of how open questions will be interpreted sampling technique sample size ethical issues	10

Question	Answer	Marks				
10(a)	Other appropriate responses should also be credited. Mark according to the levels of response criteria below: <table><tr><td> Level 3 (8–10 marks) • Response is described in sufficient detail to be replicable. • Response may have a minor omission. • Use of psychological terminology is accurate and comprehensive. </td></tr><tr><td> Level 2 (5–7 marks) • Response is in some detail. • Response has minor omission(s). • Use of psychological terminology is accurate. </td></tr><tr><td> Level 1 (1–4 marks) • Response is basic in detail. • Response has major omission(s). • If response is impossible to conduct max. 2. • Use of psychological terminology is mainly accurate. </td></tr><tr><td> Level 0 (0 marks) No response worthy of credit. </td></tr></table>	Level 3 (8–10 marks) • Response is described in sufficient detail to be replicable. • Response may have a minor omission. • Use of psychological terminology is accurate and comprehensive.	Level 2 (5–7 marks) • Response is in some detail. • Response has minor omission(s). • Use of psychological terminology is accurate.	Level 1 (1–4 marks) • Response is basic in detail. • Response has major omission(s). • If response is impossible to conduct max. 2. • Use of psychological terminology is mainly accurate.	Level 0 (0 marks) No response worthy of credit.	
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10(b)	Identify <u>one</u> practical /limitation with the <u>procedure</u> you have described in your answer to part (a) and suggest how your study might be done differently to overcome the problem. Do <u>not</u> refer to ethics or sampling in your answer. Answer will depend on problem identified. If the problem was an obvious omission in (a), fewer marks will have been awarded in (a), so they can be awarded here. Problems may, for example, be matters of: Validity - operationalisation - participants have poor insight into reasons for emotions - difficulty with poor recall/ lying to avoid emotional memories (also ethical problem) Reliability - standardisation – may not identify all aspects to standardise in interview - subjectivity of Dr Bell's interpretation (as there may be open questions) – may also be validity This list is not exhaustive and other appropriate responses should also be credited. <table border="1"> <thead> <tr> <th>Level</th><th>Marks</th><th>Comment</th></tr> </thead> <tbody> <tr> <td>3</td><td>3–4</td><td>Appropriate problem identified. Appropriate solution is clearly described.</td></tr> <tr> <td>2</td><td>2</td><td>Appropriate problem identified. <i>plus</i> EITHER Explanation of why it is a problem OR Ineffectual but possible solution described.</td></tr> <tr> <td>1</td><td>1</td><td>Appropriate problem identified. Little or no justification.</td></tr> <tr> <td></td><td>0</td><td>No response worthy of credit</td></tr> </tbody> </table>	Level	Marks	Comment	3	3–4	Appropriate problem identified. Appropriate solution is clearly described.	2	2	Appropriate problem identified. <i>plus</i> EITHER Explanation of why it is a problem OR Ineffectual but possible solution described.	1	1	Appropriate problem identified. Little or no justification.		0	No response worthy of credit	4
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Question	Answer	Marks
1	Dement and Kleitman (sleep and dreams) found a positive correlation between REM duration and the number of words used to describe the dream.	
1(a)	Explain what is meant by a ‘positive correlation’, using this study as an example. 1 mark for ‘both variables go up together’ OWTTE 1 mark for idea that longer REM durations was linked to more words Do not award each mark if the information suggests causality. when one variable increases the other one does too = 1 longer REM phases had more words to describe the dream = 1 An increase in one variable makes the other one rise = 0 Having longer in REM gave the P more chance to describe the dream in more words = 0	2
1(b)	Suggest why REM duration was a <u>more</u> valid measure of dream duration than the number of words used to describe the dream. 1 mark for identifying a reason 1 mark for explaining the reason in comparison to other measure. timing is a scientific measure / is more objective; whereas the number of words used might be affected by vocabulary; whereas the number of words used might be affected by how easily the individual wakes up; Participants may lie about dream details (to please the experimenter / so use more words);	2

