

## Solutions to practice exam questions: Mind, brain and body

### Consciousness

#### Multiple-choice solutions

- 1 **D**  
Consciousness is best defined as a state of awareness, as this definition takes into account that there are different levels of consciousness from wakefulness through to unconsciousness. The other alternatives are more indicative of being in a state of normal waking consciousness.
- 2 **B**  
'Consciousness' is defined as the awareness of objects and events in the external world and the subject's own existence and activities. **A** and **D** only address part of this definition. **C** is too vague, especially as the various levels or states of consciousness have different types of physiological activity.

### States of consciousness

#### Multiple-choice solutions

- 3 **A**  
Selective attention
- 4 **B**  
Psychologists identify significant alterations in both the quality and pattern of mental functioning as altered states of consciousness.
- 5 **C**  
When meditating, individuals can focus their concentration away from thoughts and feelings by repeating a word over and over in order to generate a sense of relaxation.
- 6 **A**  
For Stephanie, driving would be considered a controlled process because it involved higher levels of awareness, mental effort and focused attention.
- 7 **D**  
Amber was experiencing an altered state of consciousness due to the effects of the alcohol as she showed changes in her emotional state and level of self-control,

as well as distortions in her perception and ability to process information into her memory.

- 8 **A**  
While meditating, Rodric is most likely to experience a distorted sense of time.
- 9 **C**  
The findings from Dr Andrade's study (that surgical patients may be able to pick up information despite being under the influence of a general anaesthetic) suggest that the patients were in an altered state of consciousness. Such patients were not fully awake and conscious (**A**) and yet were not fully unconscious (**B**) as they were able to develop memories of activities going on around them. If they were not given enough anaesthetic (**D**) then they would react adversely to the pain of the surgical procedures.

#### Short-answer solutions

- 10 As controlled processes require an individual's absolute attention and concentration, it is usually impossible to simultaneously complete another activity.
- 11 In its simplest form, meditation involves assuming a relaxed sitting or lying position and breathing deeply, slowly and rhythmically. Attention is directed only at the breathing movements of the diaphragm, and all other thoughts and feelings are gently blocked from consciousness, thereby generating a sense of relaxation and an inner, private reality. This process changes the brainwave patterns (to an alpha state) and lowers the physiological levels of autonomic functions.
- 12 Any of the following:
- attention is highly focused on their meditation rather than the painful stimulus
  - perception is distorted, leading to a dulled or suppressed sense of pain
  - the monks may be experiencing a sense of detachment from themselves in their ASC
  - cognitive distortions may mean that sensory information from the pain receptors is not being processed

- the meditative state induces physical relaxation characterised by increased alpha and theta waves and decreased autonomic levels (heart rate, breathing rate, oxygen consumption etc.). These physiological factors are beneficial in reducing the experience of pain
- the ASC may facilitate the release of endorphins to act as painkillers
- the monks are able to lower their emotional response to the pain, and hence decrease their experience of it
- the monks expect to transcend negative influences in their meditative state, and so expect to feel no pain during their ASC, thereby raising their pain threshold above that of the uninitiated.

**Allocate 1 mark for any of the above answers. Total 2 marks**

## Sleep

### Multiple-choice solutions

- 13 C**  
Newborn infants are expected to spend approximately 20 hours sleeping each day.
- 14 D**  
Restorative theories of why people sleep emphasise physiological repair and renewal.
- 15 D**  
According to the survival theory, the purpose of sleep is to enhance the continued existence of the organism by causing it to attract less attention to itself while asleep.
- 16 B**  
NREM stages 3 and 4. Athletes, or individuals exerting themselves in vigorous, physical activity, show an increase in deep NREM sleep during the first two nights after the exertion.

### Short-answer solutions

- 17** Sleep restores the body's energy levels and enables damaged cells to be repaired.
- 18** Sleep acts as a protective mechanism resulting in an animal being inactive at its most vulnerable time.
- 19** In the range of 45–50%.
- 20** In the range of 18–23%.

## Physiological responses which indicate different states of consciousness

### Multiple-choice solutions

- 21 D**  
The device which measures eye movements is an electro-oculogram.
- 22 C**  
The electromyograph is used to measure changes in the electrical activity in the muscles.
- 23 B**  
Body temperature can be used as a physiological measure to indicate different states of consciousness because individuals who are asleep show a decrease in their body temperature.
- 24 A**  
As the galvanic skin response is used to measure levels of arousal, it could also be used to measure changes in consciousness as altered states display varying levels of lowered arousal.
- 25 D**  
While there are a number of physiological changes that occur during sleep, the different stages are best identified by analysing the brainwaves recorded by the electroencephalograph (EEG).
- 26 A**  
While still able to maintain a waking state, stress management exercises and meditation can produce a relaxed state characterised by alpha waves.
- 27 C**  
During NREM stage 4 sleep, delta brainwaves are present, as indicated by high amplitude and low frequency patterns.

### Short-answer solutions

- 28** The electroencephalograph (EEG) is used to record the electrical impulses produced by neurons activated within the brain. These impulses are detected via surface electrodes

placed onto the scalp of the individual in a sleep laboratory. These impulses are then amplified and transferred to paper as wavelike patterns.

