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**TNFL03 - fallstudier inom flygtrafik och
logistik**

Homework Set 1, 19.01.2016

Problem	A	B	C	D
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Problem	1	2	3	4	5
13					

TEXT 1 for reading comprehension, for questions 1-13:

Most people can remember a phone number for up to thirty seconds. When this short amount of time **elapses**, however, the numbers are erased from the memory. How did the information get there in the first place? Information that makes its way to the short term memory (STM) does so via the sensory storage area. The brain has a filter which only allows stimuli that is of immediate interest to pass on to the STM, also known as the working memory.

There is much debate about the capacity and duration of the short term memory. The most accepted theory comes from George A. Miller, a cognitive psychologist who suggested that humans can remember approximately seven chunks of information. A chunk is defined as a meaningful unit of information, such as a word or name rather than just a letter or number. Modern theorists suggest that one can increase the capacity of the short term memory by chunking, or classifying similar information together. By organizing information, one can optimize the STM, and improve the chances of a memory being passed on to long term storage.

When making a conscious effort to memorize something, such as information for an exam, many people engage in "rote rehearsal". By repeating something over and over again, one is able to keep a memory alive. Unfortunately, this type of memory maintenance only succeeds if there are no interruptions. As soon as a person stops rehearsing the information, it has the tendency to disappear. When a pen and paper are not handy, people often attempt to remember a phone number by repeating it aloud. If the doorbell rings or the dog barks to come in before a person has the opportunity to make a phone call, he will likely forget the number instantly.(A) Therefore, rote rehearsal is not an efficient way to pass information from the short term to long term memory.(B) A better way is to practice "**elaborate** rehearsal". (C)This involves assigning semantic meaning to a piece of information so that it can be filed along with other pre-existing long term memories.(D)

Encoding information semantically also makes **it** more retrievable. Retrieving information can be done by recognition or recall. *Humans can easily recall memories that are stored in the long term memory and used often; however, if a memory seems to be forgotten, it may eventually be retrieved by prompting.* The more **cues** a person is given (such as pictures), the more likely a memory can be retrieved. This is why multiple choice tests are often used for subjects that require a lot of memorization.

Glossary: semantic: relating to the meaning of something

Question 1 (regarding TEXT 1):

According to the passage, how do memories get transferred to the STM?

- A) They revert from the long term memory.
- B) They are filtered from the sensory storage area.
- C) They get chunked when they enter the brain.
- D) They enter via the nervous system.

Question 2 (regarding TEXT 1):

The word elapses in paragraph 1 is closest in meaning to:

- A) passes
- B) adds up
- C) appears
- D) continues

Question 3 (regarding TEXT 1):

All of the following are mentioned as places in which memories are stored EXCEPT the:

- A) STM
- B) long term memory
- C) sensory storage area
- D) maintenance area

Question 4 (regarding TEXT 1):

Why does the author mention a dog's bark?

- A) To give an example of a type of memory
- B) To provide a type of interruption
- C) To prove that dogs have better memories than humans
- D) To compare another sound that is loud like a doorbell

Question 5 (regarding TEXT 1):

Look at the positions (A)-(D) that indicate where this sentence can be added to the passage. Where would the sentence fit best?

For example, a reader engages in elaborate rehearsal when he brings prior knowledge of a subject to a text.

Question 6 (regarding TEXT 1):

How do theorists believe a person can remember more information in a short time?

- A) By organizing it
- B) By repeating it
- C) By giving it a name
- D) By drawing it

Question 7 (regarding TEXT 1):

The author believes that rote rotation is:

- A) the best way to remember something
- B) more efficient than chunking
- C) ineffective in the long run
- D) an unnecessary interruption

Question 8 (regarding TEXT 1):

The word it in the last paragraph refers to:

- A) encoding
- B) STM
- C) semantics
- D) information

Question 9 (regarding TEXT 1):

The word elaborate in paragraph 3 is closest in meaning to:

- A) complex
- B) efficient
- C) pretty
- D) regular

Question 10 (regarding TEXT 1):

Which of the following is NOT supported by the passage?

- A) The working memory is the same as the short term memory.
- B) A memory is kept alive through constant repetition.
- C) Cues help people to recognize information.
- D) Multiple choice exams are the most difficult.

Question 11 (regarding TEXT 1):

The word cues in the passage is closest in meaning to

- A) questions
- B) clues
- C) images
- D) tests

Question 12 (regarding TEXT 1):

Which of the following best provides the important information in the highlighted sentence from the passage. Incorrect answer choices leave out essential information or change the meaning of it

- A) Prompting is the easiest way to retrieve short term memory after an extended period of time.
- B) A memory can be retrieved by prompting, in a case where it has been rarely used.
- C) It's easier to remember short term memories than long term memories due to regular prompts.
- D) Recalling a long term memory that is often used is easy, while forgotten memories often require prompting.

