



SECTION A: Multiple-choice questions

1	2	3	4	5	6	7	8	9	10
B	B	D	C	B	A	C	C	D	B
11	12	13	14	15	16	17	18	19	20
D	C	A	B	D	C	A	B	C	C
21	22	23	24	25	26	27	28	29	30
D	A	B	B	C	B	B	D	B	C
31	32	33	34	35	36	37	38	39	40
B	B	A	D	C	A	A	B	C	D

Question 1 B

The hindbrain is made up of the cerebellum, medulla & pons.

The reticular formation is part of the midbrain and the hypothalamus and cerebrum are part of the forebrain.

Question 2 B

The cerebellum is largely responsible for balance, posture and coordination of motor movements.

The hypothalamus plays a key role in the body's circadian rhythm, arousal and a variety of autonomic functions such as body temperature. The medulla plays a role in transferring information between the brain and the spinal cord as well as vital functions such as heart rate. The cerebrum is involved in higher order cognitive functioning, such as speech, thinking, perception, etc.

Question 3: D

The hypothalamus plays a key role in the body's circadian rhythm (sleep-wake cycle) by releasing hormones such as melatonin and cortisol which regulate arousal over a 24 hour cycle.

Question 4 C

The parietal lobe is responsible for spatial awareness and monitoring bodily positioning in space.

Question 5 B

Wernicke's area is located near the left auditory cortex in the Temporal lobe; it is the language comprehension centre and thus plays a key role in understanding speech.

Question 6 A

The frontal lobe plays a key role in attention, decision making and other higher order cognitive functions, such as determining how much time is left when completing an examination.

Question 7 C

The hands occupy a greater proportional area of the somatosensory cortex in comparison to other body parts such as the back, head & thighs. The hands have a higher density of sensory receptors and are more sensitive to touch due to the role the hands play in our everyday lives.

Question 8 C

Pierre Flourens (1794 – 1867) introduced brain ablation experiments. Ablation involves damaging or removing sections of the brain and then observing behavioural changes. Flourens did this mainly with rabbits & pigeons. He removed small parts of the cerebral cortex and noted that loss of movement initially by the animals, but over time the animals regained movement, thus providing early evidence of neuroplasticity.

Question 9 D

A CT scan provides structural information of the brain via a series of X-ray images that are processed by a computer.

Question 10 B

Brain ablation involves damaging or removing sections of the brain and then observing behavioural changes and thus is a highly invasive process. Flourens did this in the 19th century with rats and pigeons.

A CT or PET scan is only mildly invasive given the use of tracers injected into the body with short-term exposure to radiation. Phrenology involves exploring bumps on the head to offer clues on an individual's personality and is thus a non-invasive process; it was prevalent in the 18th and 19th century.

Question 11 D

Descartes argued that the mind and the body interact through the pineal gland which he believed enabled humans to experience awareness, sensations and emotions.

Question 12 C

Parkinson's disease is largely the result of deficiencies of dopamine which control messages to the striatum which controls balance and posture. The lack of dopamine results in a loss of control of body movements.

Glutamate plays a key role in learning and memory, noradrenaline plays a key role in alertness and arousal, serotonin plays a key role in sleep, appetite and mood.

Question 13 A

Parkinson's disease is a result of a progressive degeneration of neurons in the substantia nigra which is part of the midbrain (or more specifically the basal ganglia). These neurons produce the neurotransmitter dopamine which plays a key role in the regulation of movement and motor activity. The reduction in the production of dopamine results in a variety of motor symptoms such as tremors (involuntary shaking), muscle rigidity (the muscles are unable to relax), slowness of movement (bradykinesia), instability, involuntary movements, reduced facial expressions, difficulty with speech production, etc.

Question 14 B

In terms of sensitive periods for learning to speak a native language, the brain is primed for exposure to language during childhood and will gradually start to close from the age of around seven. Thus if a child somehow misses exposure to the native language during the sensitive period, then the process of learning the language will be less efficient as the brain is less plastic in terms of the ease of which the language pathways can be development.

Question 15 D

The soma (cell body) is responsible for the initiation of an action potential. Which is then conveyed to the axon terminals via the axon which will trigger the release of neurotransmitters into the synapse, some of which will activate receptors sites on the dendrites of the post synaptic neuron.

Question 16 C

A biological contributing factor to mood disorders such as depression is a lack of the neurotransmitters noradrenalin or serotonin.

Question 17 A

Glial cells insulate and protect neurons, remove dead neurons and supply nutrients to neurons. They do not generate new neurons.