**29** Any of the following:

- drowsy/stage 1 NREM sleep is characterised by a mixture of alpha brain waves (relatively high frequency/low to medium amplitude) and theta waves (irregular medium frequency/mixture of high and low amplitudes)
- stage 2 NREM sleep is characterised by theta brain waves with sleep spindles (brief bursts of high frequency activity) and K complexes
- stage 3 NREM sleep is characterised by a mixture of theta brain waves and delta waves (low frequency/high amplitude)
- stage 4 NREM sleep is characterised by delta brain waves, and is also known as slow wave sleep
- REM sleep is characterised by erratic high frequency/low amplitude beta brain waves.

**Allocate 1 mark for any of the above answers. Total 3 marks**

## Sleep deprivation

### Multiple-choice solutions

- 30 D**  
Mild sleep deprivation is most likely to result in an increase in irritability.
- 31 A**  
Studies indicate that lengthy periods of sleeping/dreaming deprivation cause negative results when REM sleep is interrupted.
- 32 B**  
After sleep deprivation, participants found it difficult to perform simple tasks but were able to perform more complex tasks successfully.

## Divisions of the nervous system

### Multiple-choice solutions

- 33 C**  
Every part of the body is connected to the brain by nerves in the spinal cord. While the peripheral nervous system (**B**), which

includes the autonomic nervous system (**A**) of which the sympathetic nervous system (**D**) is a part, comes out from the spinal cord to the rest of the body, it is the spinal cord itself that connects directly to the brain.

- 34 C**  
The two main divisions of the peripheral nervous system are the autonomic nervous system and the somatic nervous system. **A** is incorrect as the afferent nervous system and efferent nervous system are sub-divisions of the somatic nervous system. **B** is incorrect as the sympathetic nervous system and the parasympathetic nervous system are sub-divisions of the autonomic nervous system.
- 35 B**  
The somatic nervous system transmits sensory information and controls voluntary movements.
- 36 D**  
The autonomic nervous system is divided into the sympathetic and parasympathetic nervous systems.
- 37 C**  
The 'fight-or-flight' response is a state of physiological arousal controlled by the sympathetic nervous system.
- 38 D**  
The section of the nervous system which relaxes the body after action and allows it to conserve energy is called the parasympathetic nervous system.
- 39 D**  
These physiological responses (an adrenaline 'rush', heart pounding, dry mouth, deeper breathing and cold sweat) would result from the action of the sympathetic nervous system.
- 40 C**  
The sympathetic nervous system arouses the body and prepares it to meet challenges. The parasympathetic nervous system (**D**) relaxes the body after action.
- 41 D**  
Relaxation techniques should increase the response of the parasympathetic nervous system and result in slower heart and respiration rates and less muscular tension.

42 B

Blushing is an autonomic response as it occurs without conscious control and is due to increased blood flow as a result of arousal caused by that particular situation. All of the other choices involve different aspects within the central nervous system. **A** refers to the reflex arc which is mediated by the spinal; **C** involves the cerebellum and the motor cortices; and **D** is performed by Wernicke's area.

### Short-answer solutions

- 43 The peripheral nervous system (PNS) branches out from the CNS and carries information to or from the rest of the body.
- 44 Sympathetic nervous system.
- 45 The central nervous system (CNS) comprises the brain and the spinal cord, regulates, coordinates and controls the major functions of the body along with reflexive processing.
- 46 The sympathetic nervous system is a division of the autonomic nervous system responsible for creating a state of arousal which mobilises the body's energy and resources during times of stress and arousal, thereby mediating bodily functions involved in the 'fight-or-flight' response to stress. A sympathetic response dilates pupils, inhibits salivation, relaxes airways, accelerates the heartbeat, inhibits digestion, etc.
- 47 The parasympathetic nervous system is a branch of the autonomic nervous system concerned with the conservation of the body's energy and resources during relaxed states, and as such controls bodily functions that promote growth, energy conservation and regeneration. A parasympathetic response constricts pupils, stimulates salivation, constricts airways, slows the heartbeat, stimulates digestion, etc., and hence balances out the sympathetic response to return the body to a state of homeostatic equilibrium.

## The cerebral lobes and their functions

### Multiple-choice solutions

- 48 A  
The frontal lobe plays a major role in controlling emotions, organisation, voluntary motor movements and speaking.
- 49 C  
The area located at the back of the frontal lobe which controls voluntary muscles is known as the motor cortex.
- 50 A  
The frontal lobes of the cerebral cortex containing the region controlling the muscles involved in the production of speech is known as Broca's area.
- 51 C  
The somatosensory cortex is the part of the cerebral cortex which processes bodily sensations.
- 52 D  
The primary visual cortex is located in the occipital lobe.
- 53 A  
The area of the brain responsible for processing information from our sense of hearing is the primary auditory cortex.
- 54 C  
The motor area within the cerebral cortex has more space dedicated to controlling the thumb than the leg.
- 55 D  
If damage was to occur to Broca's area, the symptomatology you would expect would be a patient's inability to produce clear and fluent speech.
- 56 A  
Wernicke's aphasia is due to damage to Wernicke's area, located in the left temporal lobe.
- 57 C  
The amount of the somatosensory area devoted to a particular region of the body is positively correlated with the sensitivity of the body region.

