Write your name here

Surname		Other names

Pearson Edexcel
International
Advanced Level

Centre Number

Candidate Number

Psychology
International Advanced Subsidiary
Paper 2: Biological Psychology, Learning
Theories and Development

Sample assessment materials for first teaching
September 2015
Time: 2 hours

Paper Reference
WPS02/01

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 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 ▶

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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 test				
N	**0.10**	**0.05**	**0.025**	**0.01**	**0.005**
5	0.900	1.000	1.000	1.000	1.000
6	0.829	0.886	0.943	1.000	1.000
7	0.714	0.786	0.893	0.929	0.964
8	0.643	0.738	0.833	0.881	0.905
9	0.600	0.700	0.783	0.833	0.867
10	0.564	0.648	0.745	0.794	0.830
11	0.536	0.618	0.709	0.755	0.800
12	0.503	0.587	0.678	0.727	0.769
13	0.484	0.560	0.648	0.703	0.747
14	0.464	0.538	0.626	0.679	0.723
15	0.446	0.521	0.604	0.654	0.700
16	0.429	0.503	0.582	0.635	0.679
17	0.414	0.485	0.566	0.615	0.662
18	0.401	0.472	0.550	0.600	0.643
19	0.391	0.460	0.535	0.584	0.628
20	0.380	0.447	0.520	0.570	0.612
21	0.370	0.435	0.508	0.556	0.599
22	0.361	0.425	0.496	0.544	0.586
23	0.353	0.415	0.486	0.532	0.573
24	0.344	0.406	0.476	0.521	0.562
25	0.337	0.398	0.466	0.511	0.551
26	0.331	0.390	0.457	0.501	0.541
27	0.324	0.382	0.448	0.491	0.531
28	0.317	0.375	0.440	0.483	0.522
29	0.312	0.368	0.433	0.475	0.513
30	0.306	0.362	0.425	0.467	0.504

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

Chi squared distribution formula

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

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.

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 significance 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.

SECTION A

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

1 (a) **Figure 1** shows a cross-section of the human brain.
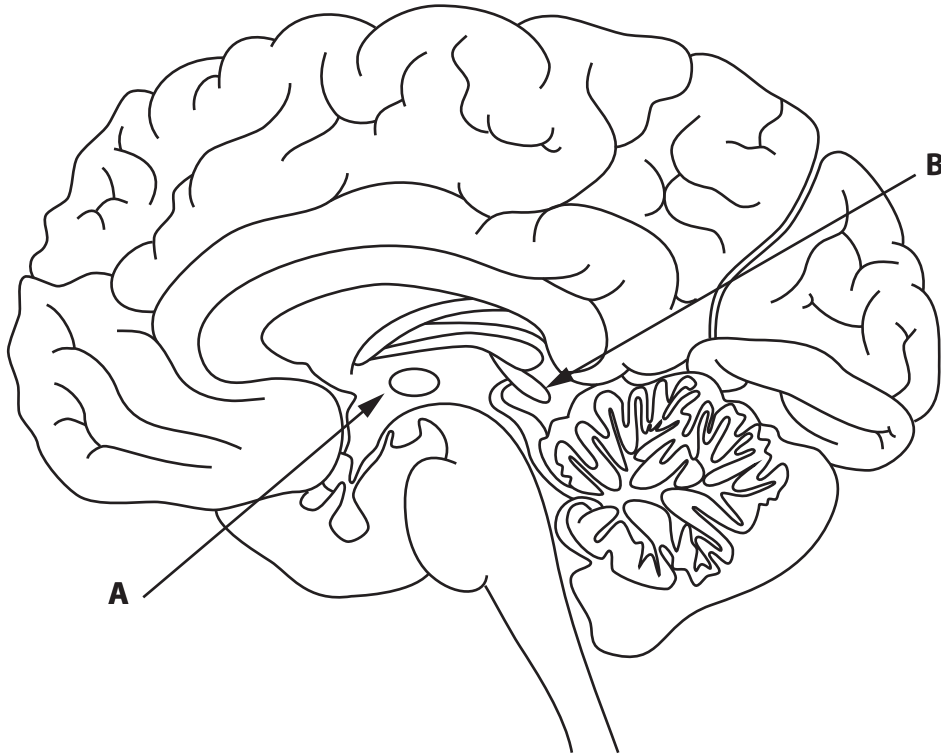
Figure 1

Name structures **A** and **B** which are involved in the monitoring of external daylight in the control of circadian rhythms.

