

MOCK EXAM WS 22/23

1. What are the central ideas of cognitive science?

- Interdisciplinary study of mind
- Not a unified field of study like each discipline themselves but rather a collaborative effort of researchers working in various fields
- It includes: philosophy, biological discipline, cognitive discipline, computational discipline.

2. Name examples for computations performed by the mind.

- Mathematical, linguistic computations, sensation, perception, attention, memory, decision making, problem solving, language, mathematical reasoning

3. What is monism?

- Only one kind of state or substance in the universe
- Aristotle characterized the difference between mind and body <-> form & matter
- Different shapes are different physical states, no non-physical or spiritual substance

4. What is voluntarism?

- Mind consists of elements assembled into higher cognitive components through the power of will -> attempt to create periodic table of mental elements
- Method: Introspection (inward looking)
- 2 types of conscious experience:
 - a) Immediate -> direct awareness of something
 - b) Mediate -> mental reflection
- „Tridimensional theory of feeling“ means any feeling can be characterised by 3 types:
 - a) Pleasure -> displeasure
 - b) Tension -> relax
 - c) Excitement -> depression
- „Creative synthesis“ is principle where minds actively organize disparate elements together to create whole new properties.

5. What is the role of glia cells?

- Cells which are nonneuronal and located in CNS and PNS
- It provides physical and metabolic support for neurons
- Types glia cells: oligodendrocytes (wraps multiple axons), schwann cells (wrap on axon cells), Microglia (remove unnecessary neurons), astrocytes (axon guidance, control blood flow and blood brain barrier)

6. Describe one of the major “neural activity generation” models?

- a) Hodgkin-Huxley:
 - describes spike generation process with a couple mathematical equations - using relations of conductance, voltage, and current.
 - Model can be represented as electrical circuit with capacitor in parallel with 3 resistors. Each has its own ion-specific battery, setting their reversal potential.
 - Drawbacks: need to define 20 parameters beforehand
 - b) Nernst Equation:
 - describes how to reach equilibrium through the neural membrane
 - Electrical potential difference drives ions through cell until extracellular and cytoplasmic site of cell are in equilibrium
 - Ions pass through ion channels (Na⁺, Cl⁻, K⁺)
7. Elaborate which neural structures are correlated with plasticity and how they react in a learning paradigm?
- brain plasticity (Neuroplasticity) is brain's ability to change and adapt as a result of experience. Such as:
 - a) Functional plasticity: The brain's ability to move functions from damaged area of brain to other undamaged areas
 - b) Structural plasticity: The brain's ability to actually change its physical structure as a result of learning.
8. What is the peripheral nervous system?
- A body's link to the world. It consists of:
 - a) Autonomic Nervous System: it regulates heart rate, respiration, digestion. It communicates with internal organs (like heart, pupils, stomach).
 - Sympathetic - prepares body for action and stress (flight or fight).
 - Parasympathetic – resting body and conserves energy.
 - b) Somatic Nervous System:
It communicates with sensory organs (eyes, ears) and carries information to CNS (sensory cortex) via spinal cord. It sends also commands from CNS to muscles (via spinal cord).
9. What are cortical columns?
- It is a group of neurons in the cortex of the brain that can be penetrated by a probe inserted perpendicular to the cortical surface, which have nearly identical receptive fields.
 - It is a group of organised minicolumns (that are made of neurons)
 - The neurons of minicolumns receive inputs and outputs and work as computation unit of cerebral cortex.
10. Hox genes are very important in development. Describe briefly their role?
- Hox genes (homeobox genes) encode and specify the characteristics of position, ensure that the correct structures form in the correct „places“ of the body.

- It forms pattern across Anterior and Posterior.

11. Describe the differences between EEG and ECoG/iEEG.

a) EEG:

- measured potentials in the skull. On skin/bones
- How? Use the „10-20 system“, electrodes are labelled in different parts of brain (Frontal, Parental, Occipital, Temporal, Central)
- Determine general states in the brain (sleep,awake) and diagnosis brain activity related to diseases (like epilepsy)

b) ECoG:

- Measure signals on open brain
- How? Put electrodes on brain tissue and use monitor

12. Genetically encoded calcium indicators are used to monitor neural activity.

Explain briefly how this works.

- Activity : using dependent fluorescence (GFP)
- Mix Artificial GFP with calcium, because normal GFP does not bind with calcium.
- Using Ca²⁺ to check glowing effect when neuron active -> low concentration of calcium for inactive neuron and increase with high active neuron
- In the presence of Ca²⁺ with artificial GFP we can see the green light if the neuron active.

13. What is the BOLD effect?

- Able to differentiate oxygenated and not oxygenated blood, so we can measure difference in signal on amount oxygenated and the blood
- Lower concentration of oxygen in the blood, means higher chance of having metabolism, because metabolism burns oxygen. (lower oxygen -> higher metabolism)
- Method: using fMRI to check brain activity and see the BOLD effect

14. Connectivity analysis can be performed on multiple levels. Name the levels and their scale.

- Microscale: see which neurons are connected via physical connections between synapses
- Mesoscale: Trace the links (anterograde and retrograde tracing) between neurons
- Macroscale: Many connective patterns across the hemispheres and complex interactions between the areas.

15. Who was Phineas Gage?

- Important patient in 19th century
- Get accident and damaged parts of his left frontal lobe
- First case to learn brain's role in personality and mental changes if brain damaged.

16. What is the WADA test?

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- It is conducted before epilepsy surgery.
- Using magnetic resonance imaging and not surgery
- To check before surgery, which side of brain causing problem and if blocking two hemispheres lead to severe damages or not.

17. What are hair cells?

- Are sensory cells of the auditory and vestibular systems.
- For example sensory cell in internal ear for the senses of sound and balance.

18. What is olfaction?

- Olfaction (sense of smell) occurs when:
Odour -> receptor in olfactory epithelium -> Glomeruli cells relay signals to olfactory bulb -> sensory input interact with brain for recognition, memory, flavour.

19. List all five tastes humans are able to perceive. Indicate which tastes rely on binding the tastant to the receptor.

- Sour, salty (rely on ion/ Na^+ channels)
- Bitter, sweet, umami (bind the tastant to the receptor)

20. The Homunculus is a special representation of the primary somatosensory cortex. Describe its unique appearance and the relationship to the primary somatosensory cortex.

- Homunculus maps the parts of body which are more sensitive and overrepresented in the brain such as hands and face (drawn bigger)

21. Voltage-gated sodium channels are important in pain mediation. Which voltage-gated sodium channel is essential in pain sensation? Describe its involvement briefly.