**58 A**  
People who experience expressive aphasia have had damage to Broca's area within their left frontal lobe.

**59 D**  
Her symptoms would indicate damage to Wernicke's area.

### Short-answer solutions

**60 i** The occipital lobes are located at the rear of the brain.

**ii** The main function of the occipital lobes is to process visual information and our visual perception.

**61** Any three of the following:

- contain the primary and secondary motor cortices, which help us plan and carry out bodily movements
- are critical to several higher functions, including rational thought
- hold memories of plans we have made, so damage to the frontal lobes makes planning for the future difficult
- hold memories of social context, which tell us what kind of behaviour is appropriate or inappropriate for a particular social situation
- control inhibition, the ability to reject our first inclination or impulse
- process emotion (the left frontal lobe processes positive emotions, while the right frontal lobe processes negative emotions)
- the left frontal lobe aids in forming new memories
- the left frontal lobe contains Broca's area, which controls the muscles associated with the production of speech.

**62** • Broca's area is located in the left frontal lobe near the primary motor cortex.

- It is responsible for producing clear speech that follows the rules of grammar, enabling coherent speech and writing. Broca's area is also involved in understanding complex grammatical structures.

**1 + 1 = 2 marks**

**63** The fingers and hands have a larger area of the motor cortex in the frontal lobe allocated to their functioning than the toes and feet. This is because they are considered more essential to primary functioning than other areas. Thus, the motor cortex enables the direction of muscular movement of the fingers and hands to a far greater extent than that of the feet and toes.

## Hemispheric specialisation

### Multiple-choice solutions

**64 A**  
The two language areas of the brain, for most individuals, are located in the left cerebral hemisphere.

**65 D**  
All of the functions listed are correct.

**66 B**  
Studies of patients who have undergone split-brain surgery have taught us a great deal about the asymmetry of the higher functions in the cortex.

**67 C**  
A patient who has suffered brain damage to the left hemisphere is likely to experience diminished capacity for naming stimuli.

**68 B**  
Non-verbal activities would typically involve the right hemisphere.

**69 D**  
Right; mouse. In an experiment with a split-brain patient, pictures briefly flashed to the extremes of their visual field would only be registered by the opposite hemisphere. In this scenario, as the brain is contralateral, the patient would need to use the hand on the same side as the image to indicate which picture they saw. Therefore, the patient could only use their right hand to indicate that they saw a mouse.

### Short-answer solution

**70 i** No, this is not an accurate comment.

**1 mark**

**ii** Any of the following:

- both hemispheres are involved in the majority of behaviours
- though it is true that many non-verbal processes are predominantly right-brain functions, for most functions this is a relative, not absolute, dominance
- a small percentage of people have reversed hemispheric specialisation for some functions (e.g. language)
- plasticity of the brain – following brain injury other areas may take over functions performed by the damaged parts.

**Allocate 1 mark for any of the above answers. Total 2 marks**

## The reticular activating system and thalamus

### Multiple-choice solutions

- 71 B**  
Sleep and wakefulness is controlled by the reticular activating system.
- 72 A**  
Thalamus.

### Short-answer solution

- 73** Reticular activation system.

## Brain research techniques

### Multiple-choice solutions

- 74 D**  
All of the methods listed (case studies of brain damaged patients, electrical stimulation of cortical areas and magnetic resonance imaging) have been used to research how the brain works.
- 75 A**  
Computerised tomography scans are the method of brain research that provide images of its internal structures. **B** is incorrect as the electroencephalograph produces a graphical depiction of the electrical activity within the brain, but does not provide any structural information. **C** is incorrect as lesioning involves surgically cutting and possibly removing part of the brain, either for direct physiological study or to see the effects on the organism's behaviour. **D** is incorrect as positron emission tomography provides images of brain areas as they are functioning, but these images do not provide clear structural information.
- 76 D**  
An electroencephalograph (EEG) provides information about the electrical activity within the brain, and can be used for monitoring of individuals over an extended period. **B** (a computerised tomography (CT) scan) provides structural images of

the brain, but no information that may assist in the diagnosis of epilepsy. **A** and **D** are incorrect as both functional magnetic resonance imaging (fMRI scan) and positron emission tomography (PET), while providing information about the active areas of the brain, would be too expensive and impractical for the longer periods of monitoring necessary to gather the information required for the diagnosis in this case.

### Short-answer solutions

- 77** Changes in electrical activity are particularly evident in behavioural states such as sleep, wakefulness and arousal, and abnormal electrical activity can signal disease states such as epilepsy and coma.
- 78 i** Any of the following:
- both methods provide images of a functioning brain at work
  - both methods can also represent the active areas of the brain on a 3D image.