Question 13 (regarding TEXT 1):

An introductory sentence for a summary of the passage is found below. Complete the summary by choosing the THREE answer choices that contain the most important ideas in the passage. Some sentences do not fit in the summary because they provide ideas that are not mentioned in the passage or are only minor ideas from the passage.

The brain stores information that a person may need in the immediate future in a place called the short term memory (STM).

1. Most people can only remember numbers for a short time.
2. Many psychologists agree that only a certain amount of information can be stored in the STM at once.
3. Some techniques for memorization don't work because of potential interruptions.
4. Elaborate rehearsal is generally considered less effective than rote rehearsal.
5. Assigning meaning to information makes it easier for the brain to retrieve.

TEXT 2 for reading comprehension, for questions 14 -16:

The safe conduct of flight is the first priority of any air traffic service. At the same time, many pilots do not want to have to follow strict and inflexible rules while in the air. These opposing requirements are met by dividing airspace into two basic types.

Firstly, some airspace is designed to allow safe and **expeditious** flights of passenger-carrying aircraft, linking airports and continents through a system of airways high-level routes, under the continuous surveillance and protection of an air traffic control service.

Secondly, the remaining airspace is free for any pilot to use as he or she wished (subject to certain basic rules of the air), without hindrance or interference from controllers.

This basic and simple principle is applied across UK airspace, although in order to ensure that **it** meets everyone's needs a number of intermediate stages are necessary.

Question 14 (regarding TEXT 2):

The word expeditious in paragraph 2 is closest in meaning to:

- A) exhibitory
- B) fast
- C) secure
- D) direct

Question 15 (regarding TEXT 2):

Which of the following is NOT supported by the passage:

- A) Safety is the highest priority in air traffic management.
- B) Part of the airspace is under continuous surveillance and protection of an

air traffic control service.

C) All airspace not under surveillance and protection of an air traffic control service can be used without any rules.

D) UK airspace is basically divided into two airspace types.

Question 16 (regarding TEXT 2):

The word it in the last paragraph refers to:

A) airspace

B) UK

C) principle

D) stage

TEXT 3 for reading comprehension, for questions 17-26:

”Science Snapshot” By Dan Vergano

Still wondering what all the “God particle” hoopla was all about?

Well, try this out.

The subatomic particle is better known to scientists as the Higgs boson. And after decades of searches, it seems likely the elusive particle has been successfully detected inside an underground tunnel experiment run by the European Organization for Nuclear Research (CERN) outside Geneva. Results “consistent” with the hard-to-detect particle, in the words of CERN chief Rolf Heuer as he announced the discovery July 4, may be the opening act in explaining the structure of the sky over our heads.

A source of heartburn to serious science types now, the “God particle” nickname for the Higgs boson comes from the title of a 1993 book by Nobel-prize winner Leon Lederman, who was trying to play up the elusive nature of the particle.

For a glimpse of one implication of this latest big news in science, climb aboard a time machine, says physicist Jonathan Feng of the University of California-Irvine, and visit the birth of the universe 13.7 billion years ago.

“Simply take the universe backwards, to an early time when the cosmos was a hot mass, brand new, filled with particles that each weighed perhaps 500 times as much as a proton,” says Feng (protons are positively charged subatomic particles inside atoms). “Now play the film forward. Just let it go until it expands to fill with today’s stars and galaxies, and what you find is that it contains amounts of that particle that are just right to be ‘dark matter’ filling the universe.”

Terrific, you might say, but what’s so wonderful about dark matter?

Dark matter is basically a bunch of stuff, likely exotic physics particles, that we can’t really see (hence its name) but we know is out there. Astronomers realized a few decades ago that galaxies should be spinning faster than they are if the stars within them were the only things providing the gravity that holds them together. So, their theories go, there must be something - dark matter - slowing them down.

It turns out that stars are just the shiny hubcaps on each galaxy, outweighed by a factor of nearly 6-to-1 by all the dark matter out there. Dark matter even pulls itself together through gravity. For example, the journal *Nature* last week reported that a dark matter cloud gravitationally connects two clusters of galaxies, called Abell 222 and Abell 223. This cloudy filament stretches over 11 million light years between the clusters and weighs 98 trillion times as much as our sun.

That’s a lot of dark matter. So is the Higgs boson this elusive dark matter particle (or particles) then?

Nope. But it may be a key to dark matter, physicists say.

The Higgs boson is the physics particle that gives other particles their mass. Essentially it interacts with them to increase their resistance to being moved faster, which we can measure as mass.

Because the Higgs boson's basic job is to interact with other physics particles to give them mass, "the Higgs boson can interact with dark matter very easily," Caltech's Sean Carroll explained on NPR's Science Friday show after the recent "God particle" announcement. "Dark matter is one of the most exciting implications of this discovery," Carroll said.