Question	Answer	Marks
2	The study by Bandura et al. (aggression) used a sample of children.	
2(a)	Identify <u>two</u> features of this sample of children. 1+1 marks for any features: 36 boys; } 36 girls; } = 2 72 boys and girls = 2 OR ‘72 participants’ = 1 Stanford / USA = 1 ‘boys and girls’ = 1 ‘36 of each gender’ = 1 ‘a nursery school’ / ‘university crèche’ = 1 aged 3 to 5/6 (years) / aged 37 to 69 months = 1 Stanford + nursery = 2	2

Question	Answer	Marks
2(b)	Suggest <u>one</u> reason why generalisations <u>can</u> be made from the sample in this study. 1 mark for a reason there were children of each gender; there was quite a wide age range; 72 is quite a big sample;	1
2(c)	Suggest <u>one</u> reason why generalisations <u>cannot</u> be made from the sample in this study. 1 mark for a reason they were only from one nursery school; it was a university nursery school; there were no older children; the results might not apply to children aged 8–10 years/teenagers/adults = 1 there were only 6 children per condition = 1	1

Question	Answer	Marks
3	In the study by Yamamoto et al. (chimpanzee helping), the researchers needed a reliable procedure for testing the tool choice made by the chimpanzee.	
3(a)	Explain what is meant by ‘reliability’, using this study as an example. 1 mark for definition 1 mark for linked example - reliability is about consistency = 1 mark - to be reliable, measures must measure the phenomenon in the same way each time = 1 mark e.g. Yamamoto et al standardised the procedure, e.g. by always having the same 7 objects on the tray (as tools) at the start of a trial / trial always ended after 5 min if not appropriate tool transfer / maximum of 4, minimum of 2 trials per day / had 3 video cameras / only counted the first tool offered etc. = 1 mark for example They made sure researchers measured helping in a similar way, i.e. were reliable, by using the same rules such as only counting the first tool offered = 2 marks	2

Question	Answer	Marks
3(b)	Suggest <u>one</u> problem with reliability in this study. 1 mark for identifying problem. (This can also be linked but does not have to be) 2nd mark for linked detail There was a range of number of trials per day (maximum of 4, minimum of 2); (1 for identification) So some chimps may have been more familiar/ less willing as they had had more / less trials; (1 for link)	2

Question	Answer	Marks
4	In a study about sharing, pairs of friends were given questionnaires. The questionnaire had only two questions: 'rate your own willingness to share' and 'rate your friend's willingness to share'.	
4(a)(i)	State what is meant by the term 'demand characteristics'. 1 mark for definition of term <u>Features of the setting</u> which indicate the aim / change the participants' responses	1
4(a)(ii)	State why demand characteristics are a problem in research. 1 mark for explanation of problem (Changes in the participants' responses mean that) differences in the DV are not due to the IV; Because participants are not responding (only) to the IV the findings will lack validity; Because it means researchers cannot judge causation	1
4(b)	Describe <u>one</u> way in which demand characteristics could be avoided in this study. 1 mark for linked description of way to avoid demand characteristics Ensure participants do not know that willingness to share is the aim of the study; Hide the questions about sharing among others (to distract the participant / to disguise the aim); Add filler questions (to questionnaire); Deceive them by telling them it's a study about what makes a good friend	1

Question	Answer	Marks
5	Sometimes it is more appropriate to use one measure of central tendency than another.	
	Suggest <u>one</u> reason why it may be better to use the mean as a measure of central tendency than the mode. 1 mark for reason The mean takes (the value of) every score into account (so is more representative) = 1 There might be two modes (which could be different from most of the rest of the data set) = 1 There might not be a most common score (so no mode) = 1	1