**Allocate 1 mark for any of the above answers**

- ii** Any of the following:
- the PET scan detects the uptake of radioactive glucose within the functioning areas of the brain, whereas the fMRI detects changes in blood flow to active brain areas
  - the fMRI can also provide detailed images of brain structure, whereas the PET scan cannot
  - the PET scan is mildly invasive because of needing to inject radioactive material into the brain whereas the fMRI is not an invasive procedure.

**Allocate 1 mark for any of the above answers. Total 2 marks**

## Solutions to practice exam questions: Memory

### The nervous system and memory

#### Multiple-choice solutions

- 1 **C**  
The hippocampus is crucial for memory formation and is one of the structures damaged in Alzheimer's disease.
- 2 **B**  
Consolidation refers to the period of time necessary for a lasting long-term memory to develop.
- 3 **A**  
Electro-convulsive shock treatment has the side effect of causing memory loss because it disrupts consolidation.
- 4 **C**  
Consolidation requires a period of time for information to enter long-term memory.
- 5 **C**  
The hippocampus is **not** clearly implicated in retrograde amnesia, but is involved in anterograde amnesia.
- 6 **B**  
Lack of consolidation. As the memory loss extends before the head injury and retrograde amnesia is not given as an alternative, the loss can only be explained by this choice, as memory of the accident must have been disrupted before consolidation could take place. **A** is not an option, as this condition would affect Ivan's ability to form new memory after the accident. **C** is invalid, as the loss was not due to a clash of learned information and **D** is wrong, as his condition is not dependent on how he was feeling – physically and/or psychologically – at the time.

#### Short-answer solution

- 7 Invertebrates have fewer neurons and much simpler nervous systems than vertebrates, and yet can display complex forms of learning, such as associative conditioning. As such, they have provided valuable models for studies into the cellular and molecular mechanisms of learning and memory.

### Memory decline over the lifespan

#### Multiple-choice solutions

- 8 **B**  
Procedural and semantic memories appear to be less vulnerable to ageing than episodic memories.
- 9 **A**  
The nature of the decline in long-term memory performance over the lifespan is best described by option **A**. Well-learned semantic memories are more easily accessed and less vulnerable to ageing than are the less well-learned and more context-dependent and state-dependent episodic memories.

#### Short-answer solution

- 10 Any of the following:
- episodic memory tends to decline from 30–50 years
  - there is an age-related decline in the ability to recall newly introduced individuals and newly learned material such as word lists, number strings and nonsense syllables
  - aged subjects take longer to encode information for storage into memory.

**Allocate 1 mark for any of the above answers. Total 2 marks**

### Amnesia, dementia and Alzheimer's disease

#### Multiple-choice solutions

- 11 **A**  
Organic causes of forgetting are due to brain damage.
- 12 **A**  
Alzheimer's disease.
- 13 **B**  
Alzheimer's disease begins slowly and, at first, the only symptom may be mild forgetfulness. People in the early stages

of Alzheimer's disease may have trouble remembering recent events, activities, or the names of familiar people or things.

14 C

Alzheimer's disease is the most common form of dementia among older people.

15 A

Age is the *most* important known risk factor for Alzheimer's as the disease usually begins after 65 years and the risk goes up with age. While family history (D) is another possible risk factor for early-onset Alzheimer's disease, there is no obvious family pattern in most cases of late-onset Alzheimer's disease.

16 D

Korsakoff's syndrome is an example of the organic bases of forgetting.

17 C

Loss of memory ability subsequent to the onset of organic brain damage is symptomatic of anterograde amnesia.

18 B

Memory loss extending backwards from a head trauma would be due to retrograde amnesia.

### Short-answer solutions

19 Organic forms of forgetting are those where memory loss occurs due to physiological/biological factors that cause damage to the brain and thereby interfere with its proper functioning.

20 Any two of the following:

- senile plaques
- abnormal clusters of dead and dying nerve cells
- accumulation of fatty deposits around sticky molecules of beta-amyloid protein within the brain
- neurofibrillary tangles
- atrophy (wasting away) of brain tissue
- deterioration of hippocampus
- general brain shrinkage from cell death
- destruction of neurons involved in production of some neurotransmitters, especially acetylcholine.

**Allocate 1 mark for any of the above answers. Total 2 marks**

## Models for explaining human memory

### Multiple-choice solution

21 B

According to the information-processing model, human memory is most analogous to a computer.

## Levels of processing

### Multiple-choice solutions

22 A

Attention. Encoding, storage and retrieval are considered to be the three basic processes of memory.

23 D

Encoding transforms incoming information into a usable form so that it can go into memory.

24 B

Visually. As Emma had recalled words that were different from the specific target words, yet conceptually similar to the original words, it is probable that she had encoded them on a shallow level according to their visual image. Phonemic encoding was not evident as the words do not sound similar.

25 C

Go through the items on the list and think about the meaning of each one. This choice relates to the deepest level of processing, semantic encoding.

## Multi-store model of memory

### Multiple-choice solutions

26 C

The correct sequence of storage within the modal model of memory is sensory, short-term, long-term memory.

