

GENERAL COMMENTS

Students generally performed well on the June paper with results, on average, being slightly lower than Examination 1 in 2002. It is considered that this was due to the slightly more sophisticated terminology used in some of the questions in the short-answer section.

In the multiple-choice section all three areas were well answered with mean performance for Biological Bases of Behaviour and Visual Perception only slightly lower than for States of Consciousness. Performance overall on the multiple-choice questions was slightly better than for the 2002 June paper reflecting high content accessibility. As in previous years, students performed less well on the short-answer questions, often because of a lack of precision and completeness in descriptions and definitions, failure to refer to appropriate psychological information or failure to provide appropriate examples in their answers when required.

Teachers had clearly instructed and directed students' attention to key concepts and phenomena in the study design. In general, students demonstrated good knowledge and understanding of the curriculum though many performed below their capabilities by not addressing all aspects of the questions in their answers. For example, when required to **name and describe** three features (e.g. Question 13) many students only named or described the features thereby failing to gain any marks for their answers. When asked to **define and give an example**, many students did not carry out both instructions. Students need to read the short-answer questions very carefully and then check their answers against the question requirements.

Marking policies

Short-answer questions worth 2 marks require two key terms and/or pieces of information. Three-mark questions usually require three terms and/or pieces of information. However, in some cases, two distinct terms and/or statements were required for each mark (e.g. name *and* describe or explain, Question 13), and this was made clear in the question stem. Within these limits assessors judge students' knowledge and understanding on the answers provided.

SPECIFIC INFORMATION

Section A – Multiple choice

This section of the paper was very well answered with only five questions resulting in a correct response rate of less than 50%. These questions, along with some moderately difficult ones, are discussed below.

This table indicates the approximate percentage of students choosing each distractor. The correct answer is the shaded alternative.

Biological Bases of Behaviour

Question	A	B	C	D	Selected comments
1	59	21	13	7	Many students were unaware of the numerical predominance of interneurons over other types of neurons in the central nervous system.
2	7	5	76	12	
3	14	10	2	74	
4	77	13	2	8	
5	2	2	94	2	
6	10	2	85	3	
7	80	8	7	5	
8	4	17	27	52	Many students incorrectly selected <i>sympathetic</i> or <i>autonomic</i> as being the division of the peripheral nervous system that would transmit the pain of a bee sting to the central nervous system. This suggests confusion in understanding the role of the autonomic nervous system.
9	4	82	3	11	
10	15	75	6	4	
11	2	1	1	96	

12	2	2	89	7	
13	90	2	2	6	
14	1	45	3	51	Many students obviously did not register the information given in the stem of the question – that when first promoted she ‘... nearly fainted’, so the correct answer could not refer to the stage of exhaustion which is the last phase of the General Adaptation Syndrome.
15	4	84	11	1	

Visual Perception

	A	B	C	D	
Question	%				Selected comments
16	88	5	4	3	
17	5	2	5	88	
18	68	21	5	6	Many students failed to realise that one major function of the photoreceptors is to <i>transduce</i> or change the form of the electro-magnetic energy collected by the eye into a form of energy (electro-chemical) capable of being transmitted through the nervous system.
19	22	6	69	3	Many students failed to identify the numerical preponderance of rods over cones in the retina (especially since the relative numbers are approximately 125 million rods and 6.5 million cones).
20	8	66	7	19	Study of a diagram of the eye clearly shows that the light travels through the pupil before reaching the lens – eliminating alternative D.
21	9	36	3	52	This was the most poorly answered of the multiple-choice questions, distractor ‘D’ could not have been selected by any student aware that in the process of dark adaptation, rods take three times as long as cones to adjust.
22	10	19	67	4	Responses to this question demonstrate difficulties with comprehension of the apparent distance hypothesis as an explanation for the moon illusion.
23	85	6	6	3	
24	48	38	6	8	Relative size works as a depth cue only when we are familiar with the objects in view.
25	2	4	91	3	
26	1	4	88	7	
27	21	2	16	61	Any student with a good understanding of the principle of closure could not have selected an alternative other than ‘D’.
28	2	89	5	4	
29	20	10	13	57	The Ames room is an illusion of distance caused by our tendency to preserve shape constancy at the expense of size constancy – as in Question 24 – it is familiarity that is the key. We maintain the rectangular perception of the room as a result of our lifetime’s experience with square or rectangular rooms.
30	8	49	25	18	The peephole in the Ames room allows the use of only one eye, therefore no binocular depth cues can be used.