Question	Answer	Marks
6	Describe the ethical guidelines of ‘right to withdraw’ and ‘deception’ in research with human participants, using any examples. 4 marks max per guideline for definition and detail 1 mark for each example that is linked to a guideline, up to a maximum of 2 per guideline. Examples can include examples from any research (core studies, other studies, candidate’s own studies) For example: Right to withdraw: ensuring participants know they can leave if they want to; (1 for definition) Deception: misinforming participants; (1 for definition) <i>Right to withdraw</i> • letting participants go if they want to; (1 definition) • and allowing them to leave without reason; (+1 detail) • because they are upset / they think they might be harmed; (+1 detail) • and take their data with them/ remove their data from the study; (+1 detail) • for example Milgram did originally tell his participants they could leave (1 for example) • although Milgram really denied the participants the right to leave with the verbal prods; (+1 for example) • 1 (accept 11) participants withdrew from Schachter & Singer’s study (due to the injection); (+1 for example) • Less possible in lab than field experiments because unaware of participation; (+1 detail) <i>Deception</i> • participants should not be lied to / is when participants are lied to (about the aim); (1 definition) • as this means they cannot give informed consent / may be distressed / might have wanted to withdraw; (+1 detail) • for example in Milgram the participants were told they were doing a study about memory/learning/punishment (when in fact it was about obedience) / were told the shocks were real; (1 for example) • but sometimes deception is essential to avoid demand characteristics; (+1 detail) • Milgram’s participants would have obeyed to 450V if they knew that the shocks were not real; (+1 for example) • Piliavin et al’s participants thought the victim was really drunk / ill; (+1 for example) • Laney et al’s participants were misled about the ‘generated profile’ (from the FBI); (+1 for example) • Laney et al’s participants were misled about the aim, told food preferences and personality; (+1 for example) • If participants are deceived they should be debriefed (although this may not be possible in field experiments)	6

Question	Answer	Marks
7	Dr Bahl wants to know about the emotions of people who spend their leisure time in different ways. He intends to use a questionnaire to collect information from these different types of people, about their emotions.	
7(a)	Explain <u>one</u> way that Dr Bahl could ensure that he obtains a varied sample of participants. 1 mark for identify a representative sampling technique 2 marks for describing how the technique works/ produces a varied sample. To earn all 3 marks, the technique must be linked to the context random sampling; (1 identification mark) varied sample because everyone (in the population) has equal chance of being picked; 1 mark (generic) description e.g. should include people who express emotions easily and those who do not; 1 mark (linked) description He could use a random number generator on the GP patients list; 1 mark (generic) description so should get people with a variety of lifestyles/leisure pursuits / interests; 1 mark (linked) description	3
7(b)	Suggest <u>one</u> open question that Dr Bahl could ask about emotions. 1 mark for open question e.g. 'Explain how do you feel when you play sport/ read a book.' E.g. 'Why does camping make you feel relaxed?' e.g. 'Describe the last time you talked to someone about feeling emotional.'	1
7(c)	Suggest <u>one</u> disadvantage of using open questions about emotion in this study. 1 mark for disadvantage 1 mark for linking to study of emotion interpretation (of responses to open questions) may be biased (1 mark) researchers may be subjective (in their recording / interpretation of answers to open questions) (1 mark) If people do not like to mention their emotions, they will not want to do it in a study; so answers from people who are happy to talk about their emotions will be longer; (2 marks) People may find their emotions embarrassing; and this would be worse for open questions (where they have to express themselves in detail) than for closed questions; (2 marks) emotions are subjective; it will therefore be difficult to interpret the answers to open questions objectively; (2 marks)	2

Question	Answer	Marks
7(d)	Dr Bahl is considering using an fMRI (functional magnetic resonance imaging) scanner to investigate emotions.	
7(d)(i)	Suggest <u>one</u> advantage of using an fMRI scanner to investigate emotions. At least one point must be linked to investigating emotions. • it produces functional information (= 1 mark) • so you can see which parts of the brain are active for different emotions (= 2nd mark linked) • it produces very detailed information (about location of activity) (= 1 mark) • so you could look at brains of emotional and non-emotional people (for differences) (= 2nd mark linked)	2
7(d)(ii)	Suggest <u>one</u> disadvantage of using an fMRI scanner to investigate emotions. At least one point must be linked to investigating emotions. • the scanner is very small / claustrophobic (= 1 mark) • so you could not readily tell which emotions related to test and which to fear of situation (= 2nd mark linked) • the scanner is very noisy (= 1 mark) • this could distract / frighten the participant making the test of emotions less valid (= 2nd mark linked) The question is about fMRI, so answers saying 'no qualitative data' / disadvantages of quantitative data are irrelevant. However, answers that link the idea that quantitative data from scans of specific brain areas / activity is difficult to relate to the (subjective) experience of emotions are creditworthy	2