- Nav 1.7
- A mutation that leads to loss of nav 1.7 results in insensitivity to pain and also anosmia

22. Describe the two kinds of photoreceptors in our retina.

- Rods : responsible for black & white (very light sensitive and provide contrast)
- Cones : responsible colours (different length of cones can perceive different colours). For example:
 - short cones -> blue
 - middle cones -> green
 - long cones -> red

23. Explain how color emerges on a camera chip.

- A chip can only see black & white. Because of the high correlation between adjacent pixels one uses small bandpass filters above each pixel (bayer pattern): small filter, that lets only specific wavelength/color through

24. Which brain structure is important in acquiring new motor tasks?

- Cerebellum: for coordination
- Motor cortex: for voluntary actions (using skeletal muscles)
- i.e. motor cortex cannot control the heartbeat

25. What is implicit memory?

- Two types of memory short-term/working memory and long-term memory
- Two types of Long-term memory: declarative/explicit and non-declarative/implicit memory
- Non-Declarative/Implicit Memory: is the unconscious storage and recall of information. It is:
 - Based on implicit learning
 - can be summarised as remembering how to do something
 - primarily used in learning motor skills
 - when one does better in a given task only due to repetition, no new explicit memories
 - have been formed but one is unconsciously accessing aspects of the previous experiences

26. What is the N400 wave?

- An event-related brain potential measured using EEG
- Refers to negativity peaking at about 400 ms after stimulus
- Used to investigate semantic processing (language, words)

27. Describe the Libet experiment

- Subjects were asked to record the time when they wanted to move. Experiments show that
- the movement began before (30 milliseconds) before the subject's conscious intention to move.
- He found that the unconscious brain activity of the readiness potential leading up to subject movements, began approximately half a milli-second before the subject was aware of a
- conscious intention to move. These studies of timing between actions and the conscious
- decision bear upon the role of the brain in understanding free will.

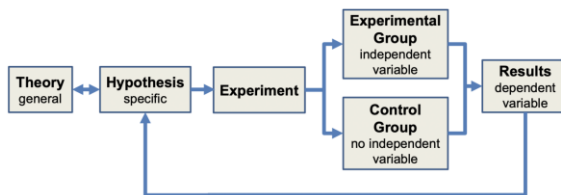
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1. What is dualism?

- Mental and physical substances are possible
- Plato: mind and body exist in two separate worlds
Mind: ideal world -> immaterial, non extended, external
Body: material worlds -> extended, perishable

2. What is the scientific method?

Psychology and the scientific method

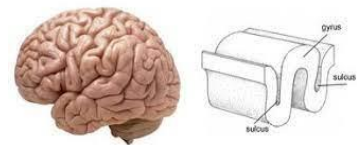


3. Explain what does the term plasticity mean?

- The ability of nervous system to change its activity in response to stimuli by reorganising structure, function and connections.
- Brain is dynamic and can adapt or learn new things.
- Two ways of learning: growth (brain increase number of neurons), reorganisation (re-wire the existing neurons to make new and stronger pattern)

4. What are gyri and sulci?

- Gyrus is a ridge on cerebral cortex
- Sulcus is a groove on the cerebral cortex
- Both give specific shape of the brain – they increase the surface



5. After birth, neurons grow to a specific shape and form spines. Describe the event after the outgrowth phase?

- Initiation > Outgrowth > Branching > Spine formation > Stopping/pruning
- Pruning: growth stopped and unnecessary connections are removed, important ones are strengthened.
- Important events for pruning: birth and adolescence (teenager)

6. What is CT (in contrast to MRI) ?

- CT: Computer Tomography – X rays

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- MRI: Magnetic Resonance Imaging – magnetic field
 - Both are used to capture disease like cancer, but MRI can show disease which are nearly unable to trace with CT
7. Understanding neural connectivity („connectomics“) is very important. Explain why. Maybe use an adequate example where the connection matters.
- Knowing the circuitry helps in identifying the purpose
8. What are split-brain patients?
- Where the hemispheres are no longer connected and communicate to each other
 - First by patient WJ injured during world war „one hand tried to open the door and other tried to block“
9. What is lateralization of brain function?
- Specific functions performed by the brain are located in one of the hemispheres (left and right)
 - Left hemisphere -> right side of body
 - Right hemisphere -> left side of body
10. What is the organ of Corti?
- It converts sound signal to electric signals in the inner ear. It's located in basilar membrane
 - It decomposes the signal into something similar to a Fourier transformation
11. Roughly describe the organization of the olfactory system?
- Odour binds to receptor in nasal epithelium
 - Then Glomeruli cells aggregate signal from these receptors and relay them to the olfactory bulb
 - Where sensory input begins to interact with parts of the brain that are responsible for recognition, memory, emotions, flavour
12. Which taste is strongly pH-dependent? Sketch why
- Sour -> because of the amount of protons
 - The olfactory bulb contains receptor in the nose where protons can directly bind to
13. What is procedural memory?
- A type of implicit memory which aids the performance of particular types of tasks without conscious awareness of these previous experience.
14. What is Wernicke's area and what happens if it is dysfunctional?

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- Injury to the left superior temporal gyrus, a part of neocortex which is known as Wernicke's area can lead to impaired comprehension of written and spoken language

15. What is Global Workspace theory?

- A cognitive architecture that has been developed to account qualitatively for large sets of matched pairs of conscious and unconscious processes.

16. What is Basal ganglia?

- Responsible for motor control and learning
- It is like a highly trained complex input-output mappings
- At first learn to drive car seems to be slow because information should go through cerebral cortex to enter motor cortex, but after a while this info can go directly through basal ganglia to enter motor cortex.
- It is like reinforcement learning (machine learn first from environment and get reward or punishment based on actions, after finishing training model knows what action to take in that environment)

Complementary questions to mock exam made up

1. Explain the multidisciplinary perspective!

- Interdisciplinary study of the mind
- The intersection of philosophy, biology, neuroscience, psychology, linguistics, AI, robotics

2. Name of the four types of representations – Explain the tri-level hypothesis.

- Representation: symbolic way to say something stands for something else
- 4 types: Concepts, Propositions, Rules, Analogies
- Tri-level hypothesis (levels for mental information processing):
 - a) computational level: what is the problem about?
 - b) algorithmic level: which algorithm to use to solve?
 - c) implementation level: how the algorithm is implemented?

3. What is Voluntarism - Structuralism – Functionalism – Gestalt Theory – Behaviourism?

- Voluntarism: Mind consists of elements assembled into higher cognitive components through power of will
- Structuralism: In contrast to voluntarism (mind not voluntary act). Mind is described with basic elements.
- Functionalism: implies that mental states could be realized in 2 separate physical systems (Concept of multiple realizability)
- Gestalt theory: counter reaction to structuralism. Mind creates larger structures than sum of elements

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- Behaviourism: The mind as a black box (environment controls a person's action and not mind)

4. What is the role of the neurons?

- Information processing
- It uses electrical impulses and chemical signals to transport information between different brain regions/nervous system
- They are connected through synapses
- Neuron consists of dendrites, cell body, and axon
- Neurons have activation thresholds, if summation of input signals (by dendrites) large enough, then depolarization happens (activation potential)

5. Explain the Hebb's Rule?

- Defines change of the weight vector depending on postsynaptic neuron activity time (the time when pre neuron fires to post, determine how much weight between two neurons change)
- „Neurons that fire together wire together“ -> both neurons need to fire in order to create a pathways through repetition (training)
- Neurons connected through synapses. Separated in pre/post synaptic
- LTP (Long Term Potential) <- weight increased (means pre fires before post)
- LTD (Long Term Depression) <- weight reduced (means post fires before pre)