- 27 D**  
Tactile memory.
- 28 B**  
The first step in placing information into storage is sensory memory.
- 29 C**  
The literal memory of visual sensory information is briefly held in iconic memory.
- 30 A**  
The duration of iconic memory is about 0.3–0.4 seconds.
- 31 A**  
Auditory information is stored in echoic memory.
- 32 B**  
Echoic memory lasts for about 3–4 seconds.
- 33 B**  
Short-term memory temporarily stores information while it is being processed.
- 34 A**  
Elaborative rehearsal.
- 35 D**  
Long-term memory does not have only seven slots or chunks for information storage as its capacity is theoretically unlimited.
- 36 B**  
Long-term memory can be divided into procedural, semantic and episodic memory.
- 37 C**  
Procedural memory.
- 38 A**  
Long-term memories are stored and organised into hierarchical semantic networks such that meaningful links or associations are formed between key concepts (or nodes).
- 39 C**  
The shape of a serial position curve typically resembles a U-shape.
- 40 A**  
The primacy effect is defined as better memory of items from the first few serial positions in a list.
- 41 D**  
All of the above.
- 42 C**  
The memory strategy involving the organisation of distinct pieces of information into one related, meaningful group is referred to as chunking.
- 43 D**  
None of the above.
- 44 C**  
Procedural memory.
- 45 D**  
Long-term memories are stored and organised into hierarchical semantic networks based on common properties of items such that one concept may be a sub-category of another. Interconnections are also formed within these networks such that meaningful links or associations are formed between key concepts (or nodes). The shorter the link between two concepts, the more closely they are related to one another. **B** is incorrect, as a *shorter* link indicates a stronger association. **A** is wrong because the nodes are synonymous with the key concepts within the semantic network. **C** is incorrect, as retrieval is based on the associations between concepts within the network rather than a sequential, chronological system.
- 46 B**  
According to the serial position effect, words in the middle of the list are most difficult to remember.
- 47 C**  
The function of sensory memory is to briefly save our sensory impressions so that a slight overlap occurs, thereby enabling us to perceive our environment in an uninterrupted fashion rather than as a series of disjointed images and sounds. Sensory memory is the initial stage of memory where external stimuli are registered and temporarily held by the sense organs (hence **B** is incorrect). Sensory memory is unlimited in its capacity (hence **A** is incorrect). Types of sensory memory include iconic (visual) memory, echoic (auditory) memory and tactile (touch) memory (therefore **D** is incorrect).

- 48 D**  
Short-term memory.
- 49 C**  
If rehearsal is not present, information generally remains in short-term memory for about 18–20 seconds.
- 50 B**  
Miller's research article 'The Magic Number 7 plus or minus 2' was referring to the storage capacity of short-term memory.
- 51 C**  
The memorisation of large amounts of information is often better using techniques for organising or 'chunking' information.
- 52 C**  
Trying to remember a phone number by saying it over and over again would involve maintenance rehearsal.
- 53 C**  
Procedural memory.
- 54 B**  
When recall of a list was delayed by 30 seconds, Glanzer and Cunitz (1966) discovered that no recency effect was evident, that is, recall of the items at the end of the list was impaired.

### Short-answer solutions

- 55** Sensory memory is the initial stage of memory where external stimuli are registered and temporarily held by the sense organs. Sensory memory is immense in its capacity, but is only capable of storing information for very brief time periods.
- 56** Maintenance rehearsal.
- 57** Episodic memory.
- 58**
- Procedural memory involves thought processes and skills about how to perform a task which enables an individual to carry out a course of action, for example, riding a bike or tying shoelaces.
  - Declarative memory contains information that can be consciously brought to mind and verbally communicated to others, including knowledge of specific facts or events. This type of memory comprises

two sub-categories: semantic memory and episodic memory.

- Semantic memory stores specialised factual information, including general knowledge, academic concepts of the variety learned at school, as well as the meaning of words.
- Episodic memory represents the autobiographical details about an individual's personal experiences, including times, places and proceedings of specific life-events that have occurred in an individual's past.

**1 + 1 + 1 + 1 = 4 marks**

- 59** An advantage of short-term memory having a small storage capacity is that we are better able to focus on relevant aspects of the material held there. By dealing with smaller amounts of information, it is easier to search through it while trying to process, manipulate and/or encode the data being held in short-term memory.

- 60**
- Maintenance rehearsal.
  - This form of rehearsal uses the conscious recitation of information so that it can be retained in short-term memory for a brief period.
  - The material remains in short-term/working memory for only a short while and, as it is in a meaningless, rote form, is not effectively encoded into long-term memory.

**1 + 1 + 1 = 3 marks**

- 61** Procedural memories are highly resistant to forgetting as they are acquired through practise and require little conscious effort to perform.

- 62**
- Long-term memories are stored and organised into hierarchical semantic networks based on common properties of items such that one concept may be a subcategory of another.
  - Interconnections are also formed within these networks such that meaningful links or associations are formed between key concepts (or nodes).
  - The shorter the link between two concepts, the more closely they are related to one another.

**1 + 1 + 1 = 3 marks**

- 63** Inferior recall for the middle items occurs as they are beyond the capacity for rehearsal and encoding from the beginning of the list and are outside the capacity for short-term memory ( $7 \pm 2$  items) for items from the end of the list.

