You will have several tasks during this exam.

1. One type of task is represented by multiple-choice questions. For ALL these questions, there is only one correct answer. In order to mark your choice, circle the letter corresponding to the correct choice on the exam sheet you have received.

2. The second task is represented by essay-type questions. These questions need to be answered in developed and coherent phrases (i.e., no single words or bullet-points with syntagms). When asked to draw representations of elements of the nervous system, please do so, as it will contribute to the grade. In order to answer these questions, please use the special exam paper provided by the examiners.

You can have with you the following materials:

1. English-Swedish and Swedish-English dictionaries.

You can write either in Swedish, or in English, as you prefer, but try to be consistent in using one or another of the languages.

Try to read all the questions before you start answering. Allocate time to each of them. Do try to answer all the points, as they bear different weight in your final grade. Be concise in your answers. Please keep the language professional in the written exam. Do not address the evaluator in the text of the exam at any moment, and please do not sign yourself or give any other identity indicators. You have 3h for this exam, so use them wisely.

Each correct answer on the multiple-choice gives you 0.16 points per correct answer, for the essay-type questions you will receive 1 point for every correctly fulfilled task.

These are the multiple-choice questions:

1. Which of the following statements regarding the myelin sheath is true:
   a. All neurons have a myelin sheath;
   b. The myelin sheath helps neurons take in nutrients from the synaptic space;
   c. The myelin sheath increases the efficiency of neural transmission?

2. Which of the next structures IS NOT a part of the central nervous system:
   a. Thalamus and hypothalamus;
   b. Limbic system;
   c. Sympathetic nervous system;
   d. Spinal cord?
3. Which of the following statements regarding the interneurons is true:
   a. Interneurons are neurons without a specific function other than to connect other neurons;
   b. Interneurons are making the connection between the sensory and the motor fiber at the level of the grey matter in the spinal cord;
   c. Interneurons are the neurons connecting the central nervous system with the peripheral nervous system?

4. Which of the following brain structures is the most primitive level of the brain:
   a. Medulla and pons;
   b. Reticular formation;
   c. Hypothalamus?

5. The role of the hypothalamus is:
   a. To keep us awake, sleep or when we pay attention;
   b. To coordinate our moves and balance;
   c. To mediate the input from sensory organs to the brain;
   d. To regulate our motivation, emotions, needs satisfaction.

6. Which of the following statements about the amygdala are true:
   a. Without the amygdala, we would not be able to establish emotional memories;
   b. The amygdala is the most important system in the fight-or-flight situations;
   c. The amygdala controls the functions of hypothalamus?

7. Which of the following statements about the cerebral cortex is true:
   a. The cerebral cortex is fundamental for the survival of an organism;
   b. The cerebral cortex is divided into four lobes: frontal, parietal, occipital and temporal;
   c. The frontal lobe of the cerebral cortex is present only in mammals?

8. The pituitary gland:
   a. Is controlled by the hypothalamus;
   b. Is involved in regulation of insulin;
   c. Is controlled by the spinal cord.

9. What is neuroplasticity:
   a. The ability of the neurons to heal;
   b. The ability of neurons to change in structure and function;
   c. The ability of neurons to multiply?

10. Corpus callosum is:
    a. A structure at the base of the brain linking the central nervous system with the peripheral nervous system;
    b. A structure similar to a bridge that acts as a communication link between the two hemispheres of the brain;
    c. A structure connecting the sensory and the motor neurons in the nervous system.

11. Which of the following functions are triggered by the activation of the sympathetic nervous system:
    a. Inhibition of the digestive system;
    b. Lowered heart beat;
    c. Dilated vessels.

12. Which of the following brain structures is not a part of the limbic system:
d. Amygdala;
e. Thalamus;
f. Hypothalamus;
g. Hippocampus;
h. Cortex.

13. What is the role of the pituitary gland?
   i. Secretes adrenaline;
   j. Secretes cortisol;
   k. Controls the metabolic rate;
   l. Regulates growth.

14. Which of the following statements regarding the midbrain it IS NOT TRUE:
   a. The midbrain is a portion of the central nervous system associated with vision, hearing, motor control, sleep/wake, arousal (alertness), and temperature regulation;
   b. The midbrain receives information from the olfactory bulb;
   c. The midbrain has an important relay function between the lower parts of the central nervous system and the cortical and sub-cortical structures of the forebrain.

15. Differences between individuals in terms of brain-size throughout the animal world are due to:
   a. Genes, more intelligent people have bigger brains;
   b. Sufficient nutrients during the embryonic development;
   c. Body size.

16. Which of the senses has nervous terminations projected directly on the hypothalamus, amygdala and hippocampus?
   d. Taste;
   e. Touch;
   f. Smell.

17. Which of the following areas have been associated with production of spoken language (motor speech):
   g. Wernicke area;
   h. Broca area;
   i. Motor neurons in the cerebellum.

18. Which of the following statements IS TRUE:
   j. We use 10% of our brain at any given time, although we might have different parts of the brain activated;
   k. A person can survive and function without parts of the cortex, but would be completely impaired if the hindbrain is affected;
   l. Men and women have structural differences in the brain, due to the presence of sex hormones.

19. Which type of neuron is represented in the figure below:
   m. Motric neuron;
   n. Sensorial neuron;
   o. Pyramidal neuron.
20. The myelin sheath in the central nervous system is secreted by:
   a. Schwann cells;
   b. Glial cells called oligodendrocytes;
   c. The ER formation in the body of the neuron.

21. Which of the following structures are fundamental in the blood-brain barrier:
   a. Glial cells called astrocytes;
   b. The membrane outside the body of the neuron;
   c. The outer layer of the blood vessels in the brain.

22. Which structure of the brain is most likely to be responsible for our personality?
   a. The limbic system;
   b. The cerebral cortex;
   c. The hypothalamus.

23. Endorphins are:
   a. Stimulants;
   b. Inhibitors;
   c. Neuromodulators.

24. What is the role of the somatic nervous system?
   a. Controls the automatic behavior of the internal organs;
   b. Carries information to and from the sense organs and skeletal muscles;
   c. Is responsible for fight-or-flight situation.

25. Which of the following statements regarding the processing of information in the human brain is true:
   a. All information coming from internal organs and the from senses is processed somehow by the cerebral cortex;
b. The human brain functions in a parsimonious manner, several structures in the brain having the role of relays, letting only relevant information pass towards the cortex;
c. All information related to threats passes directly to the cerebral cortex.

These are the essay-type questions (4 points):

1. Draw and describe the structures of the limbic system. (1p)
2. Draw and describe the structures within the forebrain. (1p)
3. Draw and describe the states in which a neuron can be, and what happens inside the neuron in each state. (1p)
4. Draw and describe a synapse with all the components and steps. (1p)

If you answer correctly to all the questions, you will get a total of 8 points. You need to reach 4.50 points in order to get a G, and 7.25 points for a VG. Exceptional answers at any of the exam questions will be rewarded with 0.50 points. Use your logic to answer the questions, and do not overcomplicate the thinking process. For the essay-type questions, give short, clear and concise answers, but try to avoid bullet-points when explaining your logic.