

Write your name here

Surname

Other names

**Pearson Edexcel**  
**Level 3 GCE**

Centre Number

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Candidate Number

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# Psychology

**Advanced Subsidiary**

**Paper 2: Biological Psychology and Learning Theories**

Monday 23 May 2016 – Afternoon

**Time: 1 hour 30 minutes**

Paper Reference

**8PS0/02**

**You do not need any other materials.**

Total Marks

## 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 70.
- 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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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**PEARSON**

## 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

n	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 test				
	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
28	0.250	0.317	0.374	0.437	0.479
29	0.245	0.312	0.367	0.430	0.471
30	0.241	0.306	0.361	0.423	0.463

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

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**Chi-squared distribution formula**

$$X^2 = \sum \frac{(O-E)^2}{E}$$

$$df = (r - 1)(c - 1)$$

**Critical values for chi-squared distribution**

Level of significance for a one-tailed test						
	0.10	0.05	0.025	0.01	0.005	0.0005
Level of significance for a two-tailed test						
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.**



**Mann-Whitney U test formulae**

$$U_a = n_a n_b + \frac{n_a(n_a+1)}{2} - \sum R_a$$

$$U_b = n_a n_b + \frac{n_b(n_b+1)}{2} - \sum R_b$$

(U is the smaller of  $U_a$  and  $U_b$ )

**Critical values for the Mann-Whitney U test**

		$N_b$															
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
$N_a$																	
<b><math>p \leq 0.05</math> (one-tailed), <math>p \leq 0.10</math> (two-tailed)</b>																	
<b>5</b>	4	5	6	8	9	11	12	13	15	16	18	19	20	22	23	25	
<b>6</b>	5	7	8	10	12	14	16	17	19	21	23	25	26	28	30	32	
<b>7</b>	6	8	11	13	15	17	19	21	24	26	28	30	33	35	37	39	
<b>8</b>	8	10	13	15	18	20	23	26	28	31	33	36	39	41	44	47	
<b>9</b>	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	
<b>10</b>	11	14	17	20	24	27	31	34	37	41	44	48	51	55	58	62	
<b>11</b>	12	16	19	23	27	31	34	38	42	46	50	54	57	61	65	69	
<b>12</b>	13	17	21	26	30	34	38	42	47	51	55	60	64	68	72	77	
<b>13</b>	15	19	24	28	33	37	42	47	51	56	61	65	70	75	82	84	
<b>14</b>	16	21	26	31	36	41	46	51	56	61	66	71	77	82	87	92	
<b>15</b>	18	23	28	33	39	44	50	55	61	66	72	77	83	88	94	100	
<b>16</b>	19	25	30	36	42	48	54	60	65	71	77	83	89	95	101	107	
<b>17</b>	20	26	33	39	45	51	57	64	70	77	83	89	96	102	109	115	
<b>18</b>	22	28	35	41	48	55	61	68	75	82	88	95	102	109	116	123	
<b>19</b>	23	30	37	44	51	58	65	72	80	87	94	101	109	116	123	130	
<b>20</b>	25	32	39	47	54	62	69	77	84	92	100	107	115	123	130	138	

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$N_a$	$N_b$															
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b><math>p \leq 0.01</math> (one-tailed), <math>p \leq 0.02</math> (two-tailed)</b>																
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
6	2	3	4	6	7	8	9	11	12	13	15	16	18	19	20	22
7	3	4	6	7	9	11	12	14	16	17	19	21	23	24	26	28
8	4	6	7	9	11	13	15	17	20	22	24	26	28	30	32	34
9	5	7	9	11	14	16	18	21	23	26	28	31	33	36	38	40
10	6	8	11	13	16	19	22	24	27	30	33	36	38	41	44	47
11	7	9	12	15	18	22	25	28	31	34	37	41	44	47	50	53
12	8	11	14	17	21	24	28	31	35	38	42	46	49	53	56	60
13	9	12	16	20	23	27	31	35	39	43	47	51	55	59	63	67
14	10	13	17	22	26	30	34	38	43	47	51	56	60	65	69	73
15	11	15	19	24	28	33	37	42	47	51	56	61	66	70	75	80
16	12	16	21	26	31	36	41	46	51	56	61	66	71	76	82	87
17	13	18	23	28	33	38	44	49	55	60	66	71	77	82	88	93
18	14	19	24	30	36	41	47	53	59	65	70	76	82	88	94	100
19	15	20	26	32	38	44	50	56	63	69	75	82	88	94	101	107
20	16	22	28	34	40	47	53	60	67	73	80	87	93	100	107	114

$N_a$	$N_b$															
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b><math>p \leq 0.025</math> (one-tailed), <math>p \leq 0.05</math> (two-tailed)</b>																
5	2	3	5	6	7	8	9	11	12	13	14	15	17	18	19	20
6		5	6	8	10	11	13	14	16	17	19	21	22	24	25	27
7			8	10	12	14	16	18	20	22	24	26	28	30	32	34
8				13	15	17	19	22	24	26	29	31	34	36	38	41
9					17	20	23	26	28	31	34	37	39	42	45	48
10						23	26	29	33	36	39	42	45	48	52	55
11							30	33	37	40	44	47	51	55	58	62
12								37	41	45	49	53	57	61	65	69
13									45	50	54	59	63	67	72	76
14										55	59	64	67	74	78	83
15											64	70	75	80	85	90
16												75	81	86	92	98
17													87	93	99	105
18														99	106	112
19															113	119
20																127



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$N_a$	$N_b$															
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<b><math>p \leq 0.005</math> (one-tailed), <math>p \leq 0.01</math> (two-tailed)</b>																
5	0	1	1	2	3	4	5	6	7	7	8	9	10	11	12	13
6		2	3	4	5	6	7	9	10	11	12	13	15	16	17	18
7			4	6	7	9	10	12	13	15	16	18	19	21	22	24
8				7	9	11	13	15	17	18	20	22	24	26	28	30
9					11	13	16	18	20	22	24	27	29	31	33	36
10						16	18	21	24	26	29	31	34	37	39	42
11							21	24	27	30	33	36	39	42	45	48
12								27	31	34	37	41	44	47	51	54
13									34	38	42	45	49	53	57	60
14										42	46	50	54	48	63	67
15											51	55	60	64	69	73
16												60	65	70	74	79
17													70	75	81	86
18														81	87	92
19															93	99
20																105

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

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**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**

<i>n</i>	Level of significance for a one-tailed test		
	0.05	0.025	0.01
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.