(2)

A ....

B ....

(b) Describe how the brain responds to falling exogenous light levels in order to bring about sleep.

(3)

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(Total for Question 1 = 5 marks)

2 (a) Tynjala et al. (1993) surveyed 11 to 16 year olds in relation to sleep duration. Information from over 40,000 participants was recorded in different countries with similar patterns of day length. The data is displayed in **Table 1**.

Country	Mean number of hours sleep			Mean number of hours sleep for 11 to 16 year olds
	11/12 years' old	13/14 years' old	15/16 years' old	
Switzerland	10	9.6	9.2	9.6
Belgium	9.7	9.3	8.9	9.3
Scotland	9.7	9.2	8.8	9.2
Norway	9.6	9.2	8.9	9.2
Sweden	9.6	9.1	8.6	9.1
Wales	9.4	9.1	8.9	9.1
Hungary	9.4	9.1	8.9	9.1
Finland	9.3	8.9	8.6	8.9

Table 1

Calculate, from the data in **Table 1**, how much greater the sleep duration of a typical 11/12 year-old-child from Switzerland is compared to a typical 15/16 year-old-child from Finland. Express your answer as a percentage to one decimal point.

(2)

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(b) Describe what the results in **Table 1** show about duration of sleep for children in different countries.

(4)

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(c) One possible conclusion from this research is that other factors can override the external zeitgeber of day length in the control of sleep duration.

Explain how the data in **Table 1** supports this conclusion.

(2)

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(d) A recent report stated that half of teenagers in Scotland are sleep deprived. Pilot studies in three Scottish schools were carried out in 2013 to assess the scale of the problem.

Suggest **three** questions that could be used in an interview with the teenagers to gather qualitative data on the effect of sleep deprivation.

(3)

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2 ....

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3 ....

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(Total for Question 3 = 11 marks)

3 The sleep-wake cycle is an important biological rhythm in humans in relation to maintaining a healthy life-style.

In 1982, a study focusing on the prevention of cancer asked participants about their sleep habits.

The researchers wanted to know whether sleep duration was associated with an increase in mortality over a six-year follow-up period.

A hazard ratio of 1.0 was given to a seven-hour sleep duration, based on previous studies. The hazard ratios for other sleep durations were given relative to this.

A hazard ratio of 1.12 would indicate that the participants were 12% more likely to die within the six-year follow-up period than those sleeping seven hours.

Table 2 shows the hours of sleep and hazard ratios for men and women.

Hours of sleep	% women	hazard ratio	% men	hazard ratio
3	0.1	1.33	0.1	1.19
4	0.7	1.11	0.6	1.17
5	3.5	1.07	2.9	1.11
6	15.9	1.07	15.5	1.08
7	31.8	1.00	33.8	1.00
8	38.8	1.13	38.0	1.12
9	6.0	1.23	5.7	1.17
10+	1.5	1.41	2.0	1.34
Missing data	1.7	no data	1.4	no data

Table 2

(a) (i) Describe the relationship between the hours of sleep and the hazard ratio, using the data in **Table 2**.

(3)

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(ii) State which test could be used to see if the relationship between the hours of sleep and hazard ratio is significant.

(1)

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(b) **Table 3** shows the number of men and women whose sleep duration was more than seven hours and the number whose sleep duration was less than seven hours.

Number of hours' sleep	Women	Men
Fewer than seven hours	202	191
More than seven hours	480	471

Table 3

(i) Calculate chi-squared for this data by completing **Table 4**.

(4)

		Observed	Expected	O–E	$(O-E)^2$	$(O-E)^2/E$
Males	<7 hours	202	199			
	>7 hours	480	483			
Females	<7 hours	191	194			
	>7 hours	471	468			
				chi-squared =		

Table 4

(ii) State the critical value for chi-squared, for this data, at p0.05, for a two-tailed test.