States of Consciousness

	A	B	C	D	
Question	%				Selected comments
31	3	1	1	96	
32	46	34	2	18	The flow of thoughts described for Adrienne in this question is a concrete example of William James’ hypothetical construct of the stream of consciousness referred to in the previous question.
33	90	4	1	5	
34	81	11	2	6	
35	5	7	88	0	
36	7	77	15	1	
37	79	2	6	13	
38	7	9	11	73	
39	3	5	76	16	

40	3	7	71	19	
41	4	5	87	4	
42	73	4	9	14	
43	60	22	7	11	It is possible for night terrors to be experienced in any stage of deep (Delta Wave) sleep, though they are more commonly experienced in Stage 4 of non-REM sleep.
44	6	4	88	2	
45	78	4	16	2	

Section B – Short answer

Biological Bases of Behaviour

Hemispheric specialisation is an area that requires special attention. The organisation of the primary motor cortex and primary somatosensory cortex were not always well explained.

As in 2002, most students had difficulty adequately explaining the implications of severance of the corpus callosum. There was also widespread misunderstanding of the fact that the corpus callosum is not the *only* connection between the two hemispheres, a person with a ‘split brain’ would indeed still have images from the left visual field sent to the right occipital lobe and vice-versa. Apart from these two areas of weakness, this section was generally well-answered.

Question 1

Marks	0	1	2	Average
%	83	12	5	0.22

This question was poorly answered and many students did not attempt a response. One mark was awarded for any of the following points:

- There is greater representation in the cortices for body regions with greater responsiveness.
- Both sensory and motor cortices have their upper portions relating to the lower limbs and lower portions relating to upper parts of the body.
- Both sensory and motor cortices have the right side of the body controlled by (responding to) the left hemisphere and vice-versa.

Question 2

Marks	0	1	2	3	Average
%	2	9	17	72	2.59

This question was well answered. Most students were aware that Broca’s aphasia affects fluency but not meaning of speech and is caused by damage in the frontal lobe, whilst Wernicke’s aphasia affects meaning of speech but not fluency and is caused by damage in the temporal lobe.

Question 3

Marks	0	1	2	Average
%	33	20	47	1.13

This question was reasonably well answered. For 2 marks, students needed to provide the following three pieces of information relating to severance of the corpus callosum:

- interpretation of the picture will take place in the **right** hemisphere
- to say the **name** of what she had seen, the information would need to be passed to the verbal (left) hemisphere
- the severed corpus callosum means that no such transfer can take place.

Question 4

Marks	0	1	2	Average
%	36	43	21	0.85

This question was designed to examine the students’ understanding of the extent of hemispheric specialization, and the degree of flexibility in the brain’s specialisation. Marks were awarded for the following pieces of information:

- Both hemispheres are involved in the majority of behaviours.
- A small percentage of people have reversed hemispheric specialisation for some functions (e.g. language).
- Though it is true that many processes are **dominantly** right-brain functions – for most functions this is a **relative**, not absolute, dominance.
- Hemispheric specialisation is much more pronounced in right-handed people (especially right-handed males, though students need not make this additional point for the mark).

v. Plasticity of the brain – following brain injury other areas may take over functions performed by the damaged parts (e.g. **right** neglect much less common than **left** neglect for reason of the plasticity of the right hemisphere).

