| Write your name here Surname | Ot | her names | |
|--|--|---------------|--------------------------|
| Pearson Edexcel | Centre Number | | Candidate Number |
| Psycholog | 447 | |) |
| International Advar Paper 2: Biological I | nced Subsidi | Learr | ning |
| International Advar Paper 2: Biological I | nced Subsidi Psychology, nd Developn | Learr nent | Paper Reference WPS02/01 |

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
 - there may be more space than you need.

Information

- The total mark for this paper is 96.
- The marks for each question are shown in brackets
 use this as a guide as to how much time to spend on each question.
- The list of formulae and critical value tables are printed at the start of this paper.
- Candidates may use a calculator.

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

PEARSON

P50586RA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

FORMULAE AND STATISTICAL TABLES

Standard deviation (sample estimate)

$$\sqrt{\left(\frac{\sum (x-\bar{x})^2}{n-1}\right)}$$

Spearman's rank correlation coefficient

$$1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

Critical values for Spearman's rank

| | Level of significance for a one-tailed test | | | | |
|--|---|-------|-------|-------|--------|
| | 0.05 | 0.025 | 0.01 | 0.005 | 0.0025 |
| Level of significance for a two-tailed t | | | | | test |
| N | 0.10 | 0.05 | 0.025 | 0.01 | 0.005 |
| 4 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 5 | 0.700 | 0.900 | 0.900 | 1.000 | 1.000 |
| 6 | 0.657 | 0.771 | 0.829 | 0.943 | 0.943 |
| 7 | 0.571 | 0.679 | 0.786 | 0.857 | 0.893 |
| 8 | 0.548 | 0.643 | 0.738 | 0.810 | 0.857 |
| 9 | 0.483 | 0.600 | 0.683 | 0.767 | 0.817 |
| 10 | 0.442 | 0.564 | 0.649 | 0.733 | 0.782 |
| 11 | 0.418 | 0.527 | 0.609 | 0.700 | 0.755 |
| 12 | 0.399 | 0.504 | 0.587 | 0.671 | 0.727 |
| 13 | 0.379 | 0.478 | 0.560 | 0.648 | 0.698 |
| 14 | 0.367 | 0.459 | 0.539 | 0.622 | 0.675 |
| 15 | 0.350 | 0.443 | 0.518 | 0.600 | 0.654 |
| 16 | 0.338 | 0.427 | 0.503 | 0.582 | 0.632 |
| 17 | 0.327 | 0.412 | 0.482 | 0.558 | 0.606 |
| 18 | 0.317 | 0.400 | 0.468 | 0.543 | 0.590 |
| 19 | 0.308 | 0.389 | 0.456 | 0.529 | 0.575 |
| 20 | 0.299 | 0.378 | 0.444 | 0.516 | 0.561 |
| 21 | 0.291 | 0.369 | 0.433 | 0.503 | 0.549 |
| 22 | 0.284 | 0.360 | 0.423 | 0.492 | 0.537 |
| 23 | 0.277 | 0.352 | 0.413 | 0.482 | 0.526 |
| 24 | 0.271 | 0.344 | 0.404 | 0.472 | 0.515 |
| 25 | 0.265 | 0.337 | 0.396 | 0.462 | 0.505 |
| 26 | 0.260 | 0.330 | 0.388 | 0.453 | 0.496 |
| 27 | 0.255 | 0.323 | 0.381 | 0.445 | 0.487 |

The calculated value must be equal to or exceed the critical value in this table for significance to be shown.

0.437

0.430

0.423

0.479

0.471

0.463

28

29

0.250

0.245

0.241

0.317

0.312

0.306

0.374

0.367

0.361

AREA

DO NOT WRITE IN THIS.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Chi-squared distribution formula

$$X^{2} = \sum \frac{(O-E)^{2}}{E}$$
 $df = (r-1)(c-1)$

Critical values for chi-squared distribution

| Leve | l of | signi | ficance 1 | for a | one-tai | led test |
|------|------|-------|-----------|-------|---------|----------|
|------|------|-------|-----------|-------|---------|----------|