6. What is the central nervous system?

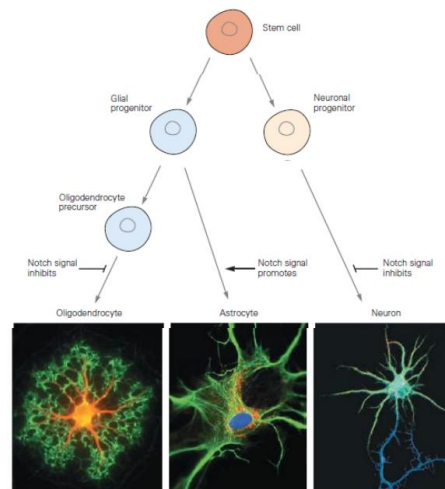
- The body's master control unit -> consists of brain, brain stem, and spinal cord
- Spinal cord connects CNS to PNS (consists of nerves that connect brain and spinal cord to the rest of body)

7. What are cortical layers?

- Structure of cerebral cortex.
- Neurons of cerebral cortex can be grouped into cortical layers and cortical columns
- Cortical layers -> consists of macrocolumns -> consists of minicolumns -> one minicolumn consists of 100 neurons

8. Brain Cells. Describe their role!

- Brain cells (CNS) is made up of two types of cells: neurons and glia cells
- Glia cells outnumber the amount of neurons, but neurons plays a big role as info messenger.



9. What is MEG?

- Magneto Encephalo Graphy
- Using magnetic fields to measure brain activity. The magnetic field of the fold of brain do not cancel out each other.

10. Describe how voltage signals can be used to measure neural activity?

- Neural activity is based on electric signals passing through them.
- The change of voltage across neurons can be measured when it is firing

11. What are CT/PET used for?

- Computer Tomography / Positron Emission Tomography
- PET : used to measure pet signal (radioactive decay = positron) -> to detect diseases
- CT : used to analyse brain activity, internal organs -> help detect tumors

12. Who was Broca – Wernicke – Molaison?

- Broca: injury on frontal gyrus -> unable to speak
- Wernicke: injury to temporal gyrus -> Bad comprehension between writing and speaking
- Molaison: surgery that cure his epilepsy, but unable to form new memories

13. What is the auditory system?

- It is a sensory system for the sense of hearing
- Outer ear -> collects sound waves
- Middle ear -> 3 bones which amplify the sound waves
- Inner ear -> the mechanical waves are going to cochlea and converted to electrical waves and send to sensory cortex

14. Explain dorsal + ventral stream?

- Ventral: „Vision-for-perception“ used for recognition of objects and shapes
- Dorsal: „Vision-for-action“ used for process information for the purpose of doing action

15. Explain Somatosensation and 3 ceptions!

- Somatosensation: Touch, pressure, pain, temperature
- Proprioception: by myself - Sensing oneself like muscles
- Exteroception: outside – Sensing outside of world (touch)
- Interoception: inter – Sensing the inside world

16. Name 3 levels how visual scene is analysed!

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- LLP (lower level processing) : orientation, colour, contrast
- ILP (Intermediate level processing) : surface, shape
- HLP (Higher level processing) : whole object

17. What is explicit memory / declarative?

- The conscious storage or recall of information
- Explicit memory since it consists of info that is explicitly stored and retrieved
- Requires conscious recall where the info must be retrieved

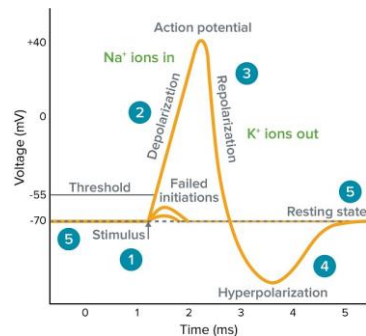
18. Describe the Turing test – Damasio's theory of Consciousness – Chinese Room!

- Turing Test (imitation game): test of machines ability to act as human think
- Damasio's theory: consciousness lies on emotions (unconscious response to external stimuli) and feelings (arise after awareness of change in emotion)
- Chinese Room: counter argument to turing test. It believes that computer can not have a mind, understanding, or consciousness regardless how intelligent the computer behave.

Braindumps WS 21/22

1. Action Potential?

- A rapid rise and subsequent fall in voltage across a cellular membrane with a characteristic pattern.
- When action potential happens, pre-stored chemicals also called neurotransmitter are moved to synapse and released to the synaptic cleft (area between presynaptic and postsynaptic)



2. Mind-Body Problem?

- Two fundamental question:
- Is the mind physical or something else?
- What is the causal relationship between mind and brain?

3. Brodman areas?

- Classified cerebral cortex to 52 different areas based on the structure of cortical layers

4. Pruning in deep neural network?

- Removing unimportant weights from network
- Results: better generalisation, fewer training data needed, increase speed of model

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- Two ways to prune: a) pruning synapses -> set certain weight's value 0, make network sparse
b) pruning neurons -> set certain activation func 0, make network dense
 - Three ways to pruning weights: Original (less number of weights), Quantization (less bits per weight), Huffman code (encode weights using huffman code)
5. EEG is noisy, what to do?
- Use White Noise Averaging: so the noise is not correlated with stimulus over time and has zero mean to deal with noise corrupting the signal
6. RSA?
- Representation Similarity Analysis
 - It is used to analyse fMRI data by combining data from different sources
 - use RSA to find brain regions where subjects who are more similar in their behaviour are also more similar in their neural response , by constructing the „behavioural similarity“ matrix and compare with „brain similarity“ matrix
7. Transcranial Magnetic Stimulation?
- Technique for simulating brain lesioning (wound)
 - Non-invasive, transient lesioning
 - Changing magnetic field used to cause electric current at specific area of brain through electromagnetic induction
 - Used clinically to measure activity and function of specific brain circuits in humans
8. What is myelining(myelinated) in neurons?
- The thicker the myelin sheath and the thicker the neuron diameter the faster the velocity of transport
 - Myelining is wrapping the axon with myelin that helps to keep the signal moving quickly. Neurons send signal using electricity
9. Why no medication nav 1.7?
- Because all sodium channels are similar, therefore need to be careful not hitting nav 1.5 (cause heart problems) or nav 1.1/nav 1.2 (cause neural activity problem)
 - The main sodium channel responsible for pain mediation
10. Disease of Basal ganglia?
- Huntington disease: abnormal involuntary movement -> indirect pathway affected
 - Parkinson disease: slow movement -> direct pathway affected

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11. Perceptual memory?