- 64** Studies by Glanzer and Cunitz (1966) have shown that if recall is delayed for 30 seconds with no rehearsal after the presentation of the list then the recency effect is vastly diminished, if it is evident at all. The same result is also caused by serial recall.

## Working memory

### Multiple-choice solutions

- 65 B**  
Working memory is associated with short-term memory.
- 66 D**  
According to Baddeley's (1986) theory of working memory, the general function of the visuo-spatial sketchpad is to store and manipulate visual and spatial information.
- 67 C**  
According to the Working Memory Model, the central executive determines which information will be rehearsed.
- 68 D**  
Sub-vocal repetition (another way of describing the articulatory rehearsal loop).
- 69 B**  
A few seconds. According to Baddeley's model, the letters will briefly enter the phonological memory store, which lasts about two seconds, but the subjects are not able to use the sub-vocal rehearsal component of the articulatory loop which would therefore result in very rapid forgetting.

### Short-answer solutions

- 70** Visuo-spatial sketchpad.
- 71** The central executive.
- 72** The articulatory (or phonological) loop.

## Theories of forgetting

### Multiple-choice solutions

- 73 D**  
All of the above.

- 74 A**  
When prior learning causes forgetting of recently learned material, proactive interference is said to have occurred.

- 75 C**  
When new information interferes with an individual's ability to remember previously learned information, this is referred to as retroactive interference. **A** and **D** both refer to the situation when previously learned information interferes with an individual's ability to remember recently learned information. **B** is incorrect as this refers to memory loss for information before some form of brain damage.

- 76 B**  
People forget information because other information gets in the way and blocks its retrieval due to interference.

- 77 D**  
All of the above.

- 78 C**  
Pseudoforgetting is the apparent loss of information due to the fact that there was a failure to properly encode it into memory in the first place.

- 79 A**  
Proactive interference occurs when previously learned information disrupts or inhibits an individual's ability to remember newly learned information.

- 80 D**  
Repression.

### Short-answer solutions

- 81** In retrieval failure, an individual is unable to access information from long-term memory due to the absence of an effective retrieval cue.
- 82**
- Information being held in short-term memory can be pushed out by newly arriving information.
  - Displacement is most likely to occur when limit of the capacity for short-term memory has been reached (about 7 units of information).

**1 + 1 = 2 marks**

- 83** • Interference may be due to overwriting, where new memory traces affect storage by damaging or removing old memory traces.
- Another explanation focuses on response competition, where new traces added to memory make it harder to find and retrieve older memory traces. Old memory traces are still stored, but they are inaccessible at that time.

**Allocate 1 mark for any of the above answers. Total 2 marks**

- 84** • Interference, whether retroactive or proactive in nature, is minimised when information to be learned following one another is dissimilar in nature.
- Therefore, an individual studying for the psychology examination could study unrelated subjects, such as mathematics or physics, either before or after their psychology studies.
  - Furthermore, if practical, the student could timetable a rest break before and after learning psychology to minimise interference from other similar subject matter.

**1 + 1 + 1 = 3 marks**

### The forgetting curve

#### Multiple-choice solutions

- 85 A**  
The forgetting curve is a representation of the speed with which information is lost from long-term memory.
- 86 B**  
Ebbinghaus used nonsense syllables for his research in order to reduce the effects of prior experience.

### The relative sensitivity of measures of retention

#### Multiple-choice solutions

- 87 A**  
Information is remembered without the aid of explicit cues or hints in recall.
- 88 D**  
Recognition involves a subject being provided with a set of alternatives within which are cues to help trigger retrieval. While cued recall (**B**) may present clues within the

question, it does not provide alternatives to act as cues.

- 89 B**  
Relearning provides the greatest evidence of retention years after a student has completed a course of study.
- 90 D**  
Recall would be involved when reciting a speech verbatim.
- 91 C**  
Of the techniques that can be measured in a test situation, recognition is more sensitive than recall.
- 92 A**  
The initials act as cues to prompt the recall of information from your memory.
- 93 B**  
The witness is relying on the use of recognition to identify the criminal within a book of 'mug shots'.

### Memory enhancement

#### Multiple-choice solutions

- 94 B**  
A mental strategy that acts as a technique or aid to improving memory is called a mnemonic.
- 95 B**  
When later tested on the material, we would expect her to do better on the meaningful paragraph, as it was easier to organise into her semantic network.
- 96 C**  
The words SCUBA and LASER are examples of acronyms.
- 97 D**  
Student A – method of loci; Student B – narrative chaining.

#### Short-answer solutions

- 98** State-dependent cues.
- 99** Mnemonic.
- 100** Narrative chaining.

- 101** • A list of previously-learned words act as 'pegs' from which the items to be remembered are 'hung'.
- The peg words usually rhyme with the number designating the order of the item in the list to be remembered, for example 'one is a bun', 'two is a shoe', 'three is a tree', 'four is a door', 'five is a (bee) hive', 'six is sticks', 'seven is heaven', 'eight is a gate', 'nine is a vine' and 'ten is a hen'.
  - The list and the peg words are paired in such a way that images combining the two are created, and it is these images that act as retrieval cues for the list of items to be remembered.

