



# 2017

## Unit 3 PSYCHOLOGY

### Trial examination

# SOLUTIONS

### SECTION A – Multiple-choice questions

1	C
2	D
3	A
4	C
5	C
6	C
7	B
8	B
9	B
10	B
11	C
12	D
13	C
14	B

15	C
16	D
17	B
18	B
19	A
20	C
21	B
22	B
23	D
24	C
25	C
26	B
27	C
28	D

29	A
30	D
31	D
32	B
33	A
34	D
35	A
36	C
37	B
38	D
39	A
40	B

#### Question 1: C

Exercise results in the release of beta endorphins which promote feelings of well-being and relaxation.

*Exercise tends to activate the sympathetic nervous system, an increase in cortisol levels would exacerbate the symptoms of stress; exercise helps to divert attention away from stressors thus relieving the symptoms of stress.*

**Question 2 D**

Parkinson's disease is caused by an imbalance of neurotransmitters, specifically a lack of GABA (or a lack of dopamine) which can trigger impairment in motor control e.g. tremors. *Glutamate plays a key role in memory and learning and adrenalin plays a key role in emotional arousal and fear.*

**Question 3 A**

The substantia nigra which is part of the basal ganglia is responsible for the production of dopamine

*The dopamine neurotransmitters control messages to the striatum which is responsible for balance and posture. The lack of dopamine results abnormal neuron functioning in the striatum and thus the motor cortex which is responsible for the initiation and coordination of voluntary movement receives insufficient information which results in a loss of control of body movements.*

**Question 4: C**

Sensory information is detected in the peripheral nervous system, afferent messages are conveyed to the central nervous (the brain via the spinal cord) for processing.

**Question 5 C**

Relearning is the most sensitive measure of retrieval because the use of the savings score formula can accurately gauge the amount of information that has been retained in memory. Recognition uses cues by providing participants alternatives to select from, but it is a less sensitive measure of retrieval in comparison to relearning.

**Question 6 C**

Eustress is a positive psychological response to a stressor. It will cause wear and tear of the body if it is prolonged as the body does not discern between eustress (good stress) and distress (bad stress)

**Question 7: B**

Drew's digestion would have been suppressed as essential bodily resources would have been diverted elsewhere to maximise his chances of survival as controlled by the sympathetic nervous system which was activated when Drew was under threat from the dog.

**Question 8 B**

The release of stress hormones into the bloodstream when we encounter stress will assist the person deal with a stressor Cortisol by enhancing the metabolism of fats, proteins, carbohydrates as well as increasing glucose levels in the blood providing additional energy for muscles. If high levels of cortisol linger in the bloodstream as a result of chronic stress, it can reduce the effectiveness of the immune system, which makes the individual vulnerable to developing a stress related illness.

**Question 9 B**

The sound of the coffee grinder in this scenario is a conditioned stimulus that triggers a condition response (salivation in anticipation of coffee) as a result of the repeated association of two stimuli (the sound of the coffee grinder and the coffee itself the UCS)

**Question 10 B**

Trisha's salivation response to the sound of the coffee grinder is triggered by her parasympathetic nervous system which regulates autonomic functions such as salivation in anticipation of food/ coffee in this case.

**Question 11 C**

Alzheimer's disease will gradually progress affecting brain structures such as the amygdala, cerebellum and motor cortex thus impairing procedural memories.

**Question 12 D**

Myelin forms a protective covering of an axon (thus forming the myelin sheath) which enhances the transmission of electrical impulses. Dendrites receive messages from other neurons, via the receptor sites.

**Question 13 C**

When an action potential is generated by the soma, the axon acts like a conduit enabling electrochemical messages to be conveyed to the vesicles in the axon terminals. This triggers the release neurotransmitters into the synapse, some of which bind with the receptors on the dendrites of the postsynaptic neuron.

**Question 14 B**

An evaluation of the significance of the stressor occurs during the primary appraisal. Given Zoe found the news of her daughter's expulsion distressing, it would indicate that she has evaluated the news as significant as opposed to irrelevant or benign-positive.