- It is a class of long-term memory for visual, auditory, and other perceptual information (odor,taste)

Multiple Question SmeshMed:

1. If total signal be large enough to active neuron?
 - a) Action potential
 - b) Depolarization (x)
 - c) Hyperpolarization
 - d) Postsynaptic
 - e) Presynaptic

2. Who created world's largest database for brain injuries?
 - a) Antonia Damasio (x)
 - b) Carl Wernicke
 - c) Henry Gustav Molaison
 - d) Michael Gazzaniga
 - e) Pierre Paul Broca

3. Where are Merkel cells located?
 - a) Brain
 - b) dermin
 - c) epidermis (x)
 - d) hypodermis
 - e) kidney

4. In which century did Psychology come?
 - a) 17th
 - b) 18th
 - c) 19th
 - d) 20th
 - e) NOT

5. What is Olfaction?
 - a) The senese of hearing
 - b) The sense of smell
 - c) The sense of taste
 - d) The sense of touch
 - e) the sense of vision

6. What ist he problem with XOR using neuron/perceptron?
 - a) XOR can be realized with one single perceptron for AND and OR
 - b) XOR can not be realized with one single perceptron
 - c) XOR woul need to many input values

7. The lipid bilayer between cytoplasmic and extracellular acts as .. for ion diffusion

- a) action potential
 - b) barrier (x)
 - c) bridge
 - d) membrane
 - e) trigger point
8. Complex input-output mapping realized by?
- a) Amygdala
 - b) Basal Ganglia (x)
 - c) Hippocampus
 - d) Thalamus
 - e) Cerebral cortex
9. A neuron fires when?
- a) depolarization exceeds the threshold for excitation (x)
 - b) hyperpolarization occurs
 - c) neurotransmitters dock onto receptor proteins
 - d) there is an excitatory postsynaptic potential
10. What is Tri-level Hypothesis?
- a) algorithmic > Computational > Implementation
 - b) Computational > Algorithmic > Implementation (x)
 - c) Implementation > Computational > Algorithmic
11. Which is the gatekeeper of Cerebral Cortex?
- a) Amygdala
 - b) Basal Ganglia
 - c) Hippocampus
 - d) Spinal cord
 - e) Thalamus (x)
12. The location of somatosensation receptors in the skin largely influences their properties. When a sensor is located in dermis, which is true?
- a) larger receptive field (x)
 - b) precise location ability
 - c) smaller receptive field
 - d) no difference
 - e) weaker sensation of pain
- *the deeper somatosensation receptor located in the skin the larger their receptive field
13. Pain killer development is not easy. Which of the following statement is false?
- a) Pain can be classified acute, persistent and chronic
 - b) Pain has two types -> A-fiber (first pain, fast, myelinated), C-fiber (second pain, slow, unmyelinated)

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- c) Some nerves fibres related to pain are „C-fibres“ without myelination
- d) the heart contains also voltage-gated sodium channels
- e) voltage-gated sodium channels are very dissimilar to each other

14. Which of the following is not brain cells?

- a) astrocytes
- b) hepatocytes (x) -> a liver cell
- c) microglia
- d) neurons
- e) oligodendrocytes

*The brain cells divided into neurons(information processing) and glia(supporting cells). Glia are astrocytes, microglia, and oligodendrocytes

15. There are 5 options true to different glial cells in our brain. Which one is true for RADIAL CELLS?

- a) It is a type of stem cell that is able to make neurons as well as other type of glial cells(astrocytes and oligodendrocytes)
- b) it is located in PNS -> radial cells located in CNS
- c) Their main function is to respond to any injuries or diseases in the CNS -> Microglia function
- d) they are also known as „immune cells“ fort he health of CNS -> Microglia cells
- e) they store glucose from the brain and use it to fuel the neurons -> Astrocytes

16. What is NOT the role of neurons?

- a) Computation
- b) Evidence integration
- c) Oxygen distribution
- d) Sensation
- e) Signal transduction

17. Membrane Potential is the difference in electrical charge between?

- a) AOT
- b) phosphoric acis and glycolipid layers
- c) potassium and sodium ions
- d) resting and action potentials
- e) the inside and outside of cell (x)

18. What is implicit memory?

- a) conscious memory
- b) declarative memory
- c) memory performed by the peripheral nervous system
- d) memory performed inside the brain
- e) unconscious memory (x)

19. Our brain hast wo hemispheres, left and right. Which of the folloing functionalities is mainly hardwired tot he left hemisphere of the brain?

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- a) Face recognition
 - b) Language (x)
 - c) Left body motor control
 - d) left visual field
 - e) melody, pitch and intensity
20. Which of the following elements/ units is not in the central nervous system?
- a) autonomic nervous system (x) -> belong to peripheral nervous system
 - b) brain
 - c) brain stem
 - d) frontal lobe
 - e) spinal cord
21. What is NOT a layer of the early fertilized cell?
- a) Ectoderm
 - b) Endoderm
 - c) Mesoderm
 - d) Neural ectoderm
 - e) Paraxial ectoderm (x)

Question SS 2022:

1. Mind-Computer analogy, which one is true?
 - a) Both use hardware and software
 - b) Both use binary number system
 - c) Both represent and transform information (x)
 - d) All is true
2. Functionalism in cognitive science? (FALSE Statement question)
 - Mental states are not just physical states but also functioning or operation of those physical states.
3. Neuron function
4. Physiology of neuron, which one is true?
 - a) AP lasts 100 ms -> wrong, it last only 2-5 ms
 - b) Resting potential of neuron -60 to -90mV (x)
 - c) Something about measuring potential in the range of miliampere
5. Fruit fly algorithm?
 - Locality enhanced hashing (the fruit fly olfactory circuit solves problem with a variant of computer science algorithm called locality-sensitive hashing, that hashes similar input items into buckets with high probability)

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- The fly circuit assigns similar neural activity patterns to similar odours, so that behaviours learned from one odour can be applied when similar odour is experienced again.
6. About RSA? (TRUE – False question)
 7. CIP? (True statement question)
 - Congenital Insensitivity to Pain is due to mutation in gene SCN9A
 - Which encodes voltage-gated sodium ion channel Nav1.7 leading to no pain experience -> Loss function of Nav 1.7
 8. TMS – Transcranial Magnetic Stimulation?
 9. PET – PET/CT?
 10. GFP?
 11. Neural plasticity: which one does not involve to neural plasticity?
 - a) Brian Growth
 - b) Hebb's rule
 - c) Integrate – fire (x)
 - d) LTP
 12. Which part is lobe of cerebral cortex?
 - 4 lobes: Frontal, temporal, parietal, occipital
 - And insular cortex lies underneath temporal lobe
 13. Classical and operant conditioning associate with which theory?
 - Behaviorism
 14. CNN's Visual system? (True or False question regarding level processing information)
 15. Basal Ganglia disorder? (True or False question)
 16. Memory? (False statement regarding memory type)
 17. Which are Theory of consciousness?
 - a) Global Workspace Theory
 - b) Integrated Information Theory
 - c) Damasio's Theory (x)
 18. Sense of Smells is? -> olfactory
 19. Umami and Chinese Restaurant Syndrome?
 20. Brodmann area?
 - Regions of cortex defined by the relative distribution of cell types across cortical layers -> one of the most influential ways of dividing up the cerebral cortex up to ~ 52 areas
 21. White Noise averaging for EEG signal?
 22. Pruning?
 23. Myelination, effect of Schwann cells? (True-False question)

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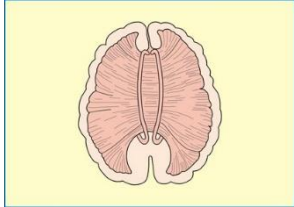
24. Camera, rod and cone, blind spot, brayer?
25. Pain, CIP side effect, IEM an PEPD (Pain Killer development for Nav 1.7)? (True-False question)