Question 18 C

The dependent variable (the variable that is measured) for the 8th and final stage of the strange situation test was the nature of the response by the child when the caregiver returns after a period of absence which helped the researchers to classify the child as either secure attachment, insecure resistant attachment or insecure avoidant attachment.

Question 19 B

According to the Ainsworth strange situation test, a young child that rejected the mother when there was a reunion between the mother and child (after the mother briefly stepped out of the room) would be classified as resistant insecure.

If the child greeted the mother enthusiastically when she returned then the child would be classified as securely attached; if the child showed little interest in the mother on return, then the child would be classified as avoidant insecure.

Question 20 C

The IV in Harlow's experiments with rhesus monkey was whether the baby monkey was raised by a terry cloth mother or a wire mother. The DV was which surrogate mother the baby monkey turned to when threatened.

Question 21 D

The somatosensory cortex processes tactile information and is part of the cerebral cortex in the brain and is thus part of the central nervous system.

The eyes, ears and skin receptors are all sensory organs that are part of the peripheral nervous system.

Question 22 A

Synaptogenesis - occurs rapidly in the sensory areas of the brain during infancy in response to exposure to environmental stimuli.

Question 23 B

The rerouting of neural pathways is a feature of adaptive plasticity as it enables the brain to compensate for damage that occurs to neural pathways responsible for cognition and behaviour.

Pruning, migration and synaptogenesis are all features of developmental plasticity that occur from infancy to adolescence.

Question 24 B

Sprouting is a feature of adaptive plasticity which involves the growth of new dendritic fibres in response to learning new skills/ facts.

Question 25 B

The total number of synaptic connections peaks during early childhood before synaptic pruning reduces many of our disused pathways which is a regulatory process that 'frees up' neural resources to be utilised for future learning.

Question 26 C

Alice's parasympathetic nervous system will increase her bladder activity back to normal. *Whilst gradually decreasing her heart rate, respiration rate and sweat gland activity back to an optimal level of functioning.*

Question 27 B

A variety of adoption studies have typically revealed that an adopted child's IQ score tends to be more similar to their biological parents than their adopted parents, thus indicating that nature has a more significant impact on intelligence than nurture

Question 28 D

A child that is demonstrating intellectual growth by resolving the conflict between assimilation and accommodation which first occurs during the sensorimotor stage and thus the child can identify distinguishing features between stimuli with similar properties and create new schemas accordingly. E.g. a child creating a new schema for a sheep, by recognising distinguishing features from other four-legged animals.

Question 29 B

It is not until the concrete operational stage of Piaget's 4 stage theory of cognitive development that a child has mastered conservation of mass, liquids and numbers which is determined by their ability to perceive that an object has maintained its mass, volume or amount of items despite changes in its appearance.

Question 30 A

Rufus in this case demonstrated the Piaget concept of assimilation. As he has incorrectly assimilated the cat with his (internal) dog schema, because he lacks the necessary cognitive development to be able to identify distinguishing features between a dog and a cat.

Question 31 A

According to Piaget's four stage theory, we first demonstrate the ability to demonstrate deductive reasoning, which involves applying rules to reach a logical conclusion during the formal operational stage of cognitive development

Question 32 D

According to Erikson, the first psychosocial crisis experienced in life during infancy is trust vs. mistrust, which is largely determined by the responsiveness of the parent when the child cry's for a feed. The child will develop a sense of trust if their needs are consistently met and a sense of mistrust if the child's meets are not consistently met.

Question 33 D

According to Erikson, autonomy vs shame & doubt is the psychosocial crisis that results from toilet training. If the child (aged 1-3) is encouraged to be autonomous and praised for their successes then they are more likely to develop a sense of autonomy. If the child is overly criticized or punished for have accidents or they are overly protective then they may feel a sense of shame or doubt.

Question 34 C

During the adolescence, the important event is peer relationships. The teenager places emphasis on how their peers perceive them. They become more introspective as their sense of self develops. If this process goes well then they will develop a sense of identity, if not then they may develop a sense of identify confusion and thus may feel that they don't fit in with others and may rebel with antisocial or nonconformist behaviour.

Question 35 C

OCD in an example of a personality disorder which are a class of mental conditions characterised by inflexible and maladaptive traits that are dysfunctional and limit a person's ability to cope with the demands of everyday life.