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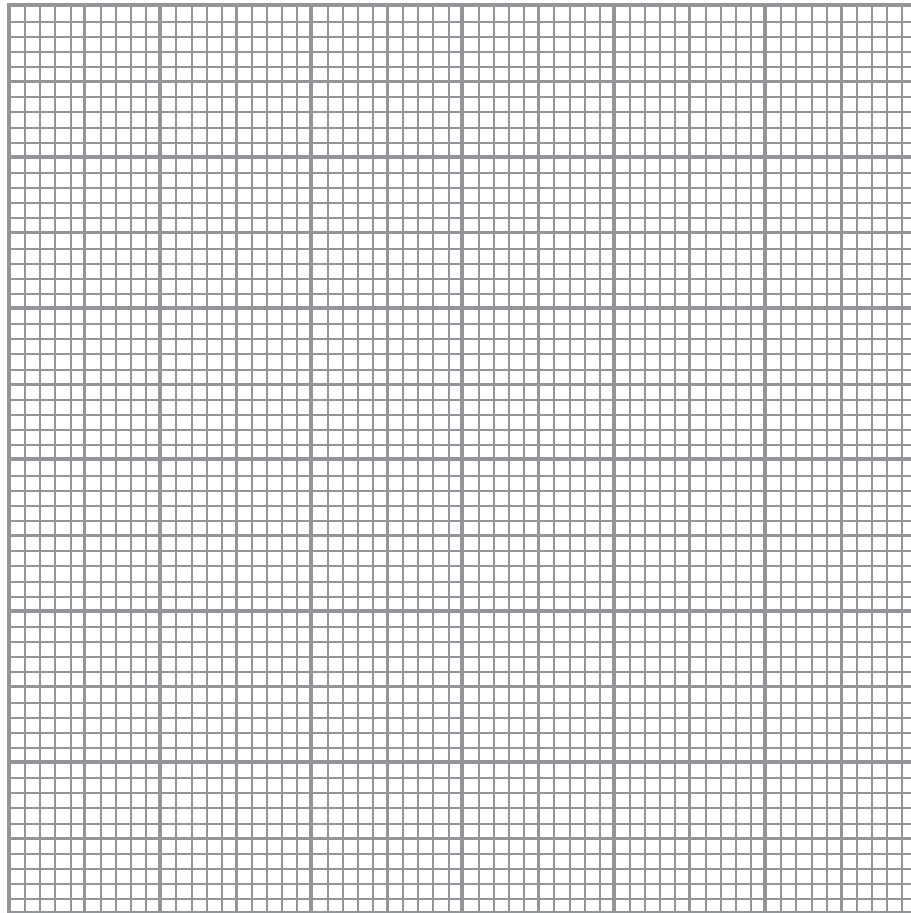
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(b) Draw a suitable graph to display the data in **Table 1**.

(3)

Title: .....



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

(1)

.....  
.....



(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 <sup>2</sup>
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		
<b>Total:</b>					

**Table 2**  
**SPACE FOR CALCULATIONS**

Spearman's rank correlation coefficient .....

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(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

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Weakness

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**(Total for Question 2 = 14 marks)**

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**(Total for Question 3 = 8 marks)**

**TOTAL FOR SECTION A = 29 MARKS**







(c) Suggest **one** way in which Pavlov's (1927) experiment with salivation in dogs could have been improved.

(2)

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**(Total for Question 4 = 7 marks)**

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5 Zaid conducted an animal study investigating the influence of different schedules of reinforcement on the time taken to complete a maze. Before going ahead with his study he gained the relevant licences for researching with animals from the Home Office. He separated rats into two groups to assess the impact of different amounts of food (variable ratio) against a specific amount of food (fixed ratio) as a reward for completing the maze successfully. He recorded the amount of time taken for the completion of the maze using a stopwatch and analysed his data to see if there was a difference between the two groups of rats.

(a) State the independent variable (IV) and dependent variable (DV) for Zaid's study. (2)

Independent variable (IV)

.....

Dependent variable (DV)

.....

(b) Describe **one** ethical issue that Zaid needed to consider before conducting his study, which would have helped him gain a Home Office licence. (2)

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(c) Explain **two** weaknesses of using animals in psychological research.

(4)

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2 .....

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**(Total for Question 5 = 8 marks)**

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(b) Bandura's (1961, 1963) original Bobo Doll experiments investigated the influence of social learning theory.

Using your knowledge of Bandura's (1961, 1963) original Bobo Doll experiments, suggest **one** way Jack's parents could use social learning theory to encourage Jack to use the potty/toilet.

(2)

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**(Total for Question 6 = 6 marks)**

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7 Evaluate systematic desensitisation as a treatment for phobias.

(8)

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**(Total for Question 7 = 8 marks)**

**TOTAL FOR SECTION B = 29 MARKS**







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**(Total for Question 8 = 12 marks)**

**TOTAL FOR SECTION C = 12 MARKS  
TOTAL FOR PAPER = 70 MARKS**



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