Multiple choice questions Online

1. The branching structures of neurons that carry information from other neurons are called:
 - a. Somas
 - b. Hillocks
 - c. Axon
 - d. Dendrites
2. The points along the axon at which myelin is absent are called:
 - a. Organelles
 - b. Nodes of Ranvier
 - c. Ventricles
 - d. Voltage-gated Na⁺ channels
3. Another term for the posterior aspect of the brain is:
 - a. Dorsal
 - b. Caudal
 - c. Rostral
 - d. Inferior
4. The dips or folds in the brain are called:
 - a. Lobules
 - b. Lobes
 - c. Sulci
 - d. Gyri
5. The neocortex consists of how many main cortical layers?
 - a. 6
 - b. 8
 - c. 5
 - d. 3
6. The lateral dividing line between the frontal and temporal lobes is called the:
 - a. Cingulate fissure
 - b. Middle frontal gyrus
 - c. Sylvian fissure
 - d. Inferior frontal gyrus
7. The island of cortex buried underneath the temporal lobe is called the:
 - a. Precuneus
 - b. Insula
 - c. Hippocampus

- d. Uncus
8. Brodmann area 17 represents a functional region often referred to as the:
- a. Planning region
 - b. Primary motor cortex
 - c. Primary visual cortex
 - d. Diencephalon
9. Which of the following parts of the limbic system has been implicated most in the detection of fearful or threatening stimuli?
- a. Mamillary bodies
 - b. Hippocampus
 - c. Olfactory bulbs
 - d. ?
10. Disorders of the basal ganglia can be characterized as:
- a. Hypokinetic
 - b. Psychosomatic
 - c. Transient
 - d. Associative
11. The part of the brain thought of as the main sensory relay for most senses is called the: a. Fornix
- b. Thalamus
 - c. Medulla
 - d. Globus pallidus
12. The hypothalamus is primarily concerned with:
- a. Memory
 - b. Sensory processing
 - c. Breathing and swallowing
 - d. Regulation of the body
13. The inferior colliculi are specialized for what type of processing?
- a. Visual
 - b. Auditory
 - c. Tactile
 - d. Olfactory
14. Which region of the hindbrain literally means "little brain" and, if extensively damaged, can lead to deficits such as dysarthria and nystagmus?
- a. Cerebellum
 - b. Superior colliculi
 - c. Anterior cingulate cortex
 - d. Medulla oblongata
15. The fluid filling the brain's ventricles is called:
- a. Bile
 - b. Cerebrospinal fluid

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- c. Glia
 - d. Aqueous humor
16. Which of the following neurotransmitters is inhibitory?
- a. GABA
 - b. Glutamate
 - c. Dopamine
 - d. Acetylcholine
17. The type of white matter tract, depicted below, connecting cortical structures across different hemispheres is called:
- a. Association tract
 - b. Projection tract
 - c. Commissure
 - d. Feedback loop
- 
18. Which of the following researchers was the first to describe the nerve cell (in 1837)?
- a. Ogawa
 - b. Berger
 - c. Purkinje
 - d. Lauterbur
19. Descartes suggested that the mind and body interacted at which gland, located at the center of the brain?
- a. Pituitary
 - b. Adrenal
 - c. Thyroid
 - d. Pineal
20. Which of the following statements about human connectomics is TRUE?
- a. The connectome map does not vary across individuals
 - b. fMRI can be used to create connectome maps at the synaptic scale
 - c. There are more synaptic connections than there are DNA bases in the genome
 - d. There is a known code for translating connectome maps into behavior
21. Which of the following was one of the two key assumptions of phrenology?
- a. The mind is located in the heart
 - b. Different regions of the brain perform different functions
 - c. Lines on a person's palms are indicative of his/her cognitive abilities
 - d. Brain size is uncorrelated with differences in cognition and personality
22. In Broadbent's (1958) serial box-and-arrow model of cognition what is the order of the components?
- a. Attention, Long-term memory, Short-term memory
 - b. Perception, Attention, Short-term memory
 - c. Short-term memory, Perception, Long-term memory
 - d. Anterior, Dorsal, Posterior

23. Which term refers to the situation where later stages of processing begin before earlier stages are complete?
- a. Bilaterality
 - b. Dualism
 - c. Serialism
 - d. Interactivity
24. The responsiveness of a node in a computational model depends most directly on:
- a. The physical distance between nodes
 - b. The overall activity contained within the model
 - c. The weight of the connection to other nodes
 - d. The number of nodes in the model
25. Pinker and Prince (1988) criticized neural network models largely on the grounds that they often:
- a. Ignore the role of serial processing
 - b. Include hidden layers
 - c. Were capable of doing things that real brains could not
 - d. Don't make any testable predictions
26. Which of the following techniques of cognitive neuroscience does NOT have a temporal resolution in the millisecond range?
- a. EEG
 - b. TMS
 - c. MEG
 - d. fMRI

Multiple choice questions „note for exam“ (part 1 till page 32)

1. What is the first region that receives auditory input in the brain?
 - a) Cerebellum
 - b) Primary auditory cortex (x)
 - c) secondary auditory cortex
 - d) spinal cord
 - e) thalamus

2. Sense of taste called?
 - a) Gustation (x)
 - b) Chemosensory
 - c) Olfactory
 - d) Somatosensory
 - e) Transduction

3. The lipid bilayer between cytoplasmic and extracellular acts as a ____ for ion diffusion
 - a) action potential
 - b) barrier (x)
 - c) bridge
 - d) membrane
 - e) trigger point

4. The basal ganglia, or basal nuclei, are group of subcortical nuclei, of varied origin, in the brains of vertebrates. What happens if the basal ganglia is damaged?
 - a) Damage to the basal ganglia cells may cause problems controlling movement
 - b) Damage to the basal ganglia cells may cause problems controlling posture
 - c) Damage to the basal ganglia cells may cause problems controlling speech
 - d) Damage to the basal ganglia cells may cause problems controlling speech, movement and posture (x)
 - e) None of the answers are correct

5. Let's have a look into the structure of a neuron. Give the task of each of the following parts: Node of Ranvier, Myelin sheath, Axon
 - a) Allow fast transduction and a low-noise environment, transmit the electrical signal over large distances, refresh the signal (x)
 - b) Refresh the signal, transmit the electrical signal over large distances, allows fast transduction and a low-noise environment
 - c) Transmit the electrical signal over large distances, allow fast transduction and a low-noise environment, refresh the signal
 - e) Transmit the electrical signal over large distances, refresh the signal, allow fast transduction and a low-noise environment

6. „You will pass this exam if you have covered every topic diligently“
What type of representation is this?