**1 + 1 + 1 = 3 marks**

## Eyewitness testimony

### Multiple-choice solutions

**102 B**

Based on her findings from studies into eyewitness testimony, Loftus developed the reconstructive memory hypothesis.

**103 D**

All of the above.

### Short-answer solutions

- 104** • By taking witnesses back to the scene of the crime, Detective Nabb is relying on context dependent cues to assist recall by the witnesses (cued recall is more sensitive than free recall).
- The more closely retrieval cues match the external environment (physical context) in which learning occurred (the location where they saw the robbery), the greater the chance of recalling the details of the robbery.

**Each of the above points is required to earn full marks. An otherwise correct answer that did not refer to the scenario given (bank robbery) would not gain full marks.**

- 105** • Ecological validity was low because it was a laboratory study, and the participants knew they were taking part in an experiment.
- The accident is seen on film. The person is looking directly at the film and has been told to watch. In real-life situations there would be an element of surprise, so you might not be paying attention and may only see part of it.
  - In an experiment, it is not important if the estimate of speed is not accurate, whereas in real life it is obviously vital that you report it accurately.
  - The person is unlikely to find the film stressful. In real-life situations, there would be an increase in emotion, such as fear or shock, especially if there were victims.

**Allocate 1 mark for any of the above answers. Total 2 marks**

- 106** If a study lacks ecological validity, the results might not be able to be generalised to real life.

## Solutions to practice exam questions: Research methods

### Scientific method

#### Multiple-choice solution

1 **A**

The effects of brain injury on cognitive functioning would usually be investigated through a case study.

#### Short-answer solution

- 2 Experiments are artificial and contrived, and so may not be directly applicable to 'normal' situations in the 'real' world. Furthermore, in psychology, there is often a myriad of extraneous subject variables that cannot be controlled and which may have an impact on the situation under study.

### Operational hypotheses

#### Multiple-choice solutions

3 **C**

An operational hypothesis is a testable statement that phrases the prediction regarding the outcome of a research study in practical terms.

4 **B**

The independent variable in this case was the number of hours subjects go without sleep.

5 **A**

High temperature and humidity during peak hour traffic; the number of reported incidents of road rage. This choice is correct as it states the exact procedures used to represent the concepts of frustration and aggression.

6 **D**

The statement is an example of an operational hypothesis as it not only states a predicted outcome for the experiment but how it will be shown in practice. **C** is incorrect as research hypotheses use more general terms or concepts (in this case: 'That recognition would provide a better measure of retention than recall.'). **A** is not appropriate

as a theory incorporates a general body of knowledge providing background for, but not necessarily making, a prediction. **B** is wrong because a null hypothesis would state that there would be no difference in recall rate between the two groups.

#### Short-answer solutions

7 Any of the following:

- the independent variable (IV) is the factor that is deliberately altered or systematically manipulated by the experimenter in order to ascertain whether it produces a difference in the behaviour or performance of the participants
- the dependent variable (DV) is the participants' behaviour or performance that is measured to demonstrate the effects of the IV.

**Allocate 1 mark for any of the above answers. Total 2 marks**

- 8
- The independent variable in this case is age.
  - The dependent variable is the ability to recall newly learned material.

**1 + 1 = 2 marks**

- 9
- The operational definition would have to enable the concept of memory to be quantifiable and testable.
  - Depending on the experimental design, this could be the number of correct responses or items remembered from stimuli within the experiment.

**1 + 1 = 2 marks**

### Participant selection and allocation

#### Multiple-choice solutions

10 **D**

A major requirement for a sample to be used in psychological research is that it be representative of the population from which it is drawn.

11 **B**

A stratified sample ensures that the subset derived from the population represents relevant groups and/or subject characteristics in proportion to their numbers within the population.

- 12 B**  
When everyone in the target population has an equal likelihood of being selected to take part in a survey, the researcher has selected a random sample.
- 13 D**  
The main role of the control group in an experiment is to provide a basis for comparison against which the behaviour of the experimental group can be assessed.
- 14 A**  
A stratified sample is best described as a sample of people who are selected to proportionally match for certain characteristics within the population.
- 15 D**  
The group exposed to the independent variable, in this case the alcohol condition, is the experimental group.
- 16 C**  
Research participants are said to be randomly assigned when they each have an equal chance of being assigned to either the experimental or control group.
- 17 D**  
In a study into the effects of caffeine on performance, the control group should be given no caffeine at all.
- 18 C**  
The group exposed to the independent variable, in this case the interference condition, is the experimental group.

### Short-answer solution

- 19**
- The method required to control for the subject variable of cultural background and ethnicity would be stratified sampling.
  - While still employing random sampling, the teacher would need to ensure that each cultural/ethnic group was represented within the sample in the same proportions as they occur within the school population.