Question	Answer	Marks
8	Martha wants to conduct a naturalistic observation of children playing. She is planning to observe the children in her local school.	
8(a)	State what is meant by a 'naturalistic observation' 1 mark for meaning. Watching the behaviour of participants without interference from the researcher = 1 mark Recording activities without manipulation of the environment / no controlled variables	1

Question	Answer	Marks
8(b)	Suggest <u>one</u> disadvantage of using naturalistic observation in Martha's study. Both marks are for one disadvantage At least one point must be linked to the study e.g. children's behaviour. The behaviours the children do cannot be controlled/produced; (generic disadvantage) So Martha might not see any play behaviour at all; (link) For example the children might just sit and read all the time; (link) The children's play may be affected by (extraneous / uncontrolled) variable e.g. temperature; (link) Responses making appropriate reference to ethics (e.g. deception, children) may earn credit	2
8(c)	Suggest how Martha should follow the ethical guideline of informed consent in her study. All marks are for way(s) to follow consent At least one point must be linked to the study i.e. children. There may be more than one suggestion. She should ask the parents (because the participants are children); she should also ask the teachers/school; and the children themselves; the request to the children must be simple enough for them to understand; the request to parents/school must tell them enough about the study for them to decide whether the child/children should participate; for example Martha should tell them her aim is to study play/that they will be observed whilst playing	3
8(d)	Suggest how Martha could operationalise <u>one</u> play behaviour that she could observe. 1 mark for identifying a play behaviour 2nd mark for operationalising it. skipping (= 1 mark) swinging a rope and jumping over it/ each jump could be counted (= 2nd mark, operationalisation) playing ball (= 1 mark) throwing and catching a ball / each throw or catch could be counted (= 2nd mark, operationalisation) playing tag (= 1 mark) running after another child to 'catch' them (= 2nd mark, operationalisation)	2

Question	Answer	Marks
8(e)	Suggest what Martha would do if she were a covert observer. Both marks are for describing what a covert observer does. At least one point must be linked to the study (other than simply saying 'she'/'Martha'). Martha must ensure the participants cannot see her/ do not know she is observing them/ are unaware she is an observer (= 1 generic) for example, she could disguise herself as a dinner lady / playground attendant / she could watch out of a classroom window (= 2nd mark, linked)	2

Question	Answer	Marks
9	Otto's aim is to investigate which age groups of internet users are most likely to play internet-based games.	
9(a)	Suggest an operationalised directional (one-tailed) hypothesis that Otto could test. 2 marks for a one-tailed hypothesis with both variables if correlational, 2 levels of IV and a DV if experimental with at least one operationalised variable 1 mark for a one-tailed hypothesis with 2 levels of IV and a DV 0 marks for a non-directional (two-tailed) hypothesis 0 marks for a null hypothesis Hypothesis may be experimental or correlational Adults are more likely to play internet-based games than younger people = 1 (experimental not operationalised) The older you are the more likely you are to play internet games = 1 mark (correlational not operationalised) Older people/adults are more likely to play internet based games for more than 2 hours per day than younger people / children. = 2 marks 12 year olds are more likely to play internet based games than people over 40 = 2 marks The older you are in years the more likely you are to play an internet game. = 2 marks The older you are the less likely you are to play an internet game for more than 8 hours a day. = 2 marks	2
9(b)	Describe the population that Otto will need to use for his investigation. 1 mark for identifying a suitable population (by description or example) 2nd mark for detail (e.g. stated age range) OR second feature of the population internet users with a wide are range / all the internet users in one town / all social media/Snapchat/Twitter users; for example 10–70 years old	2

Question	Answer	Marks
10	Cecile has ten parrots that can answer questions about shapes. She is interested in whether there is a difference between the ability of parrots to learn to answer questions about sounds, such as from bells or buzzers, compared to shapes.	
10(a)	Describe how Cecile could conduct a laboratory experiment to test whether there is a difference in the ability of parrots to learn to answer questions about sounds compared to shapes. Three major omissions for a laboratory experiment are: What - will be recorded, i.e. DV (ability of parrots to answer questions) How - IV (sounds & shapes) - controls The minor omissions are: • where – location of participants when data is collected (i.e. lab) • who - participants (parrots) Indicative content for a laboratory experiment: • How – identification of the independent variable (sounds and shapes) • How operationalisation of the dependent variable (ability of parrots to answer questions) • What – identification of the dependent variable • operationalisation of the dependent variable • including examples of ways to measure the variable • How – controls • experimental design (any are appropriate here) • sampling technique • sample size (10) • description of how data will analysed, e.g. use of measures of central tendency and spread, bar charts • ethical issues	10