Question 5

Marks	0	1	2	3	Average
%	35	20	23	22	1.32

This question was specifically referring to a spinal reflex. The following information was required for 3 marks:

- Sensory neuron takes the sensory neural impulse to the spinal cord.
- Interneuron takes neural impulse to the motor neuron.
- Motor neuron sends motor signal to the skeletal muscles and withdrawal of hand occurs.

Question 6

6i

Marks	0	1	Average
%	51	49	0.49

Many students listed *physiological* changes not psychological changes. They could not therefore get any marks. Students could name either a positive effect, such as *motivation* or a negative effect, such as difficulty concentrating, irritability or other emotional change, forgetfulness, difficulty following a train of thought and difficulty planning; anxiety.

6ii

Marks	0	1	2	Average
%	27	33	40	1.12

Students needed to identify that immunity would decrease (due to reduction in the number of lymphocytes) and therefore infections – bacterial or viral – are more likely to cause her to be ill.

Visual Perception

This was the weakest of the three areas of study in the short-answer section. The distinction between sensation and perception in the process of vision, whilst arguable in theory, is a fundamental distinction at this level of study and is specified in the study design. Problems arose with students being unable to draw this distinction. It is important that the difference between visual perceptual principles and psychological factors is understood and answers to questions in this area suggested that this was not the case. In previous examinations, students have been asked to explain visual illusions that occur as a result of misperceptions of depth or distance – Question 12 in 2003 asked exactly this, with relatively poor results. Students need to understand not only what a visual illusion *is*, but also why our perception is deceived.

Question 7

Marks	0	1	2	Average
%	39	46	15	0.75

This question was answered poorly and it is apparent that this was largely because most students answered only half the question – failing to indicate why *sensation* is said to be similar for everybody **as well as** indicating why *perception* may vary from person to person.

Question 8

8i

Marks	0	1	Average
%	35	65	0.65

Most students correctly identified *cones* as the receptors that are not working correctly.

8ii

Marks	0	1	Average
%	53	47	0.47

Less than half the students correctly identified that the *rods* – photoreceptors responsible for peripheral vision – were not affected whilst the *cones* – responsible for central vision were damaged.

8iii

Marks	0	1	Average
%	76	24	0.24

Being aware that *cones* are responsible for acute vision and vision in colour, few students identified *colour vision* as being the other visual process most likely to be affected.

Question 9

Marks	0	1	2	Average
%	45	25	30	0.85

Many students wrongly described *size* constancy, rather than *shape* constancy and therefore gained no marks. A few students gave inappropriate examples (basketballs and soccer balls do not cast images of different shapes depending on the angle from which they are viewed).

Question 10

10i

Marks	0	1	Average
%	49	51	0.51

The psychological factor of *context* (*perceptual set* and *expectancy* were also accepted). *Closure* and *proximity* which were listed by many students are Visual Perceptual Principles, not Psychological Factors.

10ii

Marks	0	1	Average
%	62	38	0.38

If students had incorrectly identified the factor in 10i, they could not gain a mark in 10ii.

10iii

Marks	0	1	Average
%	39	61	0.61

The context of letters (horizontally) leads us to interpret the ambiguous figure as a letter [B]; the context of numbers (vertically) leads us to interpret the ambiguous figure as a number [13].

Question 11

Marks	0	1	2	Average
%	54	33	13	0.59

This question was poorly answered, which suggests that students are less familiar with the bullet points in the study design than would be appropriate – since diabetic retinopathy is clearly listed as a physiological cause of vision loss.

Students needed to give two of the following pieces of information:

- the walls of the minute blood vessels in the retina are weakened and may leak blood into the eye, restricting passage of light to the photoreceptors
- the weakened blood vessels in the retina do not remove wastes from the eye so it becomes cloudy
- weakened blood vessels do not carry sufficient oxygen to the photoreceptors so they may die
- proliferation of blood vessels across the retina, attempting to compensate for those that are not working, obscures light access to the photoreceptors.

Question 12

12i

Marks	0	1	Average
%	54	46	0.46

Less than half the students were able to indicate that the different configurations of the ends of the lines cause a consistent misperception of the length of the horizontal lines.