Question 36 C

In terms of the relationship between genetics and mental illness a family history of mental illness. Genetics is a predisposing factor to the development of a mental illness that simply puts these people at a higher risk category than the general population, other psychological or social factors can also contribute to a mental illness, likewise many people can avoid developing a mental illness despite a family history of a particular disorder e.g. a mood disorder.

Question 37 D

Introversion-extroversion is a personality trait that exists on a continuum. Some members of the community have a higher level of extroversion and other members of the community are more introverted. Their behaviour would only be considered abnormal if it was atypical, maladaptive or dysfunctional.

Question 38 A

Anxiety disorders are often acquired through classical conditioning, often as a result of a traumatic experience which alters the fear pathways in the brain to subsequently trigger a fear (fight-flight-freeze) response when they encounter their fear evoking stimulus in the future.

Question 39 C

Catatonia is a symptom of schizophrenia which is a state of motor immobility or behavioural abnormality

Question 40 D

According to the mental health continuum, an individual who is experiencing marked distress, insomnia, constant fatigue and is socially withdrawn would be identified as experiencing a mental disorder as their behaviour is an inability to function in their day to day lives.

SECTION B: Short-answer questions**Question 1 (3 marks)**

a. define Adaptive plasticity

- The brain's ability to change in response to everyday experience or
- to compensate for damage to the brain.

2 marks

b. What causes rerouting (of neurons) to occur?

When a neural pathway is broken due to neural damage, an active neuron will reroute its pathway to another active neuron to regain any lost functionality (a feature of adaptive plasticity)

1 mark

Question 2 (2 marks)

Provide two explanations for the manner in which specific descriptions of how the frontal lobe regulates emotions.

- The frontal lobe is responsible for our temperament– i.e. control of our emotional responses to events)
- It regulates our behavior by anticipating the consequences of our actions. It plays an important role in delayed gratification by maintaining emotions over time and organizing behavior toward specific goals.
- It evaluates rewards and our consequential motivation
- It is responsible for dampening responses to negative events, thus it helps us 'move on' or it responsible for letting our negative emotions get the better of us.
- It regulates our mood, which is largely affected by the levels of serotonin & noradrenaline in our brain

1 mark for any of the above points (maximum of 2 marks)

Question 3 (2 + 1 + 1 = 4 marks)

a. Describe in detail, the manner in which a PET scan generates a functional image of the brain

- A PET scan requires the use of a radioactive tracer to be injected into the bloodstream
- Which provides functional information (a coloured map) of the brain at work whilst completing a cognitive task.

2 marks

b. Describe one advantage of a PET scan over an MRI scan

The PET scan provides functional information of the brain at work, thus indicating the parts of the brain that are utilised when completing a cognitive task. An MRI merely provides a detailed static image of the brain (no functional information).

1 mark

c. Describe one disadvantage of using a PET scan in comparison to an fMRI.

An fMRI provides functional information from moment to moment, thus showing the rapid interaction between the various specialised parts of the brain when completing a cognitive task. The PET scan generates an image once every 30-40 seconds, thus the neuropsychologist does not get the moment to moment information.

1 mark

Question 4 (2 marks)

Identify both an internal and external factor that can affect mental health

Internal: genetics, brain function, brain chemistry, hormone, physiological responses to stress.

External: poverty, level of education, abuse, social networks, interpersonal relationship, culture, lifestyle, stressors, etc.

Question 5 (3 marks)

Claudia was sitting on the grass at lunch time, when she feels a sharp pain on her pinky finger in her left hand as a result of a bee sting.

Identify and explain how both components of her central nervous system as well as a division of her peripheral nervous system have resulted in processing the pain from her pinky finger

- Somatic.N.S (peripheral.N.S) : the skin receptors in her somatic.N.S would detect the pain in the finger and then transmit afferent messages towards her
- Spinal cord (central.N.S): which then conveys afferent messages towards the brain
- Brain (central.N.S) right somatosensory cortex then processes the pain in the finger

Question 6 (2 marks)

Explain the neuronal function and relationship between the axon and myelin sheath.

- The axon conducts an electrical impulses (an action potential) away from the soma and
- The myelin sheath is a fatty substance that protects and insulates the axon thus enhancing the transmission of the action potential towards the axon terminals.

Question 7 (2 marks)

In terms of the brain vs heart debate, provide one point for each side of the debate.

Brain: Greek Philosopher: Alcmaeon (@ 500 BC) – argued that the brain was the source of mental processes and he gathered evidence via dissections of dead animals.