Question	Answer	Marks
10(a)	Other appropriate responses should also be credited. Level 3 (8–10 marks) • Response is described in sufficient detail to be replicable. • Response may have a minor omission. • Use of psychological terminology is accurate and comprehensive. Level 2 (5–7 marks) • Response is in some detail. • Response has minor omission(s). • Use of psychological terminology is accurate. Level 1 (1–4 marks) • Response is basic in detail. • Response has major omission(s). • If response is impossible to conduct max. 2. • Use of psychological terminology is mainly accurate. Level 0 (0 marks) No response worthy of credit. Mark according to the levels of response criteria below:	

Question	Answer	Marks															
10(b)	Identify one practical weakness/limitation with the procedure you have described in your answer to part (a) and suggest how your study might be done differently to overcome the problem. Do not refer to ethics or sampling in your answer. Answer will depend on problem identified. Problems may, for example, be matters of: Validity - operationalisation e.g. deciding if learning has occurred - parrot factors e.g. auditory range, choices of reinforcers, parrot imitating sound rather than learning the task Reliability - inter-rater consistency (re decision about whether parrot's response is 'correct') - intra-rater consistency. This list is not exhaustive and other appropriate responses should also be credited. <table border="1"> <thead> <tr> <th>Level</th><th>Marks</th><th>Comment</th></tr> </thead> <tbody> <tr> <td>3</td><td>3–4</td><td>Appropriate problem identified. Appropriate solution is clearly described.</td></tr> <tr> <td>2</td><td>2</td><td>Appropriate problem identified. <i>plus</i> EITHER Explanation of why it is a problem OR Ineffectual but possible solution described.</td></tr> <tr> <td>1</td><td>1</td><td>Appropriate problem identified. Little or no justification.</td></tr> <tr> <td>0</td><td>0</td><td>No response worthy of credit</td></tr> </tbody> </table>	Level	Marks	Comment	3	3–4	Appropriate problem identified. Appropriate solution is clearly described.	2	2	Appropriate problem identified. <i>plus</i> EITHER Explanation of why it is a problem OR Ineffectual but possible solution described.	1	1	Appropriate problem identified. Little or no justification.	0	0	No response worthy of credit	4
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PSYCHOLOGY

9990/23

Paper 2 Research Methods

May/June 2019

MARK SCHEME

Maximum Mark: 60

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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This document consists of **12** printed pages.



Cambridge Assessment
International Education

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Question	Answer	Marks
1(a)	State what is meant by ‘participant variables’. 1 mark for definition Features of individuals in the sample that could affect their performance in the study/such as age, intelligence;	1
1(b)	Suggest <u>one</u> participant variable that could have affected the level of obedience in the study by Milgram. 1 mark for suggested participant variable Occupation / age / experience of electricity / personality / social class / military experience Accept any reasonable answer Note: Obedience = 0 (this is being measured), Gender = 0 (there were only males in the study by Milgram)	1

Question	Answer	Marks
2	In the study by Baron-Cohen et al. (eyes test), a correlation was found.	
2(a)	Describe the correlation found between the Eyes Test score and the Autism Spectrum Quotient (AQ). 1 mark for negative / inverse (correlation); 1 mark for as Eyes test score increases, Autism Quotient decreases; ORA	2
2(b)	Explain why a researcher in a correlational study could <u>not</u> conclude that there was a causal relationship between variables. 1 mark for a partial explanation, e.g. why causal conclusions cannot be drawn from correlations. 2 marks for a full explanation e.g. why causal conclusions cannot be drawn from correlations and detail e.g. why they can be drawn from experiments. in a correlation two variables are only related, they change together (one doesn't cause the other to change); in a correlation, a third factor could cause both to change; so you cannot know because there are no controls;	2