12ii

Marks	0	1	2	Average
%	57	28	15	0.58

The important points to be made in this answer were that:

- both straight lines cast identical size retinal images (or that both lines are identical in size)
- the lower line is misperceived to be more distant (or the upper line is misperceived to be closer) and the 'more distant' object, casting the same sized image, is misperceived to be longer (or the 'closer' image is misperceived to be shorter)

States of Consciousness

Students generally demonstrated good knowledge of this area of study although problems showed up in the way some questions were answered, for example Question 13 required the *naming* and *description* of three differences between NWC and ASC – many students *named* but did not *describe* the differences. Problems with this type of question have

been noted in previous advice and this indicates the need for practice and attention to this examination technique. The understanding of using psychological techniques to control autonomic processes was not well expressed.

Question 13

13i

Marks	0	1	Average
%	28	72	0.72

Most students could correctly identify and describe at least one of the ways in which ASCs differ from NWC. These included changes in perception of time, awareness of stimuli, memory, thought processes, suggestibility and response to pain.

13ii

Marks	0	1	Average
%	34	66	0.66

This demanded another response from the list above.

13iii

Marks	0	1	Average
%	41	59	0.59

This demanded another response from the list above.

Question 14

Marks	0	1	2	Average
%	51	39	10	0.59

The wording of the question eliminates references to drug-induced analgesia and to the fact that (e.g. with the fakir's bed of nails) physical factors such as distribution of mass are also involved.

Few students were able to correctly indicate two of the required pieces of information, specifically:

- focused attention on a particular stimulus other than the pain creates selective attention for that stimulus
- selective attention on a specific stimulus causes reduced awareness of other stimuli, including pain
- muscular relaxation in an ASC can reduce experience of pain
- emotional state has been shown to influence experience of pain – people undertaking these activities are often in an euphoric state.

Question 15

15i

Marks	0	1	Average
%	51	49	0.49

Students were generally able to provide the information that GSR refers to a measure of either:

Electrical conductivity of the skin's surface

or

Resistance of the skin's surface to the passage of electricity. A student may also indicate that GSR is inversely proportional to the resistivity of the skin's surface.

15ii

Marks	0	1	Average
%	66	34	0.34

This question was not well answered, with only one third of students able to indicate that the EEG detects, records and amplifies electrical activity of the brain in the form of brain-waves *and* that *BETA* waves would be shown by a person in an alert state.

Question 16

16i

Marks	0	1	2	Average
%	22	50	28	1.06

Psychological effects

Any **two** of the following pieces of information:

- i. Affective disturbance
 - anxiety
 - phobias
 - emotionality (irritability, mood swings).
- ii. Sleep deprivation psychosis (hallucinations)
- iii. Cognitive disturbance (including delusions)
- iv. Attentional difficulties
- v. Difficulty concentrating on simple tasks (better with complex tasks)

Physiological effects

Any **two** of the following pieces of information:

- i. Shaking hands
- ii. Feelings of fatigue
- iii. Drooping eyelids
- iv. Problems focusing
- v. Heightened sensitivity to pain
- vi. Ataxia (physical strength and coordination deteriorate)
- vii. REM rebound
- viii. Dizziness
- ix. Headaches

16ii

Marks	0	1	Average
%	66	34	0.34

Most students indicated that any lasting ill effects of this sleep deprivation are unlikely.

Question 17

17i

Marks	0	1	Average
%	44	56	0.56

Most students correctly identified the process as *Biofeedback*.

17ii

Marks	0	1	Average
%	75	25	0.25

Many students identified the way in which *acute* pain could be controlled, which was not the required answer.

17iii

Marks	0	1	Average
%	40	60	0.60

Most students correctly identified the other technique used as *meditation*.

Question 18

Marks	0	1	2	Average
%	25	35	40	1.15

Most students correctly identified the sleep disorder as *sleep apnea (apnoea)*. Fewer students were able to list associated symptoms such as *snoring* or *choking and gasping for breath*.

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