**Question 15 C**

If the stressor is deemed significant as part of the primary appraisal then Zoe would then make a secondary appraisal, which involves an assessment of the resources and levels of energy required to deal with the stressor and consequentially an evaluation of both her internal and external coping options.

**Question 16 D**

The neurohormone adrenalin plays a key role in encoding the emotionality of an episodic memory. A highly emotional experience will result in the release of a high level of adrenalin which will strengthen the encoding of the episodic memory (the memory of a personal experience).

**Question 17 B**

A procedural memory is a memory of an action or a skill, thus is a form of implicit memory as it is recalled without conscious awareness e.g. the movements required for an experienced to steer a car around a corner.

*Declarative memories (including semantic and episodic memories) are types of explicit memories as they required conscious awareness to be recalled.*

**Question 18: B**

The hippocampus is responsible for the consolidation of semantic (explicit) memories.

*The amygdala, cerebellum are involved in the formation of implicit/ procedural memories*

**Question 19 A**

Sensory memory is the entry point for incoming information, where it is briefly held in its raw form until the material that is attended to is transferred in an encoded form to STM where it is actively processed before it is consolidated (semantically) in LTM.

**Question 20: C**

According to G.Miller – STM has a capacity of 5 – 9 bits of information.

*Sensory memory (iconic & echoic memory) as well as LTM has a virtually unlimited capacity.*

**Question 21 B**

Prior to the school holidays, Kevin slowing down when going through school zones during school times was an example of the behaviour (operant response) which is triggered by the antecedent (discriminative stimulus) – entering a 40kmh. zone during school times.

**Question 22 B**

Kevin's fine for speeding through the 40kmh. school zone is an example of response cost. I.e. the cost (loss of money) as a result of the response (speeding in a school zone) with the desired consequence to weaken the dangerous (speeding) driving in school zones.

**Question 23 D**

After the holidays, Kevin's speeding behaviour through school zones which was extinguished as a result of the fine has spontaneously recovered after a rest period (the summer holidays).

**Question 24 C**

This investigation has tested a hypothesis under research conditions by testing the effects of the IV (the order the data was presented) on the DV (recall for each of the 15 ordered items). *A case study is an in-depth study of an individual or group. An observational study involves observing the actions/ behaviour of a group of participants (without any manipulation of variables). A correlational study measures the strength of the relationship between two or more variables (this is no longer on the study design).*

**Question 25 C**

The percentage of recall of the 15 ordered words has specified how the dependent variable will be measured in this case.

**Question 26 B**

The data generated (percentage recall of each of the ordered words) is purely quantitative a descriptive statistic.

**Question 27 C**

Due to the one minute delay with an interfering task and use of an interfering task which eliminated rehearsal, a primacy effect would occur. A recency effect would not occur due to the limitations of the STM in terms of duration (memories fade from STM after 30 seconds without rehearsal)

**Question 28 D**

the two second intervals between words, enabled the student to attend and rehearse the initial items more thoroughly than the middle and later items thus resulting in a primacy affect i.e. a superior recall of items from the start of a the serial list.

*According to the consolidation theory it takes a minimum of 30 minutes for memory traces to form, thus this theory does not explain the superior recall of items remembered from the start of a serial list.*

**Question 29 A**

The heat from the candle flame would have been detected by sensory receptors in her hand, which would have activated an afferent pathway towards her spinal cord which would have processed the information before trigger a motor response via the integration of the sensory and motor information by the interneurons in her spinal cord.

**Question 30 D**

The neurotransmitters represent the keys that need to bind with the receptors (on the dendrites) which represent the lock. When a receptor binds with a neurotransmitter binds the 'key' will open the lock and have an inhibitory or excitatory effect.

**Question 31 D**

When Xavian's body adapts to the stressor, by activating the parasympathetic nervous system which reduce her heart rate and other biological processes she has reached the resistance stage

**Question 32 B**

Initially Xavian's body may act injured as her body goes into shock, her body temperature may drop as her resistance to the stressor drops below the normal level of response as she is briefly frozen.