Question	Answer	Marks
3(a)	Explain what is meant by the term ‘order effects’. 1 mark for a partial explanation. 2 marks for a full explanation (<i>either</i> general + example <i>or</i> both practice and fatigue). <i>Possible points include:</i> order effects are the consequence on results of performing two similar tasks such that performance on one affects performance on the other; practice effects are when performance on the first task improves performance on the second; e.g. remembering how to do it / what your answers were; e.g. getting more skilled at a physical task; e.g. learning the process required to score well; fatigue effects are when performance on the first task impairs performance on the second; e.g. getting bored; e.g. getting tired;	2
3(b)	Explain <u>one</u> reason why there were no order effects in the study by Canli et al. (brain scans and emotions). 1 mark for a partial explanation. 2 marks for a full explanation. <i>Possible points include:</i> Because although it was repeated measures; the order of (trials for) the levels of the IV were randomized; so no one level of the IV would have been towards the ‘end’;	2

Question	Answer	Marks
4(a)	State what the standard deviation measures. 1 mark for definition. Variation/ spread / dispersion of scores around the mean; It shows how different the participants’ scores were from each other;	1
4(b)	State <u>one</u> advantage of using the standard deviation, rather than the range. 1 mark for advantage. <i>Possible points include:</i> The standard deviation takes every score into account; So is less influenced by outliers; The standard deviation gives a representative measure (of the variation / whole groups’ scores); It is better than the range which only includes the largest and smallest scores;	1

Question	Answer	Marks
5	In the study by Pepperberg (parrot learning), many variables were controlled.	
5(a)	Explain why it is important to control extraneous variables in experimental studies. 1 mark per acceptable point, explanatory (note that reliability / validity cannot earn marks alone, example acceptable as second mark) because it ensures that the variable having influence is the IV; so it improves validity; (dependent on first marking point) because it helps to standardise the experience of participants; so it improves reliability; (dependent on first marking point) so the experimenter can make a judgment about causality;	2
5(b)	Identify <u>one</u> uncontrolled variable in the study by Pepperberg and <u>suggest</u> how this could have affected the results. 1 mark for identification of uncontrolled variable 1 mark for suggestion of how the uncontrolled variable could affect the results What he did during the day was not controlled (e.g. he could choose to go to the gym or not); This could have affected the results because he would have been exposed to different colours / shapes in different places; What he ate was not controlled (e.g. he had a range of foods such as different nuts and vegetables); These are different colours so he would have been exposed to some recently; What toys he played with were not controlled (because he could ask for different ones); These were different shapes/materials/colours so he would have been exposed to some types recently;	2

Question	Answer	Marks
6	Describe the use of ‘open questions’ and ‘closed questions’ in research, using any examples. 1 mark for each definition, up to a maximum of 1 for each term (2 in total). 1 mark for each example that is linked to one type of question, up to a maximum of 2 different examples. Examples can include examples from any studies, or of ways they <i>could</i> affect studies. Max 4 if answer is only about open questions <i>or</i> closed questions. • Open questions: allow P to choose own response; (1 for definition) • Closed question: only allows P to choose from a limited number of options; (1 for definition) • Open questions produce more detailed / in depth / descriptive / qualitative data; (1 for detail) • e.g. answers to ‘Describe ...’ (1 for example) • e.g. when Ps in Dement & Kleitman ‘were instructed to ... relate the content of the dream.’ (1 for example) • Closed questions produce quantitative/ numerical data; (1 for detail) • e.g. answers to ‘How many times on a scale of 1–10 ...’ (1 for example) • e.g. Eyes test choices in Baron-Cohen; (1 for example) • open questions are interpreted researchers / are subjective; (1 for detail) • closed questions tend to be more objective /less subjective; (1 for detail)	6

