2.5 Learning and cognition

Name: _____ Class: _____ Date: _____ **Total: 30 marks**

KEY WORDS classical conditioning • operant conditioning • testing effect • spacing effect • Google effect

Objective

Build the skills to answer exam questions on **learning and cognition**: classical and operant conditioning, social learning, the **testing effect** and spacing, and how technology affects memory.

You must be able to:

- distinguish classical conditioning, operant conditioning and social learning, with examples
- describe Roediger and Karpicke (2006) and explain the testing effect
- explain why spaced study works better than one long session
- explain the "Google effect" (Sparrow et al., 2011)
- apply learning research to advice for students and teachers

1 Key knowledge and worked examples

■ Ways of learning

- **Classical conditioning**: a neutral signal is paired with something that already causes a response, until the signal alone causes it (Pavlov's dogs salivated at a sound). Learning by **association**.
- **Operant conditioning**: behaviour followed by a reward becomes more frequent; behaviour followed by punishment becomes less frequent (Skinner). Learning by **consequences**.
- **Social learning**: learning by watching a model whose behaviour is rewarded (Bandura, 1.3).

■ Learning that lasts

Roediger and Karpicke (2006): students learned short texts. One group read a text four times; another read it once and then tried to recall it three times. After one week, the **testing** group recalled 61 % of the ideas and the **re-reading** group only 40 %. This is the **testing effect**. **Spacing** study over several days also works better than one long session.

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■ **Technology and memory**

Sparrow et al. (2011): people remembered less of new facts when they expected a computer to save them; they remembered **where** the facts were saved instead. This is often called the **Google effect**. (HL students study technology in more depth in 4.2.)

Common error: mixing up classical conditioning (association) with operant conditioning (consequences).

2 Practice

2.1 Distinguish between **classical** and **operant** conditioning. [2]



2.2 Identify the type of learning in each case:

(a) A child feels afraid at the sound of the dentist's drill after a painful visit. [1]

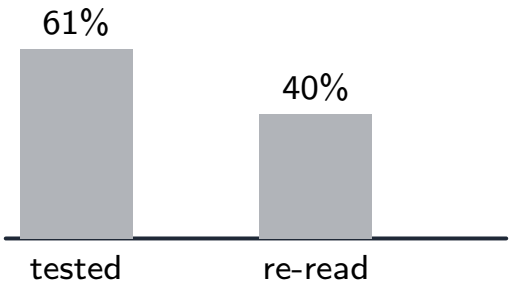
(b) A student hands in homework on time more often after the teacher praises her. [1]

(c) A boy starts to say "thank you" after he sees his older sister praised for it. [1]

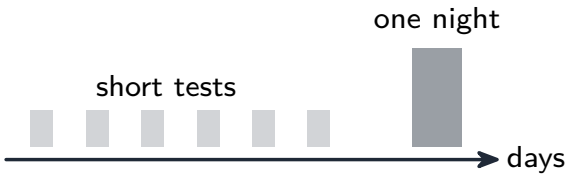
(a) drill (b) praise (c) a model

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2.3 *(Paper 1 Section A.)* Describe **one** study of the testing effect. [4]



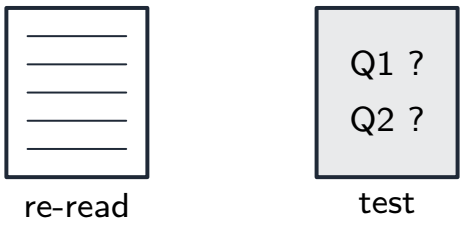
2.4 *(Paper 1 Section B, learning and cognition.)* A teacher wants her students to remember 200 new words for an exam in two weeks. Most students plan to re-read the list many times the night before. Using research, explain what the teacher should advise. [6]



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3 Exam-style questions

3.1 *(Paper 1 Section C.)* "The best way to learn is to test yourself." Discuss this claim with reference to the concept of **measurement**. [15]



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Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

classical: learning by association: a neutral signal is paired with something that already causes a response; operant: learning by consequences: behaviour that is rewarded becomes more frequent

2.2

(a) classical conditioning

(b) operant conditioning

(c) social learning

2.3

Roediger and Karpicke (2006); students learned short texts: one group read the text four times, another read it once and tried to recall it three times; after one week, the testing group recalled 61 % of the ideas, the re-reading group 40 %; practising recall strengthens memory more than re-reading

2.4

award up to [6]: the testing effect: recalling information strengthens memory more than re-reading; Roediger and Karpicke (2006): after a week, testing gave 61 % recall against 40 % for re-reading; so students should test themselves, e.g. word cards or short quizzes, not just re-read; spacing: short sessions over the two weeks work better than one long session the night before; re-reading feels easy, so students may think they know the words when they do not; a limit: the study used texts and one week; word lists for an exam may differ, but the advice fits the evidence

3.1

Mark with the markbands: [13-15] focused on the claim, accurate knowledge, evidence used to build an argument, the concept used to evaluate throughout, a supported conclusion; [10-12] mostly focused, evidence used, some evaluation through the concept; [7-9] relevant knowledge but mostly description; [4-6] limited knowledge, little evaluation; [1-3] little that is relevant. Points that may be included: testing effect: Roediger and Karpicke (2006): 61 % against 40 % recall after one week; measurement: learning measured as the percentage of ideas recalled from short texts after a fixed delay; a clear, comparable measure, but it covers recall, not understanding or applying knowledge; the delay matters: re-reading can look as good on an immediate test, so the time of the measure changes the result; spacing also improves long-term recall, so how and when we test both matter; Sparrow et al. (2011): what we remember depends on whether we expect to look information up later; lab texts and university students may not represent every subject or learner; conclusion: strong evidence that self-testing beats re-reading for recall; "the best way" needs measures of understanding and real exams

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