**Question 33 A**

Adrenaline will be first released into Xavian's bloodstream to help her body respond to the stressor when she has reached her body has gone into countershock; her resistance to the stressor will rapidly rise as her body becomes aroused and highly responsive to the stressor.

**Question 34 D**

Despite her body adjusted to the demands of the stressor, if her resistance to the stressor has remained high and stress hormones such as cortisol and adrenalin remain high then she may display early signs of illness such a headaches, a cold, etc.

**Question 35 A**

The GAS can be best described as a biological model for dealing with stress. Seyle's model highlights the manner in which the body responds to stress and how the body's resources can become depleted as a result of stressor based on empirical testing of rats exposed to a variety of stressors.

**Question 36 C**

Long term depression involves a weakening of synaptic pathways, thus activation of the presynaptic neuron will trigger a low-frequency stimulation which over time will weaken the synaptic configurations and thus theoretically clear the brain of the neural resources that can be utilised for future learning and memories.

**Question 37 B**

Observational learning is a more cognitive process than the other two learning theories, as the learner must pay attention to the model's behaviour, form a mental representation and determine if the consequences are desirable or not thus it involves thinking and memory.

**Question 38 D**

The neutral stimulus in this case is the act of turning the lights out in his bedroom as prior to the conditioning this would not elicit a response. But through the repeated pairings of the lights out and the loud tuba note, it eventually became a conditioned stimulus once the association was made.

**Question 39 A**

The unconditioned stimulus in this case is the flinching in response to the tuba as this behaviour has not been conditioned and is thus a natural reflexive response to the unconditioned stimulus of the loud tuba note.

**Question 40 B**

The conditioned response in this case is the flinching in anticipation of the tuba, as he has been conditioned through the repeated association of the two stimuli – turning out the lights and the sound of the loud tuba note, to flinch in response to the turning out the lights (the conditioned stimulus).

**SECTION B – Short-answer question****Question 1 (3 marks)**

- Grandpa will have remembered more players from the photo than he is able to name.
- Identifying the players from the photo involves recognition as opposed to naming the players without the assistance of cues which involves recall
- Recognition is a more sensitive measure of retrieval than recall.

*1 mark for each of the above points (which must refer to the underlined features of the explanation)*

**Question 2 (2 marks)**

Taking a Panadol

- Removes an aversive stimulus – a headache/ pain
- Thus strengthening the targeted behaviour – taking a Panadol when in pain.

*1 mark for each dot point*

**Question 3 (4 marks)**

1<sup>st</sup> stage: Attention: Tara may fail to actively pay attention and observe distinctive features of Hannah's demonstration

2<sup>nd</sup> stage: Retention: Tara may fail to form a mental representation of the steps required to change the tyre

3<sup>rd</sup> stage: Reproduction: Tara may lack the strength to loosen the wheel-nuts for instance thus preventing her from completing the tyre change.

4<sup>th</sup> stage: Motivation: Tara may not desire to change the tyre, she might think of calling the RACV instead (in the event of a flat tyre).

*1 mark for each stage that has been explained and linked to the scenario – note: the student does not need to name the stage as this was not specified in the question*

**Question 4 (2 marks)**

Watson & Rayner should have

- fully informed Albert's mother about the nature of the study
- explained to Albert's mother her right to withdraw Albert from the experiment at any time should he experience distress.
- she should have been informed about potential risks to his well-being.

*1 mark for any 2 of the dot points*

**Question 5 (2 marks)**

- It eliminates a possible placebo effect (in which the expectations of participants can affect the experimental results)
- It eliminates a possible experimenter effect (in which the actions of the experimenter can affect the experimental results)

*1 mark for each point*

**Question 6 (3 marks)**

- The fight-flight response is an automatic response that enables an animal to confront a physically or psychologically threatening situation by either confronting it (**fight**) or running away (**flight**) or remain still and act injured (freeze).
- The sympathetic nervous system is immediately activated when the person is under threat by triggering a release of stress hormones via the endocrine system triggering an acceleration of the heart, increased respiration rate, etc.
- When the threat has subsided the parasympathetic nervous system counteracts the effects of stress by gradually returning these physiological systems back to a homeostatic level.