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- a) Analogy
 - b) Concept
 - c) None of the above
 - d) Proposition
 - e) Rule (x)
7. Hammer, anvil, and stirrup are all part of human's ____?
- a) Ear (x)
 - b) Heart
 - c) Mouth
 - d) Nose
 - e) Stomach
8. Give the primary function of the following memory types:
Sensory Memory, Short-term memory, Working memory, Long-term memory
- b) Holds information from sensory organs || Holds but does not manipulate a small amount of information || Holds information temporarily and enables manipulating information || Takes information from the short-term memory and creates long lasting memory (x)
9. Philosophy is part of cognitive science.
What does not philosophy do to help investigate in cognitive science?
- a) criticizing models
 - b) defining problems
 - c) generating results (x)
 - d) search for wisdom and knowledge
 - e) suggesting areas of future research
10. Which one is the most bitter compound in the world?
- a) Alkaloids
 - b) Caffeine
 - c) Denatonium (x)
 - d) Nicotine
 - e) None
11. Which order of the visual cortex system correspond with the order of detecting „edges and lines“ -> „shapes“ -> „objects“ -> „faces“?
- a) IT > V1 > V2 > V4
 - b) IT > V4 > V2 > V1
 - c) V1 > V2 > V4 > IT (x)
 - d) V1 > V2 > V3 > V4
 - e) V2 > V1 > V4 > IT
12. Which area of the brain is responsible for language generation?
- a) Angular gyrus
 - b) Arcuate Fasciculus

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- c) Broca's area (x)
- d) Insular Cortex
- e) Wernicke's area

* The Broca's area is responsible for speech generation. If it is damaged, patients can still comprehend language but are not able to speak anymore

13. What is not a type of representation?

- a) Analogies
- b) Concepts
- c) Processing (x)
- d) Propositions
- e) Rules

14. Regarding lesion studies which definition of cortical blindness is true?

- a) the total or partial loss of color vision caused by damage to the occipital cortex (x)
- b) the total or partial loss of depth perception caused by damage to the parietal cortex
- c) the total or partial loss of language comprehension caused by damage to the occipital cortex
- d) the total or partial loss of vision caused by damage to the occipital cortex
- e) the total or partial loss of vision caused by damage to the temporal cortex

15. What is the resting potential in most neurones?

- a) 40 mV
- b) 70 mV
- c) -20mV
- d) -40mV
- e) -70mV (x)

16. Binary tree sort is an example of which tri-level hypothesis of computation?

- a) algorithmic level (x)
- b) code level
- c) computation level
- d) implementation level
- e) none

17. Which taste we would get if H (Hydrogen or proton) conduct through Ion Channel?

- a) Bitter
- b) Salty
- c) Sour (x)
- d) Sweet
- e) Umami

18. What is not the role of neurons?

- a) Computation
- b) Evidence integration
- c) Oxygen distribution (x)

- d) Sensation
 - e) Signal transduction
19. How we sense sweet, bitter, and umami?
- a) ion channels
 - b) None
 - c) Receptors (x)
 - d) Receptors and ion channels
 - e) Taste pore
20. The CNS consists of 2 major types of cells: Neurons and Glial cells
What is the main function of Oligodendrocytes?
- a) All
 - b) Communication
 - c) Myelination around axons (x)
 - d) None of the above
 - e) Removing damaged cells
21. To obtain data in Psychology, scientific methods are used.
What is not a scientific method in psychology?
- a) Case study analysis
 - b) ECG (x)
 - c) Questionnaires
 - d) Recording of behaviour
 - e) Surveys
22. What does an electroencephalogram (EEG) measure?
- a) Measures activity in the spinal chord
 - b) Measures muscle activity
 - c) Measures potentials in the skull (x)
 - d) Measures signals on the open brain
 - e) Measures the electric activity of the heart
23. Approximately how many neurons does a microcolumn contain?
- a) 1.000.000 neurons
 - b) 10 neurons
 - c) 10.000 neurons
 - d) 16 Billion neurons
 - e) 100 neurons (x)
24. Which of these is the gate-keeper of the cerebral cortex?
- a) Amygdala
 - b) Basal Ganglia
 - c) Hippocampus
 - d) Spinal Cord

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- e) Thalamus (x)
25. The whole is more than the sum of its parts. Which of the following psychological approaches suit this statement?
- a) Behaviorism
 - b) Functionalism
 - c) Gestalt Theory (x)
 - d) Structuralism
 - e) Voluntarism
26. The McCulloch-Pitts Neuron is a mathematical model of neuron. Which logical operation cannot be performed by the McCulloch-Pitts neuron?
- a) AND
 - b) None
 - c) NOT
 - d) OR
 - e) XOR
27. Which taste we would get if Na (sodium conduct) through Ion Channel. Type of Taste
- a) Bitter
 - b) Salty (x)
 - c) Sour
 - d) Sweet
 - e) Umami
28. We can taste different tastes with our tongue. Which one is not correct?
- a) bitter
 - b) salty
 - c) sour
 - d) spicy (x)
 - e) sweet
29. The lipid bilayer between cytoplasmic and extracellular acts as a barrier for ion diffusion and gives rise to an electrical potential across this lipid bilayer, that we call it membrane potential, or V_m : voltage (charge diff.) across the neuronal membrane; Which statement is false?
- a) high concentrations of potassium (K^+) in the cytoplasmic site and low concentrations in the extracellular site.
 - b) high concentrations of sodium and chloride ions (Na^+ , Cl^-) in the cytoplasmic site and low concentrations in the extracellular site.
 - c) high concentrations of sodium and chloride ions (Na^+ , Cl^-) in the extracellular site and low concentrations in the cytoplasmic site.
 - d) when it decreases (less than -60), hyperpolarization
 - e) When the membrane potential increases relative to the resting state (bigger than -60 which was resting voltage) we call it depolarization

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30. For the encoder decoder principle there are different methods that can be used for the feature reduction step. Which statement is False?
- a) Hollistic means that the face is encoded as a combination of different faces and not in single features
 - b) NMF is a parts based method
 - c) parts based means that the faces are encoded via different features
 - d) PCA is a holistic method
 - e) VQ ist parts based method (x) -> It is a holistic method

31. What is the job of Somantic Nervous System?
- a) Calms the body
 - b) Digestion
 - c) heart rate
 - d) Prepares body for action and stress
 - e) Sensory information from sensory organs to the CNS

32. During the maturation of a neuron it transitions through five stages:
Initiation > Outgrowth > Branching > Spine Formation > Stopping/Pruning

Which of these states is most important for dynamic and efficient connections?

- a) Branching
 - b) Initiation
 - c) Outgrowth
 - d) Spine Formation
 - e) Stopping/Pruning (x) -> because it removes unnecessary connection and strengthened the important one
33. Hebb's rule states that "Neurons that fire together, wire together". Based on that different synaptic plasticity rule have been established. Which of the following statements true?
- a) The correlation-based plasticity rule can model long-term depression and long-term potentiation of synapses.
 - b) The correlation-based plasticity rule can only model long-term depression of synapses. (x)
 - c) The correlation-based plasticity rule can only model long-term potentiation of synapses.
 - d) The covariance-based plasticity rule can only model long-term depression of synapses.
- *Basic Hebb only allows positive weights, and thus only LTP
34. Whole cerebral cortex divided into _____ broadmann areas.
- a) 52 (x)
 - b) 56
 - c) 65
 - d) 75
 - e) 100
35. Sort the following list (in question alpha order) of electromagnetic radiation from low energy to high energy.

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Infrared(1), Radio Waves(2), UV(3), Visible Light Blue(4), Visible Light Red(5)

- a) 1,4,5,3,2
- b) 2,1,4,5,3 (b)
- c) 2,1,5,4,3
- d) 3,4,5,1,2
- e) 3,5,4,1,2

* Higher wavelength equals lower energy, thus start is with radio waves. Blue light has higher energy than red light

36. A neuron can have multiple dendrites and thus receives multiple inputs depending on the neuron type of one hundred of thousands always have a single Axon that carries out put signal.