| | 0.10 | 0.05 | 0.025 | 0.01 | 0.005 | 0.0005 |
|----|-------|-------|-------|------------|--------|--------|
| | | | | for a two- | | |
| df | 0.20 | 0.10 | 0.05 | 0.025 | 0.01 | 0.001 |
| 1 | 1.64 | 2.71 | 3.84 | 5.02 | 6.64 | 10.83 |
| 2 | 3.22 | 4.61 | 5.99 | 7.38 | 9.21 | 13.82 |
| 3 | 4.64 | 6.25 | 7.82 | 9.35 | 11.35 | 16.27 |
| 4 | 5.99 | 7.78 | 9.49 | 11.14 | 13.28 | 18.47 |
| 5 | 7.29 | 9.24 | 11.07 | 12.83 | 15.09 | 20.52 |
| 6 | 8.56 | 10.65 | 12.59 | 14.45 | 16.81 | 22.46 |
| 7 | 9.80 | 12.02 | 14.07 | 16.01 | 18.48 | 24.32 |
| 8 | 11.03 | 13.36 | 15.51 | 17.54 | 20.09 | 26.12 |
| 9 | 12.24 | 14.68 | 16.92 | 19.02 | 21.67 | 27.88 |
| 10 | 13.44 | 15.99 | 18.31 | 20.48 | 23.21 | 29.59 |
| 11 | 14.63 | 17.28 | 19.68 | 21.92 | 24.73 | 31.26 |
| 12 | 15.81 | 18.55 | 21.03 | 23.34 | 26.22 | 32.91 |
| 13 | 16.99 | 19.81 | 22.36 | 24.74 | 27.69 | 34.53 |
| 14 | 18.15 | 21.06 | 23.69 | 26.12 | 29.14 | 36.12 |
| 15 | 19.31 | 22.31 | 25.00 | 27.49 | 30.58 | 37.70 |
| 16 | 20.47 | 23.54 | 26.30 | 28.85 | 32.00 | 39.25 |
| 17 | 21.62 | 24.77 | 27.59 | 30.19 | 33.41 | 40.79 |
| 18 | 22.76 | 25.99 | 28.87 | 31.53 | 34.81 | 42.31 |
| 19 | 23.90 | 27.20 | 30.14 | 32.85 | 36.19 | 43.82 |
| 20 | 25.04 | 28.41 | 31.41 | 34.17 | 37.57 | 45.32 |
| 21 | 26.17 | 29.62 | 32.67 | 35.48 | 38.93 | 46.80 |
| 22 | 27.30 | 30.81 | 33.92 | 36.78 | 40.29 | 48.27 |
| 23 | 28.43 | 32.01 | 35.17 | 38.08 | 41.64 | 49.73 |
| 24 | 29.55 | 33.20 | 36.42 | 39.36 | 42.98 | 51.18 |
| 25 | 30.68 | 34.38 | 37.65 | 40.65 | 44.31 | 52.62 |
| 26 | 31.80 | 35.56 | 38.89 | 41.92 | 45.64 | 54.05 |
| 27 | 32.91 | 36.74 | 40.11 | 43.20 | 46.96 | 55.48 |
| 28 | 34.03 | 37.92 | 41.34 | 44.46 | 48.28 | 56.89 |
| 29 | 35.14 | 39.09 | 42.56 | 45.72 | 49.59 | 58.30 |
| 30 | 36.25 | 40.26 | 43.77 | 46.98 | 50.89 | 59.70 |
| 40 | 47.27 | 51.81 | 55.76 | 59.34 | 63.69 | 73.40 |
| 50 | 58.16 | 63.17 | 67.51 | 71.42 | 76.15 | 86.66 |
| 60 | 68.97 | 74.40 | 79.08 | 83.30 | 88.38 | 99.61 |
| 70 | 79.72 | 85.53 | 90.53 | 95.02 | 100.43 | 112.32 |

The calculated value must be equal to or exceed the critical value in this table for significance to be shown.



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Wilcoxon Signed Ranks test process

- Calculate the difference between two scores by taking one from the other
- Rank the differences giving the smallest difference Rank 1

Note: do not rank any differences of 0 and when adding the number of scores, do not count those with a difference of 0, and ignore the signs when calculating the difference

- Add up the ranks for positive differences
- Add up the ranks for negative differences
- T is the figure that is the smallest when the ranks are totalled (may be positive or negative)
- N is the number of scores left, ignore those with 0 difference

Critical values for the Wilcoxon Signed Ranks test

Level of significance for a one-tailed test

| | 0.05 | 0.025 | 0.01 |
|-----|-----------------|-------------------|-------------|
| | Level of signif | icance for a two- | tailed test |
| n | 0.1 | 0.05 | 0.02 |
| N=5 | 0 | - | - |
| 6 | 2 | 0 | - |
| 7 | 3 | 2 | 0 |
| 8 | 5 | 3 | 1 |
| 9 | 8 | 5 | 3 |
| 10 | 11 | 8 | 5 |
| 11 | 13 | 10 | 7 |
| 12 | 17 | 13 | 9 |

The calculated value must be equal to or less than the critical value in this table for significance to be shown.