- He found that the eyeball was connected to the brain, thus reasoned that the eye is responsible for sensing visual stimuli, therefore visual information is processed and interpreted in the brain, thus the brain was responsible for perceptions, thoughts, understanding, etc.

Heart: Greek Philosopher Aristotle (386-323 BC) proposed the Cardiocentric (heart-centered) model.

- Aristotle noticed that poking the brain of an injured person did not induce pain. He therefore reasoned that the brain is not engaged in perception of any kind.
- Aristotle noticed that the body grows cold when the heart stops beating, which led him to assume that the heart produces the body's heat.
- The human voice is supplied by air exhaled from the lungs. Hence, Aristotle reasoned that the heart supplies words and they come out together with voice as they roll out of the chest cavity.

Note: this is not an exhaustive list, thus one mark for any reasonable explanation for either/ both of the brain and heart.

Question 8 (2 marks)

Describe two key functions of the thalamus

- Relaying information between the brain stem & the cerebral cortex
- It plays a key role in perception, attention/ alertness, consciousness, cognition
- Memory
- Timing and movement

1 mark for any of the above points (maximum of 2 marks)

Question 9 (2 marks)

In terms of forms of developmental plasticity, describe two features of frontal lobe development.

- Synaptogenesis occurs in the frontal lobe between the ages of 3-6 as a child's cognitive abilities develop at a rapid rate during this critical period of develop
- Synaptic pruning is heightened in the frontal lobe during the teenage years, when many of the disused connections established during childhood are eliminated, which is a regulatory process enabling the frontal lobe to create new connections more efficiently for the complex cognitive skills that teenagers are exposed to both academically and also in their day-to-day lives.

Question 10 (2 marks)

How did Harlow arrive at the conclusions that close comfort was more important in forming attachments than provision of nourishment – briefly describe experimentally.

- Harlow removed the monkeys from the birth mother and placed them with 2 artificial surrogate (substitute) mothers. 1 of these surrogate mothers were made of wire, the other was made of terry-cloth. ½ of the wire surrogate mothers had a feed bottle attached near where the breast milk would be located on a real monkey; the other ½ of the feed bottles were on the terry cloth surrogate.
- Findings: The monkey's spent the vast majority of their time with the terry-cloth mother – regardless of which surrogate had the feed bottle
- Findings: When frightened (by a scaring moving toy for instance) again the monkey's would seek physical comfort from the terry-cloth mother, regardless of which surrogate had been the feeder

1 mark for any of the above points (maximum of 2 marks)

Question 11 (2 marks)

Identify and briefly describe two characteristics of an individual who is demonstrating a formal operational level of cognitive development – according to Piaget's 4-stage theory.

- Abstract thought, i.e. an ability to mentally manipulate ideas
- They can systematically solve problems,
- They can thinking about consequences of potential actions
- Deductive reasoning which involve applying rules to reach a logical conclusion
- They develop idealistic thinking - the ability to compare themselves to their peers and then strive to improve.

1 mark for any of the above points (maximum of 2 marks)

Question 12 (2 marks)

Describe how parenting can either result in **industry** or **Inferiority** for a child according to Erikson's psychosocial crises.

Industry:(is demonstrated by an ability to try new things, a sense of curiosity about the world, a willingness to work towards a goal and to collaborate with others).

This is more likely to occur if the child has been praised and encouraged for their initiative

Inferiority: (is demonstrated by a feeling of inadequacy about their abilities, skills and achievements in comparison to their peers).

This may develop. - if their work is criticised or they are made to feel that it is not helpful.

Question 13 (4 marks)

Provide two clear distinctions between sensitive periods and critical periods of learning.

	Sensitive periods	Critical periods
Starts and ends	Gradually	Abruptly
During the period	It is a period of maximal sensitivity	The organism has heightened sensitivity to external stimuli that are compulsory for development of a particular skill
After the period has elapsed	The skill can still be learned, but less efficiently	The cortical areas allocated for the particular skill will adapt and perform a different function.
Examples	Language development	Development of binocular vision (from @ 8 months to 3 years)

1 mark for each correct point that provides a clear distinction between the two periods of learning.

Question 14 (2 marks)

Distinguish normal behaviour from abnormal behaviour in relation to mental illness.

Normality: Patterns of behaviour or personality traits that is typical and adaptive,

Abnormality: Describes a pattern of behaviour that is atypical and maladaptive.