How? That brings us back to Feng's rerun of the universe. "Having a particle out there theoretically just a little heavier than the Higgs boson, which interacts with it, is waving a red cape in front of the eyes of physicists," Feng says. "There is a lot more data coming from CERN ahead that may reveal the dark matter particle."

Dark matter particles that theoretically could be detected at CERN's underground Large Hadron Collider are envisioned by a theory called "focus point supersymmetry." Supersymmetry theories predict that the already discovered particles that comprise everyday matter have much-heavier "super" counterparts awaiting detection (for example, the already detected "quarks" inside protons would have an undetected super-partner called "squarks"). Focus point supersymmetry predicts both a Higgs boson with a weight similar to the one reported on July 4, about 130 times as heavy as a proton, and dark matter particles.

"In fact, the simplest focus point models predict that dark matter particles should be seen not long from now in the underground detectors that are searching for them," if the CERN lab indeed found a Higgs boson, Feng says. "So there are really two predictions—dark matter should be seen in underground detectors, and new particles should be seen at the Large Hadron Collider in the next few years." Some of the new superpartner particles theoretically weigh in the detectable range for the underground experiment. Finding these new particles would crack the dark matter mystery and would indicate that even heavier super-particles are out there, ones that someday could allow physicists to explain gravity the same way they can explain electromagnetic and nuclear forces, a goal of cosmologists for nearly a century. "The simplest outcome is that we'll be totally wrong and it won't find anything," Feng says. "But we are at a point in physics where we can talk about theories and experiments coming together very closely thanks to what is now happening, and we couldn't do that for a long time before."

When do the next big results come from CERN that might offer more answers? Likely in December. So, Feng says, physicists celebrated one holiday, July 4, with new particle results and hopefully Christmas will bring them

hints of new presents. “That would be excellent, we couldn’t ask for better gifts,” he says.

Question 17 (regarding TEXT 3):

The word hoopla in paragraph 1 is closest in meaning to

- A) commotion
- B) public outrage
- C) propaganda
- D) insanity

Question 18 (regarding TEXT 3):

What tone does the author demonstrate in paragraph 3 when he quotes scientists use of “consistent” as a description for their experiments?

- A) skepticism
- B) awe
- C) fear
- D) utter belief

Question 19 (regarding TEXT 3):

Why is the Higgs boson nicknamed the “God Particle”

- A) Its potential power is so great it could have universal influence
- B) It has been a subject of religious study
- C) Proving its existence has been as elusive to scientists as proving the existence of god
- D) It is believed that the particle has some mystical powers

Question 20 (regarding TEXT 3):

What is the purpose of the time machine in the article?

- A) To suggest that we will likely never know the true history of the particle until a working time machine is invented
- B) To demonstrate that we must understand the origins of the Higgs boson particle to accurately understand its implications today
- C) The particle does not have any viable evidence of existing before the galaxies were formed
- D) The life of the particle can only be explained using a linear timeline

Question 21 (regarding TEXT 3):

According to the article, all are true of dark matter EXCEPT

- A) Its gravitational force slows the spinning of galaxies
- B) The ratio of dark matter to stars is 6 to 1
- C) It is comprised most likely of physics particles, though it is invisible
- D) Dark matter is named so because of its destructive, sinister force

Question 22 (regarding TEXT 3):

What is the key function of the Higgs boson particle?

- A) To increase the appearance of dark matter on scientific screening tools
- B) To collide with other particles to produce energy
- C) It proves the existence of god
- D) It gives other particles measurable mass

Question 23 (regarding TEXT 3):

In paragraph 14 the phrase “waving a red cape” is closest in meaning to

- A) giving up
- B) raising awareness among scientists
- C) provoking conflict
- D) encouraging scientists to avoid the topic

Question 24 (regarding TEXT 3):

What is the most accurate definition for focus point supersymmetry?

- A) The theory that particles all have a point of energy within them that is mirrored in others of their kind
- B) The theory that particles all have equal balance in their basic structures
- C) The theory that particles that have already been discovered have heavier “super” counterparts that are yet to be discovered still
- D) The theory that particles can be merged at a particular point in their atomic makeup

Question 25 (regarding TEXT 3):

The phrase “crack the dark matter mystery” in paragraph 17 is closest in meaning to

- A) Put a definitive end to all theories involving dark matter
- B) Disprove the theories around dark matter while proving other standing theories
- C) Separate the theories around dark matter into more specific groupings
- D) Solve a problem that has baffled scientists for a very long time

Question 26 (regarding TEXT 3):

What is the most accurate summary for the article?

- A) The discovery of Higgs boson is a notable step toward learning about dark matter, but it is only one aspect of a larger mystery
- B) Focus Point Supersymmetry is the most promising theory for understanding dark matter
- C) While dark matter provides an interesting story, it is much more a myth than a phenomenon rooted in actual scientific evidence
- D) Higgs boson, the "God Particle," and dark matter are all significant threats to world religions.