Question	Answer	Marks
7	Carol is interested in theory of mind. She is comparing adults in ‘caring’ jobs such as nursing with adults in ‘non-caring’ jobs that have less contact with the public. Carol believes that adults in caring jobs will score higher on the Eyes Test than those in non-caring jobs.	
7(a)	Write a <u>null</u> hypothesis for Carol’s study. 1 mark for a null hypothesis (whether operationalised or not) 0 marks for an experimental/ alternative hypothesis / correlational null. e.g. There will be no difference between eyes test scores for caring job adults and non-caring job adults = 1 e.g. Any difference between theory of mind in nurses and typists is due to chance = 1 e.g. There will be no difference between theory of mind and caring or non-caring jobs = 0 (nonsense) e.g. Any difference between eyes test scores and adults job type is due to chance = 0 (nonsense) e.g. There will be a difference between eyes test scores for caring job adults and non-caring job adults = 0 (H_1) e.g. Theory of mind in nurses will be better than in typists = 0 (H_1)	1
7(b)	Carol obtains a sample from 2000 people who found a job through an employment website. Each person has an equal chance of being in her sample.	
7(b)(i)	Name the sampling technique that Carol used. random sampling = 1 mark DEFINITIVE Accept identification by description: selection from the population is random.	1
7(b)(ii)	Explain why it is an advantage that each person had an equal chance of being in Carol’s sample. 1 mark for advantage 1 mark for application to study it is likely to be representative / is not biased; (1 for advantage) so the range of nurses and typists will be varied / there will be a wide range of different theory of mind abilities; (1 for link)	2
7(c)	Explain the experimental design being used in Carol’s study. 1 mark for identifying design = independent measures (definitive but accept equivalent terms) 2nd mark for explaining this in the study the caring job / nurses group contains different people from the non-caring / typists group; 1 mark (link)	2

Question	Answer	Marks
7(d)	Carol intends to draw a graph of the median Eyes Test score for each group of participants.	
7(d)(i)	Explain why the median was the <u>most</u> suitable measure of central tendency for Carol to use. Reason for using median (generic) = 1 mark Reason for using median (linked to study) = 2 marks median because Carol's data is ordinal; median because some expressions are harder than others to identify the emotion; mean because it is more informative than the mode/median so will tell Carol more about ToM;	2
7(d)(ii)	Carol found that the median Eyes Test score for the caring job participants was 30/36 and the median Eyes Test score for the non-caring job participants was 20/36. Draw an appropriate graph of these results on the axes below. You must label both axes. Award 1 mark for each of: • <i>x-axis labels</i> 'caring' and 'not caring' • <i>x-axis heading</i> 'job type' OWTTE • <i>y-axis values</i> points up to 36 • <i>y-axis heading</i> 'Eyes test score' / Theory of mind ability OWTTE • Data correctly plotted on two separate bars (must have this for 4 marks)	4

Question	Answer	Marks
8	Misha and Dalman are conducting interviews with elderly people to find out how their dreams have changed with age. Misha thinks it is essential to gain information from each participant using the same questions. Dalman thinks it would be better to be able to vary the questions used with each participant.	
8(a)	Identify the type of interview that Misha wants to use <u>and</u> explain <u>one</u> advantage of this type of interview. 1 mark for interview type 1 mark for advantage (linked or not) structured interview; (type) DEFINITIVE A structured interview uses identical questions for each P; (advantage) Enables easy comparison of different participants' answers; (advantage) Misha could collect the same data about dreaming making it reliable/standardized/replicable; (linked advantage)	2

Question	Answer	Marks
8(b)	Identify the type of interview that Dalman wants to use and explain one advantage of this type of interview. 1 mark for interview type 1 mark for advantage (linked or not) unstructured interview; (type) An unstructured interview allows the interview to change the questions for each P; (advantage) Better to be able to vary the questions used with each participant to explore their individual experience; (ad) Dalman could collect / valid data by asking lots of specific questions; (linked advantage)	2

Question	Answer	Marks
9	Aram plans to use a controlled observation to record the behaviour of children in the play area of a classroom.	
9(a)	Explain what is meant by a ‘controlled observation’, using Aram’s study as an example. 1 mark for definition 1 mark for link A controlled observation is where the researcher sets up/creates the situation or setting (social or physical) (which means that they can control the opportunities for the P’s behaviour); (definition) So Aram could set up the play area with specific toys / interact with the child in specific ways; (link)	2
9(b)	Suggest how Aram could operationalise <u>one</u> behaviour that he could observe in the play area. 1 mark for identifying a behavior that could be seen in a play area. 1 mark for definition (Aram could record) playing with building bricks (this could be defined as) ‘picking up bricks and putting them on top or beside one another’ There will be many different possible answers. Credit all acceptable suggestions.	2