Neurons typically consists of:

- a) Cell soma-Axon
- b) Dendrites-Axon
- c) Dendrites-Cell body
- d) Dendrites-cell body-Axon (x)
- e) Only Dendrites

37. If you're having problems with your vision, then it's likely that there could be a problem with your ___.

- a) Cerebellum -> helps coordinate and regulate a wide range of functions and process
- b) Frontal lobe -> voluntary movement, language and some executive functions
- c) Occipital lobe (x) -> responsible for visual
- d) Parietal lobe -> sensory like taste, hearing, sight, touch and smell
- e) Temporal lobe -> processing auditory information and encoding of memory

38. Which of the following is strongly influenced by Darwin's theory of natural selection?

- a) functionalism (x)
- b) Gestalt theory
- c) None
- d) Structuralism
- e) Voluntarism

39. Pain is perceived due to an encoded channel. Which statement is wrong?

- a) Existing disorders of the pain perceivment are easy to treat because one only has to compensate for one channel
- b) If the channel is not working you constantly hurt yourself without noticing
- c) If you have a disorder in perception, you can have pain from simply wearing socks
- d) It is very hard to treat because there is more than just Nav 1.7 and the similarity causes problems.
- e) The channel is Nav 1.7 and encoded by SCN9A

* Not easy because there are many similar channels that will also be blocked by nav 1.7 sensitive pain killers

40. The earliest forms of brain interface devices focused primarily on which task?

- a) none
- b) controlling robotic limbs

- c) converting physical stimuli to neural activity
 - d) creating long-term memories
 - e) increasing memory recall
41. Name the brain cell from the following list that is necessarily the predecessor of all other listed brain cells
- a) Astrocytes
 - b) glia cells
 - c) neuronal progenitor
 - d) oligodendrocytes
 - e) stem cell (x)
42. Pruning in deep neural networks can be described with different statements. Which of statements is false?
- a) Pruning means removing unimportant weights from network
 - b) Pruning neurons makes the network sparse
 - c) Pruning neurons means removing the neurons from the network
 - d) Pruning synapses makes the network sparse
 - e) Pruning synapses means deleting connections between neurons
43. What is implicit memory?
- a) conscious memory
 - b) declarative memory
 - c) memory performed by the peripheral nervous system
 - d) memory performed inside the brain
 - e) unconscious memory (x)
44. What are lesion studies?
- a) draw conclusion of function and impairment of certain brain area (x)
 - b) malnutrition patient and examine which parts of the brain are damaged to draw conclusion about nutrition
 - c) not a topic of neuroscience
 - d) sending high voltage through brain areas to excite the neurons – enhancement of cognition is then studied
 - e) Study patients with severe forms of depression and their connection to the brain
45. Which of the below actions/task is not processed in the left hemisphere of the human brain?
- a) all
 - b) drawing, face recognition (x)
 - c) none
 - d) problem solving
 - e) sequential processing
46. How many tastes human are able to perceive?
- a) 3

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- b) 4
 - c) 5 (x)
 - d) 6
 - e) 7
47. What is common way to improve the capacity of short-term memory?
- a) blocking
 - b) chanking
 - c) chinking
 - d) chunking (x)
 - e) drinking
48. Which of the following elements/units is not in the CNS?
- a) Autonomic Nervous system (x) -> a part of PNS
 - b) Brain
 - c) Brain stem
 - d) Frontal lobe
 - e) spinal cord
49. What are muller cells?
- a) activator cell
 - b) denoisers
 - c) light guides (x)
 - d) sensory cells
 - e) type of neurons
50. Gestalt principles. Which one is not?
- a) Additivity
 - b) closure
 - c) common fate
 - d) Proximity
 - e) similarity
51. Which one is the study of knowledge and asking questions?
- a) deductive reasoning
 - b) epistemology (x)
 - c) inductive reasoning
 - d) Metaphysics
- * Two branches of philosophy are: Metaphysics (what is nature of reality?) and Epistemology
* Primal methods in philosophy: Deductive and inductive reasoning
52. Which taste is strongly pH-dependent?
- a) Bitter
 - b) Salty
 - c) Sour

- d) Sour (x) -> acidic, because amount of protons
- e) Sweet
- f) Umami

Notes for exam (part 2 from page 33)

1. Which of the following controls the blood brain barrier and blood flow?
a) Astrocytes (x) b) Microglia c) Nodes of Ranvier d) Oligodendrocytes e) Schwann cells
2. The limbic system consists of the Amygdala and the Hippocampus. What is a function of the Hippocampus?
a) Conscious perception b) Control of fear c) Emotional responses d) Episodic Memory(x) e) Voluntary movements
3. The inferior and superior colliculi compose the
a) Myelencephalon b) Substantia nigra c) tectum(x) d) tegmentum e) thalamus
4. Checking whether a neuron is excited and firing is a very important task in neuroscience. This can be done by letting parts of it light up (fluoresce) if it sees an action potential. What is the way to go if one wants to only have fluorescence when the neuron is firing?
a) Binding GFP to a Calcium binding domain as Calcium indicated neural activity.(x)
b) Binding GFP to a Calcium binding domain as Calcium indicated neuronal activity.
c) Binding GFP to a magnesium binding domain as magnesium indicated neural activity.
d) non of the above.
e) Simply inserting GFP into the neuron
5. Regarding the definition of psychology, internal mental and external events are mentioned. Which of the following answers belongs to external events? Which of the following answers is part of external events?
a) behavior(x) b) language c) perception d) reasoning e) visual
6. Which of the following statements best describe Hebb's rule?
a) Firing of neurons is independent of the connections to each other.
b) Neurons that are connected don't have to fire together.
c) Neurons that are not connected can still fire together.
d) Neurons that fire at together don't have to be connected.
e) Neurons that fire together, wire together(x)
7. The brain processes the signals acquired in the retina. Which statement about the process is FALSE?
a) it is clear that face recognition works via sparse coding(x)
b) perception is not stable - pictures can flip between different image perceptions
c) the brain works with encoder decoder methods
d) what stream- below and ventral
e) where stream- above and dorsal
8. The thalamus is located at the middle of the brain, above the brain stem. About the thalamus, it is correct to affirm all EXCEPT:
a) has a 1 to 1 mapping with the cerebral cortex
b) is related to episodic memory and spatial navigation(x)
c) It is important to attention as it defines which information should be passed to the cerebral cortex
d) Operates as "gate keeper" of the cerebral cortex
e) Works as a relay station of sensory input to cerebral cortex Choice B The wrong one would be correct for the hippocampus
9. Which of the following options appropriately summarizes functionalism
a) None of the above
b) All of the above
c) It is fruitful to define mind by the sort of processes that they carry out, instead of the stuff that they are made of (x)