**1 + 1 = 2 marks**

## Extraneous variables

### Multiple-choice solutions

- 20 D**  
In an experiment, a variable that causes a change in the dependent variable and therefore affects the results of the experiment in an unwanted way is referred to as a confounding variable.
- 21 B**  
In a repeated-measures design, all of the research participants are exposed to both experimental conditions.
- 22 B**  
This type of research is known as a single-blind experiment.
- 23 C**  
An experimenter effect is said to have occurred if the experimenter's characteristics or expectations influence the results.
- 24 A**  
The procedure Mr Black is using is described as a single-blind.
- 25 D**  
The researchers in this case have employed a matched-participants design as the experimenters have tried to balance each group of participants by pairing them according to relevant characteristics.
- 26 B**  
This is an example of a placebo effect.
- 27 D**  
The researchers in this case have employed an independent-groups design as each group of subjects was knowingly exposed to different experimental conditions.
- 28 D**  
The researchers in this case have employed a repeated-measures design as each group of participants was exposed to all three experimental conditions.

29 D

The researchers in this case have employed an independent-groups design as each group of participants was knowingly exposed to different experimental conditions.

### Short-answer solution

- 30
- The double-blind procedure.
  - In this procedure, neither the subjects nor the experimenters are aware of which subjects have been allocated to the experimental group as opposed to the control group.

1 + 1 = 2 marks

## Statistics

### Multiple-choice solutions

31 A

Within their research, psychologists use inferential statistics to draw conclusions from their research findings.

32 B

When results are referred to as 'statistically significant', this means that the results would probably not occur by chance.

33 A

A significance level of  $p < 0.01$  would be considered to be the most statistically significant within the given choices. This level would indicate that the probability is less than 1 in 100 that the difference between scores was due to chance factors.

34 B

Inferential statistics are used to generalise the results of a study to a population.

### Short-answer solution

- 35
- Correlations are used to identify and describe how two variables are related to one another in terms of direction (positive or negative) and strength.
  - These measures do **not** give any information about cause-and-effect relationships between the variables under study, but merely point out that they are related in some way. It may, in fact, be a third factor that causes the changes to the variables being studied.

1 + 1 = 2 marks

## Research findings

### Short-answer solution

36 Any of the following:

- random (and stratified) subject selection to ensure a sample that is representative of the population
- random allocation to the experimental and control groups (there may also be the need for a baseline measure)
- adequate operationalisation and control of the IV and DV
- extraneous variables are controlled to eliminate any confounding variables
- relevant and appropriate statistical methods are used to analyse the data which would calculate the probability of whether they are due to chance (statistical significance).

Allocate 1 mark for any of the above answers. Total 2 marks

## Ethical principles

### Multiple-choice solutions

37 C

The ethical principle of confidentiality is designed to protect the participants' rights to privacy by ensuring that researchers do not publicise any information that may identify any of the subjects who were a part of the study. The other choices relate to preventing coercion of subjects to be involved in the study and the recommendation that feedback should be given to subjects about the results/findings of the research.

38 D

Informing participants of the nature of the research and that they are free to participate or to decline to participate or to withdraw from the research would be necessary to ensure the ethical principle of informed consent.

39 A

Before they participate in a research study, potential subjects must realise that their participation in the study must be voluntary, and it is up to the researchers to emphasise this fact. **B** is incorrect as the experimental participants are entitled to feedback about

the results of the study. **C** is incorrect as deception by the experimenter may be permitted under certain circumstances where full knowledge of the experiment may affect the participants' behaviour, and hence the results of the study.

**40 D**

The overriding ethical principle is the preservation of the welfare of the research participants, which necessitates that participants should not be subjected to situations that would cause them distress. As such, participants could never be exposed to painful or traumatic situations in the course of an experiment. While **C** does contain ethical issues in terms of ability for consent, experimentation could be performed through comparing data gained through the use of standardised questions as a part of routine assessments of the patients' condition.

risks, in order for them to make an educated decision as to whether they will agree to be a part of the experiment.

- Voluntary participation: participants willingly agree to be involved in the study (i.e. are not forced or coerced to participate).
- Withdrawal rights: participants have the right to discontinue or pull out of the study at any time.
- Confidentiality: participants have the right to participate anonymously in any study, and to have their right to privacy protected by the researcher.
- No harm: participants will not be exposed to a condition that will cause physical or psychological harm or distress.
- Deception: participants should not be deceived or misled as to the nature of the study.
- Debriefing: participants should be provided with appropriate debriefing/explanation/counselling following participation in a study.

### Short-answer solutions

**41 i** Confidentiality.

- ii**
- Research subjects have the right to participate anonymously in any study, and to have their right to privacy protected by the researcher.
  - While giving relevant details about the case, by using a pseudonym the author did not give enough information to identify the female patient involved.

**Allocate 1 mark for any of the above answers. Total 2 marks**

- 42**
- Voluntary participation ensures that participants willingly agree to be involved in the study (i.e. are not forced or coerced to participate).
  - Informed consent goes further to provide the potential participants with all the necessary details about the research study, including possible risks, in order for them to make an educated decision as to whether they will agree to be a part of the experiment.

**1 + 1 = 2 marks**

**43** Any three of the following ethical considerations are acceptable. (Note: the question implies that you also name the ethical principle in order for your explanation to make sense.)

- Informed consent: potential participants are given all the necessary details about the research study, including possible