Question	Answer	Marks
9(c)	Suggest <u>two</u> controls that Aram could use to keep the play area the same for all his observations. 1 mark for each suggested control <i>Aram could:</i> make sure the area only has certain toys in it/same toys/same number of toys; same location for each toy each time; have a fixed range of furniture;	2
9(d)	Suggest <u>one</u> reason why it would be better for Aram to be an overt, participant observer, rather than a covert, non-participant observer. 1 mark for a suggestion 1 mark for reason why it would be better At least one mark must be linked to the stem (participant) because then he can encourage the children to play more; (suggestion – linked) he will be able to guide the children to play with specific toys / in particular ways; (reason – linked) (participant) because he will be able to close to the participants; (suggestion) so he can see their faces and judge whether ambiguous behaviours are play; (reason – linked) (overt) he won't have to hide who he is so he can play more easily with the children; (suggestion – linked) so he will interact better with the participants / understand them better; (reason)	2

Question	Answer	Marks
10	Elio is planning a field experiment to investigate whether office layout affects laziness. The two types of office he is comparing are big open-plan shared offices and individual offices with walls and doors that make them more private.	
10(a)	Describe how Elio could conduct a field experiment to test whether the type of office layout affects laziness. Three major omissions for a field experiment are: What: – will be recorded, ie DV How: – IV Where – location of participants when data is collected (e.g. a company with different types of office / different companies with differing style offices) The minor omissions are: how – controls who – participants (must be office workers) Indicative content for a field experiment: • How – identification of the independent variable • operationalisation of the dependent variable • What – identification of the dependent variable • operationalisation of the dependent variable • including examples of ways to measure the variable such as questions/tests used • Where – location of participants when data is collected • How – controls • experimental design (any are appropriate here) • sampling technique • sample size • description of how data will analysed, e.g. use of measures of central tendency and spread, bar charts • ethical issues Level 3 (8–10 marks) • Response is described in sufficient detail to be replicable. • Response may have a minor omission. • Use of psychological terminology is accurate and comprehensive. Level 2 (5–7 marks) • Response is in some detail. • Response has minor omission(s). • Use of psychological terminology is accurate. Level 1 (1–4 marks) • Response is basic in detail. • Response has major omission(s). • If response is impossible to conduct max. 2. • Use of psychological terminology is mainly accurate. Level 0 (0 marks) No response worthy of credit.	10

Question	Answer	Marks															
10(b)	Identify <u>one</u> practical weakness/limitation with the procedure you have described in your answer to part (a) and suggest how your study might be done differently to overcome the problem. Do not refer to ethics or sampling in your answer. Answer will depend on problem identified. If the problem was an obvious omission in (a), fewer marks will have been awarded in (a), so they can be awarded here. Problems may, for example, be matters of: Validity - operationalisation (of laziness) - difficulty with demand characteristics/social desirability Reliability - intra-rater consistency (scoring laziness) This list is not exhaustive and other appropriate responses should also be credited. <table border="1"> <thead> <tr> <th>Level</th><th>marks</th><th>comment</th></tr> </thead> <tbody> <tr> <td>3</td><td>3–4</td><td>Appropriate problem identified. Appropriate solution is clearly described.</td></tr> <tr> <td>2</td><td>2</td><td>Appropriate problem identified. <i>plus</i> EITHER Explanation of why it is a problem OR Ineffectual but possible solution described.</td></tr> <tr> <td>1</td><td>1</td><td>Appropriate problem identified. Little or no justification.</td></tr> <tr> <td>0</td><td>0</td><td>No response worthy of credit</td></tr> </tbody> </table>	Level	marks	comment	3	3–4	Appropriate problem identified. Appropriate solution is clearly described.	2	2	Appropriate problem identified. <i>plus</i> EITHER Explanation of why it is a problem OR Ineffectual but possible solution described.	1	1	Appropriate problem identified. Little or no justification.	0	0	No response worthy of credit	4
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