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

SECTION A

Answer ALL questions in this section. Write your answers in the spaces provided.

1 As part of his psychology course, Jacob investigated the relationship between aggression and antisocial behaviour. He decided to use a twin study. His sample consisted of monozygotic (MZ) and dizygotic (DZ) twins.

Jacob's results are displayed in **Table 1**.

| Sample | Concordance rate between aggression and antisocial behaviour |
|-------------------|--|
| Monozygotic twins | 87% |
| Dizygotic twins | 67% |

Table 1

| (a) |) Identify which sample of twins has a higher genetic relatedness between aggression and antisocial behaviour. | (1) |
|-----|--|------|
| | | |
| | | |
| (b |) Jacob used a twin study for this investigation. | |
| | Explain one strength and one weakness of the twin study method. | (4) |
| | Strength | (-1) |
| | | |
| | | |
| | | |
| | Weakness | |
| | | |
| | | |
| | | |
| | | |



DO NOT WRITE IN THIS AREA

| | (c) Explain one conclusion that Jacob might draw from his results. (2) |
|---|---|
| | (Total for Question 1 = 7 marks) |
| 2 | Describe the role of infradian rhythms in explaining human behaviour. |
| | |
| | |
| | |
| | |
| | (Total for Question 2 = 4 marks) |
| | |
| | |

DO NOT WRITE IN THIS AREA

| 3 | Siffre (1972) conducted research to test the 24-hour sleep-wake cycle. He lived underground for 205 days where there were no zeitgebers such as natural light. Siffre did not know what time it was, although he did have contact with the outside world via a telephone. His behaviour was monitored, including when he went to sleep, when he woke, and when he ate meals. The results found that he experienced a change in his daily sleep-wake cycle up to approximately 48 hours. | |
|---|---|------|
| | (a) Identify the type of bodily rhythm that Siffre (1972) was researching. | (1) |
| | (b) Explain, using research, why the regulation of an internal body clock could change. | |
| | | (4) |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | (c) Explain one weakness of research conducted into the sleep-wake cycle. | (2) |
| | | |
| | | |
| | | |
| _ | (Total for Question 3 = 7 ma | rks) |



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

- A researcher studied the influence of light therapy on individuals with Seasonal Affective Disorder (SAD). He selected participants with a diagnosis of SAD symptoms for two or more years. They completed a self-assessment questionnaire about their mood before the light therapy treatment. They were treated with two hours of light therapy for eight weeks. Following this, the researcher reassessed their mood levels using the same questionnaire.
 - (a) State a one-tailed (directional) hypothesis for this study.

(3)

(b) The results of the study are given in **Table 2** below.

| Participant | Mood self-assessment score before light therapy (out of 100) | Mood self-assessment score after light therapy (out of 100) |
|-------------|--|---|
| 1 | 38 | 58 |
| 2 | 66 | 71 |
| 3 | 34 | 54 |
| 4 | 40 | 51 |
| 5 | 36 | 63 |
| 6 | 30 | 55 |
| 7 | 42 | 66 |
| 8 | 41 | 68 |
| 9 | 27 | 58 |
| 10 | 46 | 56 |

Table 2

(i) Calculate the mean scores for before and after light therapy using the data in **Table 2**.

(2)

Mean mood self-assessment score before light therapy.....

Mean mood self-assessment score after light therapy.....

DO NOT WRITE IN THIS AREA

| | | nean scores for this stu | (3) |
|-------|---|--------------------------|-----|
| Title | : | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

| 5 Evaluate Raine et al's (1997) study into brain abnormality in murderers. |
|--|
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| (Total for Question 5 = 8 marks) |
| TOTAL FOR SECTION A = 34 MARKS |

AREA

DO NOT WRITE IN THIS.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

SECTION B

Answer ALL questions. Write your answers in the spaces provided.

6 Shamilla wanted to investigate the speed of cars being driven both with and without passengers. Using a hand held speed recorder, she measured the speed of cars and noted their occupancy.