*1 mark for the definition*

*1 mark for explaining the role of the sympathetic nervous system*

*1 mark for explaining the role of the parasympathetic nervous system*

**Question 7 (2 marks)**

- The Lazarus and Folkman Transactional Model of stress and coping identifies that an individual's focuses on the transaction between people and their external environment in their evaluation (appraisal) of a stressor
- The two key psychological factors that determine the extent of the stress experienced by the individual is 1: their appraisal of the significance stressor and 2: the appraisal of their ability to cope with the stressor.

**Question 8 (2 marks)**

- Long Term Potentiation (LTP) refers to the long lasting enhancement of synaptic transmission/
- LTP is critical for memory and learning via the repeated stimulation of the connection and the increased responsiveness of the postsynaptic neuron to the presynaptic neuron.

**Question 9 (3 marks)**

- A **leading question** – is a question that suggests the answer or contains the information the examiner is looking for e.g. ‘‘you saw him throw a rock at the car didn't you’’ (implying that he did indeed throw a rock – for that sentence to make sense).
- Individuals are only capable of storing abstract features of an incident, thus when a memory is revisited the incident must be reconstructed by combining these abstract features with other memories from our LTM in order to create a sequential testimony that makes sense.

- Later on the witness might reconstruct their memory of the incident so that they incorporate aspects of the leading question such as seeing the accused throw a rock at the car even though it might never have happened.

**Question 10 (2 marks)**

- A neurotransmitter such as glutamate that has an excitatory effect
- Is more likely to make a postsynaptic neuron 'fire' when it binds with the receptors (on the dendrites)

**Question 11 (4 marks)****Difference**

- A conscious response to sensory stimuli involves the brain initiating the motor response e.g. sensing that your shoes are too tight, the brain responds by initiating an action to loosen the shoes.
- An spinal reflex involve the spinal cord initiating the motor response e.g. when a barefoot steps on a pin, an afferent message will be conveyed to the spinal cord, the interneurons will integrate the sensory (pain) information and a rapid subsequential motor response.

**Similarity**

Both involve activity by the somatic nervous system in the detection of the sensory input and the activation of the skeletal muscles that are required to perform the movement as well as the central nervous system to process the information.

E.g. the somatic nervous system will detect either that tightness of a shoe on a foot or the pain from a pin in the foot. The tightness of the show will be processed by the Central NS (the pain) from the pin will be processed by the Central NS (spinal cord). The skeletal muscles in the somatic nervous system will be activated when loosening the shoe or withdrawing the foot from the pin.

**Question 12 (2 marks)**

- Life events are a more significant and less frequently occurring form of stressor than daily pressures. They can also take the form of eustress or distress.
- According to Holmes and Rahe, the death of a spouse, divorce, marriage and retirement are all examples of significant life events that are high level sources of stress.

**Question 13 (2 marks)**

- Degeneration of dopamine releasing neurons in the substantia nigra (part of the basal ganglia brain structure in the midbrain)
- the dopamine neurotransmitters control messages to the striatum (brain structure) which is responsible for balance and posture.
- The lack of dopamine results abnormal neuron functioning in the striatum and thus the motor cortex which is responsible for the initiation and coordination of voluntary movement receives insufficient information which results in a loss of control of body movements.

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

**Question 14 (2 marks)**

- Neurotransmitters are the electrochemical messages which are released from the vesicles in an axon terminal into a
- A synapse which is the junction between two neurons thus enabling a neuron to pass an electrical or chemical signal to another cell



**Question 15 (2 marks)**

- Glutamate is the most abundant excitatory neurotransmitter in the nervous system
- Glutamate plays a key role in learning (LTP)
- It is involved in the formation of explicit memories.

*1 mark per point (a maximum of 2 marks)*

**Question 16 (2 marks)**

- Charlottes's brain surgery could result in memory loss, either temporarily or possibly permanently.
- This could be due to damage or to the hippocampus or frontal lobe which could cause anterograde amnesia which would impair her ability to consolidate new long term memories.