(1)

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(iii) There is no significant gender difference in the relationship between duration of sleep and hazard ratio. Use the data above to justify this statement.

(1)

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(Total for Question 2 = 10 marks)

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QUESTION 4 BEGINS ON THE NEXT PAGE.

4 Assess the validity of **one** piece of research into the role of external zeitgebers in the control of the infradian rhythm of the menstrual cycle.

(8)

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(Total for Question 4 = 8 marks)

TOTAL MARKS FOR SECTION A = 34 MARKS

SECTION B

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

5 (a) Describe the main features involved in the process of classical conditioning.

(3)

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(b) Using the concept of operant conditioning, explain how a negative reinforcement strategy would differ from a punishment strategy to bring about a change in a person's behaviour.

(4)

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(Total for Question 5 = 7 marks)

6 Jones & Friman (1999) carried out a case study of a 14-year-old boy suffering from a phobia of insects.

The presence of insects in the class room seriously disrupted his performance at school.

The boy said that when he thought insects might be present in the classroom he had difficulty concentrating and that he was often teased by his classmates about his phobia.

He said that the insects he was most afraid of were ladybirds and crickets. Teachers observed him ignore his work, pull his hood over his head, or yell when he saw insects.

He was treated using systematic desensitisation, starting with pictures of insects to having insects near him. At each stage he was rewarded for concentrating on maths tasks given to him.

After his therapy was completed he was observed to examine insects and was unresponsive to the taunts of his peers.

(a) State **one** piece of qualitative data collected in the study.

(1)

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(b) State the avoidant behaviour shown by the boy in his initial response to insects.

(1)

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(c) Describe how positive reinforcement was used successfully in the context of this study.

(2)

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(Total for Question 6 = 4 marks)

7 (a) Capafóns et al. (1998) carried out a study into the use of systematic desensitisation to overcome the fear of flying. In this study patients were recruited through a media campaign (radio, press and television) set up by the research team.

Identify how this is an example of volunteer sampling.

(1)

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(b) Explain **one** advantage and **one** disadvantage of using a volunteer sampling technique in this study.

(4)

Advantage

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Disadvantage

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(c) An alternative therapy to treat phobias could be the use of psychoanalysis.

Explain **two** ways in which psychoanalysis could be an appropriate alternative to using systematic desensitisation to treat phobias.

(4)

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(Total for Question 7 = 9 marks)

8 (a) During your course, you will have conducted a practical investigation to observe human behaviour.

Describe how you created and subsequently recorded the behavioural categories used.

(3)

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(b) For your practical investigation, state **three** observations could have been improved.

(3)

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(Total for Question 8 = 6 marks)

9 Mrs Walker is suffering from a bird phobia. A clinical psychologist suggests that she might benefit from therapy involving systematic desensitisation. Discuss how systematic desensitisation could be used to treat Mrs Walker's bird phobia.

You must make reference to the context in your answer.

(8)

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(Total for Question 9 = 8 marks)

TOTAL MARKS FOR SECTION B = 34 MARKS

SECTION C

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

10 An educational psychologist is helping a teenager at school with problems of depression. During the course of his initial sessions the boy describes his problems as being more severe in the winter months than in the summer. He explains that he is having trouble sleeping properly and as a result falls asleep in class. The psychologist suspects that the teenager's problems might be due to Seasonal Affective Disorder and recommends light therapy.

Evaluate the psychologist's decision to use light therapy as a treatment for Seasonal Affective Disorder.

You must make reference to the context in your answer.

(12)

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(Total for Question 10 = 12 marks)

11 Brendgen et al. (2005) examined genetic and environmental effects on aggression. The study used six-year-old twins and looked at the contribution of genes and environment to aggression. One aim was to see whether the correlation between social and physical aggression could be explained by similar genetic or environmental factors.

Evaluate the importance of biological factors **and** social learning theory factors in explaining the development of aggression in pairs of twins.

(16)

(Total for Question 11 = 16 marks)

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