Table 3 shows the results Shamilla recorded.

| Speed of cars being driven without passengers Km/h | Speed of cars being driven with passengers Km/h |
|--|---|
| 56 | 58 |
| 60 | 50 |
| 66 | 53 |
| 53 | 58 |
| 55 | 53 |
| 61 | 42 |
| 47 | 52 |
| 71 | 44 |
| 60 | 61 |
| 55 | 40 |

Table 3

| (a) | Calculate the median speed for cars without passengers and the median spee | d |
|-----|--|---|
| | for cars with passengers. | |

| Median | speed for | cars without | passengers | | |
|--------|-----------|--------------|------------|------|--|
| | | | | | |

Median speed for cars with passengers

DO NOT WRITE IN THIS AREA

| (b) Calculate the range of speed for cars without passengers and the range of speed for cars with passengers. | (2) |
|--|-----|
| Range of speed for cars without passengers | |
| Range of speed for cars with passengers | |
| (c) Shamilla may have wanted to consider using standard deviation instead of the range as her measure of dispersion. | |
| Explain why standard deviation may have been more appropriate. | (2) |
| (d) Explain two reasons why Shamilla chose to use a non-participant observation | |
| 1 | (4) |
| 2 | |
| | |

DO NOT WRITE IN THIS AREA

| (e) There are many on the day of he | variables that could have a r observations. | | |
|-------------------------------------|--|--|-------------------------------|
| Explain two extr | aneous variables that cou | ld have affected the resul | ts. (4) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | you will have learned abo Conditioned emotional rea | ut Watson and Rayner's (1 | 14 marks) 920) classic |
| study 'Little Albert: O | | ut Watson and Rayner's (1 actions'. | 920) classic |
| study 'Little Albert: O | Conditioned emotional rea | ut Watson and Rayner's (1 actions'. | 920) classic dy. |
| study 'Little Albert: O | Conditioned emotional rea | ut Watson and Rayner's (1 actions'. | 920) classic dy. |
| study 'Little Albert: O | Conditioned emotional rea | ut Watson and Rayner's (1 actions'. | 920) classic dy. |
| study 'Little Albert: O | Conditioned emotional rea | ut Watson and Rayner's (1 actions'. | 920) classic dy. |
| study 'Little Albert: O | Conditioned emotional rea | ut Watson and Rayner's (1 actions'. | 920) classic dy. |
| study 'Little Albert: O | Conditioned emotional rea | ut Watson and Rayner's (1 actions'. | 920) classic dy. |
| study 'Little Albert: O | Conditioned emotional rea | ut Watson and Rayner's (1 actions'. | 920) classic dy. |
| study 'Little Albert: C | Conditioned emotional rea | ut Watson and Rayner's (1 actions'. | 920) classic dy. |



DO NOT WRITE IN THIS AREA

| (b) Explain one strength and one weakness of the Watson and Rayı classic study. | ner (1920) |
|---|-----------------------|
| Strength | |
| | |
| | |
| Weakness | |
| | |
| | |
| (c) Suggest two ethical improvements you could make to the Wats (1920) classic study. | on and Rayner (4) |
| 1 | |
| | |
| | |
| 2 | |
| 2 | |
| 2 | |
| | uestion 7 = 12 marks) |

DO NOT WRITE IN THIS AREA

| Discuss how Learning Theories could help to blaying with them. | each the twins to put their toys away after |
|--|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | (Total for Question 8 = 8 marks) |
| | (Intal for Question 8 - 8 marks) |



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

SECTION C

Answer ALL questions. Write your answers in the spaces provided.

| | Answer ALL questions. Write your answers in the spaces provided. | | |
|-------|--|------|--|
| 9 | Maria has a phobia of cats, which means that she can no longer visit her friend, Alice, who has just bought a cat. | | |
| | Evaluate systematic desensitisation as a treatment/therapy for Maria's phobia. | | |
| | You must make reference to the context in your answer. | (12) | |
| | | (12) | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| ••••• | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

16



DO NOT WRITE IN THIS AREA

| (Total for Question 9 = 12 marks) |
|-----------------------------------|
| |



DO NOT WRITE IN THIS AREA

| 10 Liam is a 14-year-old boy who has been getting into trouble at school for fighting with other boys. | | | |
|--|------|--|--|
| To what extent does biological psychology and learning theories and development explain Liam's aggressive behaviour? | | | |
| You must make reference to the context in your answer. | (16) | | |
| | (10) | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

TOTAL FOR SECTION C = 28 MARKS TOTAL FOR PAPER = 96 MARKS