**Question 17 (1 mark)**

An approach strategy involves proactively using strategies to reduce the emotional distress triggered by a stressor (emotion-based coping), which can result in a reappraisal and potentially lead to a more problem-based coping strategy.

**Question 18 (10 marks)****Explanation of the role of glutamate and NMDA in learning**

Glutamate is the most abundant excitatory neurotransmitter in the nervous system. Glutamate plays a key role in both LTP & LTD; it is highly concentrated in Hippocampus. It is involved in learning explicit memories.

Stored in the vesicles of the presynaptic neuron, nerve impulses (an action potential) triggers the release of glutamate into the synapse it then binds with specialised receptors - NMDA & AMPA found on the dendrites of the postsynaptic neuron.

Specifically in terms of the lock and key process of the transmission of information across the synapse that is integral to the formation of explicit memory. The release of the glutamate neurotransmitter represents the 'keys' that need to bind with NMDA receptors which represent the 'lock'. When the NMDA receptor binds with the glutamate neurotransmitter the key opens the lock by increasing the permeability of the ion channels resulting in an influx of positively charged sodium ions into the postsynaptic neuron which will have a depolarising effect and thus causing the postsynaptic neuron to fire.

Through the regular activation of the memory pathway, more glutamate will be released from the axon terminals presynaptic neuron and thus there will be higher uptake of the glutamate with the NMDA receptors which will strengthen the memory pathways and make the retrieval of the memory a more efficient process.

**Hypothesis and conclusion**

The hypothesis that the use of the drug 'receptor enhancer' will be more effective in the development of a cognitive map of a 3D virtual maze completion task than individuals who took placebo drugs was supported

This was reflected by the significance of the reduction in time taken to complete the maze by the group of participants exposed to the IV (the 'receptor enhancer') vs the control group (the placebo group) who averaged only a minor improvement between the two trials performed.

**Implications**

It could be concluded that the 'receptor enhancer' drug has been effective in sensitising the receptiveness of glutamate and thus has been effective for improving the spatial learning of the participants tested.

In order to determine if this drug will have a similar effect on memory and learning, additional tests would need to be performed e.g. language tests, numeracy tests, recognition tests, etc.

### **Weaknesses of experimental design**

The use of an independent groups design meant that participant related variables have not been controlled, particularly given the small sample size. Some participants may have superior spatial ability than others.

A possible experimenter effect may have occurred; given there is no evidence that a double-blind procedure was used. Consequentially the experimenter's actions may have influenced the behaviour, expectations and responsiveness of the participants.

The use of undergraduate volunteers is a form of conveniences sample which is thus not an accurate representation of society which would limit the extent to which the results can be generalised to the wider population.

10 marks

<b>Marking grid</b>	
<b>Very high (9-10 marks)</b>	accurate and highly detailed explanation of key concepts accurate research hypothesis (IV, DV, prediction, population) accurate conclusion (based on results) & highly detailed implication a highly detailed evaluation of the research design (covering multiple points)
<b>High (7-8 marks)</b>	accurate and detailed explanation of key concepts accurate research hypothesis (IV, DV, prediction, population) accurate conclusion (based on results) & detailed implication a detailed evaluation of the research design (covering multiple points)
<b>Medium (5-6 marks)</b>	accurate explanation of key concepts accurate research hypothesis (IV, DV, prediction, population) accurate conclusion (based on results) & implication an evaluation of the research design (covering 1 or 2 points)
<b>Low (3-4 marks)</b>	A limited explanation of key concepts Partially correct research hypothesis (IV, DV, prediction, population) Partially correct conclusion (based on results) & implication A limited evaluation of the research design (covering 1 or 2 points)
<b>Very low (0-2 marks)</b>	No/ inaccurate explanation of key concepts Incorrect research hypothesis (IV, DV, prediction, population) No/ inaccurate conclusion (based on results) & implication No/ inaccurate evaluation of the research design (covering 1 or 2 points)