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- d) Mind and body exist in two separate worlds
 - e) The difference between mind and body is the same as that between form and matter
10. The first step in the scientific method is to make a(n)
- a) hypothesis
 - b) observation(x)
 - c) prediction
 - d) proclamation
11. Where would you see the nodes of Ranvier?
- a) on an axon (x)
 - b) in the cell body
 - c) on a dendrite
 - d) both a and c
 - e) None of these
12. Neural activity of single cells can be measured to gain insights on connectivity. Which of the following is the least invasive method for measuring cell potentials?
- a) CT
 - b) ECOG
 - c) EEG(x)
 - d) FP and unit spikes
 - e) Intra-cellular measurement
13. Which method focuses on three tiered system of consciousness
- a) Functionalism
 - b) Gestalt psychology
 - c) Psychoanalytic psychology (x)
 - d) Structuralism
 - e) Voluntarism
- * Three tiered system: Conscious mind, preconscious mind, unconscious mind
14. Which of the following is true for rods?
- a) Capable for color vision
 - b) High spatial acuity
 - c) Nocturnal animals have fewer rods
 - d) Responsible for night vision (x)
 - e) Responsible for photopic vision
15. What is the approximate resting potential voltage?
- a) 0V
 - b) 5V
 - c) 10mV
 - d) 10mV
 - e) 60mV (x) -> minus 60
16. Which theory stated "Neurons that fire together, wire together?"
- a) Deep Neural Networks
 - b) Hebb's rule (x)
 - c) Spike timing dependent plasticity
 - d) Oja's rule
 - e) None of the above
17. Why is color weakness (green-red) a male dominant phenomenon?
- a) Because of the male behavior eye nerves get damaged over time
 - b) Because the genes for this lay on the X-Chromosome (x)
 - c) Because the genes for this lay on the Y-Chromosome
 - d) It comes from the interaction with testosterone
 - e) It is widely unclear
18. When checking a hypothesis in psychology one uses a scientific method. Which statement concerning the workflow of the method is correct?
- a) all groups are presented the same dependent variables
 - b) all groups are presented the same independent variables
 - c) none of the above
 - d) the dependent variable is the measurable effect of the independent variable (x)
 - e) the independent variable is the measurable effect of the dependent variable
19. The BOLD effect is used in medical imaging Which Statement about the BOLD effect is wrong
- a) BOLD effect stands for blood oxygen level dependent effect
 - b) In an active brain area the blood oxygen level is lower because the neurons consume the oxygen
 - c) The BOLD effect is often use in fMRIs (fMRT) (x)
 - d) We can use the BOLD effect to observe neural brain activity
 - e) We need many repetitions to identify active regions for the stimulus when we use the BOLD effect

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20. Approximately how many nerve fibers are there in cochlea?
a) 3 b)30 c) 300 d)30000(x) e)30000000
21. Which of the following System is NOT part of the Global Workspace Theory of Consciousness?
a)Attentional System b)Disclosure System(x) c)Evaluative System d)Motor System e)Perceptual System
22. Rods are part of the photoreceptors in the retina. When are rods the most active?
a)At Daytime b)At dusk and dawn(x) c) Consistently active throughout the day d)only at dawn e)only at noon
23. Gestalt Laws are laws describing the preceived visual reality. Which Gestalt Law implies that parts that are close to each other are grouped together?
a)closure b)none of the above c)pragnanz d)proximity e)similarity
* Proximity (Parts that are close are perceived as a whole), Similarity (parts that are similar in lightness, color, shape group together), Closure (A coherent whole because of closure), Pragnanz (Parts that are simple will group together)
24. We have four different brain cells, which one of the Usted cells is NOT a brain cell? Which of the following cells is NOT a brain cell?
a) astrocytes b) hepatocytes(x) c) microglia d) neurons e) oligodendrocytes
25. Limbic system contains Amygdala and Hippocampus. Which of the following is NOT the function of the Hippocampus?
a) Emotional responses (x)
b) Episodic Memory
c) Memory formation
d) Spatial Navigation
e) The brain's RAM (rapid access memory)
26. The Central Nervous System is splitted on...
a) Brains Stem, Brain, Cerebellum
b) n.d.a.
c) Spinal Chord, Basal Ganglia and Thalamus
d) Spinal Cord, Brain Stem and Brain(x)
e) Spinal Cord, Brain Stem and Cerebellum
27. Damasio's Theory of Consciousness is one of the 3 Major Theories that explain the meaning of Consciousness. Which one of the following is NOT a part of the 'Hierarchy of Stages' of Damasio's Theory of Consciousness?
a) Cognitive consciousness Clip
b) Collection of un-conscious neural responses
c) Core Consciousness
d) Extended consciousness
e) Protoself(x)
28. The connection between two neurons is called...
a)None of the Above b)Post-synaptic c) Pre-synaptic d) synapse(x) e)transmitters
29. The brain develops throughout lifetime. Which of the following terms describes the strengthening of a synapse?
a) Long term depression
b) Long term potentiation
c) Plastic fire integration
d) Short term action potential
e) Short term mania
30. In how many levels is a visual scene analysed?
a)1 b)2 c)3(x) d)4 e)5
31. Mini column are the basic functional unit of

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- a) Amygdala b)Cerebellum c)cortex (x) d) hippocampus e)Limbic system
32. The shape of the cochlea resembles to which one?
a) NOT b)SeaHorse c)Snail (x) d)Spider e)Turtle
33. If we distinguish things by their actions or tendencies, according to what school of mind we are explaining
a) dualism b)functionalism(x) c)monoism d)philosophical concept e)physical concept
34. Nvidia published a brute force study in which it introduces a simple way of pruning. Select the one that is NOT part
a) Add a connection in order to remove a Neuron (x)
b) Check if further Pruning is necessary
c) Evaluate importance of Neurons
d) Fine-Tuning
e) Remove the least important Neuron
35. Due to Freud's Psychoanalytic psychology, which one is completely in the unconscious mind?
a) all of above b) ego c)Id(x) d)none of above e)super ego
36. The Brain has two sides and due to lesions there where differences found between them. Which statement is NOT true?
a) A way to simulate a separated brain is the Wada test
b) For research of the differences split brain patients are studied
c) The left and right hemisphere are built up in the same way (same sizes of each area) (x)
d) The left hemisphere is known for Broca's and Wernicke's area
e) The right hemisphere is known for holistic parallel processing
37. Neurons fire if a certain activation threshold is reached. In this context one can use an integrated fire model. What is an integrated fire model?
a) It integrates the action potential of a neuron
b) It models different action potentials from the same neuron
c) It models the summation of the dendrites signals and integrates them (x)
d) It shows the strength of the resulting action potential of a neuron
e) It shows which neurons are interconnected
38. Mark the wrong statement
a) Hebb's law describes a rule for the wiring between neurons and when to weaken or strengthen synaptic connections.
b) if the postsynaptic cell fires before the presynaptic cell the weight will be decreased
c) Intensifying a connection is also known as LTD (x)
d) Neurons that fire together wire together.
e) The strength of the connection of a synapse is proportional to the size of the synapse
39. When testing a theory, scientists must be especially careful to avoid:
a) belief bias(x) b) correlational designs c) peer review d) qualitative measurements
40. Which of the following can be assessed by measuring brain activity?
a) all of the above(x) b) day-dreaming c) recalling memories d) speaking aloud
41. A visual scene is analyzed in 3 levels. What is NOT an example for low-level processing?
a) color b) contrast c) movement direction d) orientation e) surface depth(x)
42. One of the following statements does not belong to the central ideas of cognitive neuroscience. Which of the following answers is NOT a central idea of cognitive science?
a) Cognition is equivalent to computation
b) Mental processes do not manipulate representations (x)
c) Mental processes that act on representations
d) Mental representations of information
e) The mind is an information processor

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43. Representations can have different features. Which one is NOT a feature of a representation?

- a) Appropriate causal relations b) Indirect reference(x) c) Intentionality d) Semantic e) Symbolic