Question 15

a. describe a biological cause of schizophrenia

- Genetics
- Enlarged ventricles in the brain
- Hypofrontality i.e. a reduced level of brain activity in the prefrontal cortex (as identified via functional neuroimaging) – or –
- Excessive dopamine activity in the prefrontal cortex – which explains altered or impaired cognition

1 mark

1 mark for any of the above points

b. describe what is meant by the 'two-hit' hypothesis as an explanation for the development of schizophrenia.

The 2-hit hypothesis proposes that the development of schizophrenia involves both of

1: Genetic vulnerability – i.e. a family history

2: Environmental stress – e.g. abuse, family breakdown, any type of detrimental major life event

Note: the 2 factors must occur in this order

2 marks

Question 16 (3 marks)

In terms of contributing factors to mood disorders such as depression

a. biological contributing factor (1 mark for any of the following)

- **Genetics:** For people who have been diagnosed with depression, they were more likely to have obtained the disorder if one parent has suffered from depression and even more likely if both parents had suffered this mood disorders. No gene has been identified that triggers depression, thus there are a variety of social and psychological factors that can influence the role of genes in depression.
- **Serotonin** is a neurotransmitter that has an inhibitory effect on the nervous system, it has a calming effect, and it soothes and generates feelings of general contentment. Low levels

of serotonin are associated with sad and anxious behaviour, disrupted sleep (all symptoms of depression)

- Noradrenalin is a neurohormone (a neurohormone can be released into the bloodstream or the brain); it can affect the amygdala where attention and stress responses are controlled. Low levels of noradrenalin have been linked to symptoms of depression
- b.** Psychological contributing factors to depression (1 mark for any of the following)
- Depression can be triggered by stress (or the other way around)
 - Depression can result from a condition known as learned helplessness which describes a person whom has been conditioned (typically through past abuse) to behave submissively, even when there is an opportunity for the person to resist an unpleasant or harmful circumstance to which it has been subjected.
- c.** Social contributing factors to depression (1 mark for any of the following)
- Abuse in the form of ... physical, sexual, psychological, emotional or neglect e.g. failure of a parent to take care of child – nutritionally, provision of shelter, etc.
 - Poverty: Some people lack the basic necessities of life (this can include social necessities), e.g. food, clothing, shelving, health services, education, these people are more at risk of developing depression.
 - Social isolation: The absence of social contacts, interactions and relationships with family, colleagues, etc., which be subjectively or objectively perceived. Studies have shown a strong relationship between social isolation & depression

Question 3 (10 marks)

Write a discussion that includes

- A conclusion and implications
- identification and evaluation of the research design used
- discussion of the impact of these two extraneous variable on the results: non-standardised procedures; placebo effect
- discussion of methods that could be used to overcome these 2 extraneous variables
- discussion of extent to which results can be generalised to the wider population.

Conclusion: the results appear to be significant, thus the hypothesis that adolescents aged 15-18 who sleep less than 6 hours per night will have a significantly higher incidence of mental health problems and mental illness than adolescents aged 15-18 who sleep 8-9 hours per night is supported.

Implications: sleep is of paramount importance to the well-being of adolescents. Thus teenagers should be strongly encouraged to prioritise sleep and to maintain a well-regulated sleep-wake cycle in order to maintain an optimal level of mental health. Sleep provides important restoration for both mind and body as evidenced by the higher incidence of mental health problems and illness for adolescents who are in fact sleep-deprived i.e. averaging less than 6 hours sleep per day.

Extraneous variables: Non-standardised procedures: The participants all would have had varying sleeping arrangements and sleeping conditions, thus the quality and regularity of sleep routine could have varied greatly, thus potentially affecting the validity of the well-being test results. Likewise the general health of students, their workloads would have also varied thus potentially having an extraneous effect on the DV. This could be overcome by standardising procedures i.e. all participants could have slept in a uniform environment i.e. a simulated sleep lab. They could have been matched on similarity of work-loads, etc.

Placebo effect: it is possible that the students who sleep less might have had expectations that their mental well-being should be impacted as a result of their poor sleep hygiene as they may have learned this through the media or at school well-being sessions, this may have affected their responses to well-being survey questions. This could be overcome by using a

single-blind procedure which could be achieved by initially testing the participant's well-being and then recording their sleep patterns after this to eliminate preconceptions relating to the purpose of the study.

Generalisations: the use of volunteers is a form of convenience sampling and thus is not generally an accurate representation of society (as not all VCE students would have access to the social media sites used to recruit participants), thus the results cannot be generalised to the wider population of 15-18 year olds and certainly not to adults since they were not represented in the sample.