psych/logic

AQA A-level Psychology
Unit 2
(7182/2)

BIOPSYCHOLOGY

Questions + Answers

SAMPLE MATERIAL

What

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Each question refers you to the line numbers in the Syllabus Notes which contain the model answer for that question.

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BIOPSYCHOLOGY – THE SYLLABUS

- The structure and function of sensory, relay and motor neurons. The process of synaptic transmission, including reference to neurotransmitters, excitation and inhibition
- The divisions of the nervous system: central and peripheral (somatic and autonomic)
- The function of the endocrine system: glands and hormones
- The fight or flight response including the role of adrenaline

LOCALISATION OF FUNCTION IN THE BRAIN AND HEMISPHERIC LATERALISATION

- Motor, somatosensory, visual, auditory and language centres including Broca's and Wernicke's areas
- Split brain research
- Plasticity and functional recovery of the brain after trauma

WAYS OF STUDYING THE BRAIN

- Scanning techniques, including functional magnetic resonance imaging (fMRI); electroencephalogram (EEGs) and event-related potentials (ERPs); post-mortem examinations

BIOLOGICAL RHYTHMS

- Circadian, infradian and ultradian and the difference between these rhythms
- The effect of endogenous pacemakers and exogenous zeitgebers on the sleep/wake cycle

BIOPSYCHOLOGY – QUESTIONS + ANSWERS

- **The structure and function of sensory, relay and motor neurons. The process of synaptic transmission, including reference to neurotransmitters, excitation and inhibition**
- **The divisions of the nervous system: central and peripheral (somatic and autonomic)**
- **The function of the endocrine system: glands and hormones**
- **The fight or flight response including the role of adrenaline**

Complete the following sentence. Shade one box only.
Sensory neurons carry information

A	Away from the brain.	⬭
B	Both to and from the brain.	⬭
C	Towards the brain.	⬭
D	Within the brain.	⬭

(Total 1 mark)

C.

Lines 22-23.

Complete the following sentence. Shade one box only.
The somatic nervous system

A	Comprises of two sub-systems.	⬭
B	Connects the central nervous system and the senses.	⬭
C	Consists of the brain and spinal cord.	⬭
D	Controls involuntary responses.	⬭

(Total 1 mark)

B.

Lines 47-48.

Complete the following sentence. Shade one box only.
Relay neurons carry information

A	Connect different parts of the central nervous system (CNS).	⬭
B	Connect different parts of the peripheral nervous system (CNS).	⬭
C	Convey instructions for physical operations.	⬭
D	Convey instructions for mental operations.	⬭

(Total 1 mark)

A.

Line 26.

Which one of the following responses results from the action of the sympathetic division of the autonomic nervous system? Shade one box only.

A	Decreased pupil size	⬭
B	Increased digestion	⬭
C	Increased heart rate	⬭
D	Increased salivation	⬭

(Total 1 mark)

C.

Lines 54-55.

Which one of the following responses results from the action of the parasympathetic division of the autonomic nervous system? Shade one box only.

A	Decreased digestion	⬭
B	Increased pupil size	⬭
C	Decreased heart rate	⬭
D	Blood flow diverted to heart and brain	⬭

(Total 1 mark)

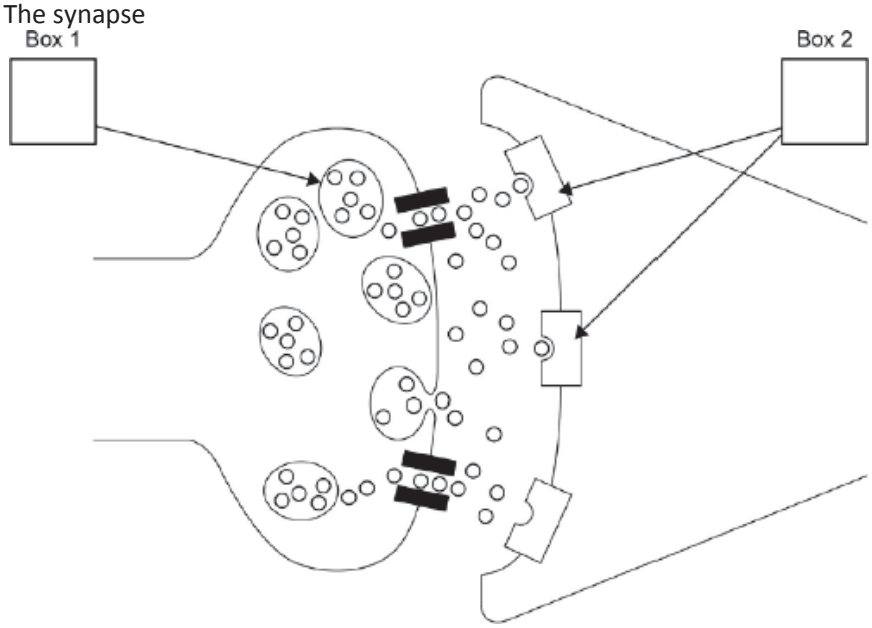
C

Lines 110-112.

Label the two areas of the synapse in the diagram below by putting the appropriate letter in each box.

A	Axon
B	Dendrites
C	Neurotransmitters
D	Receptor sites
E	Vesicle

The synapse

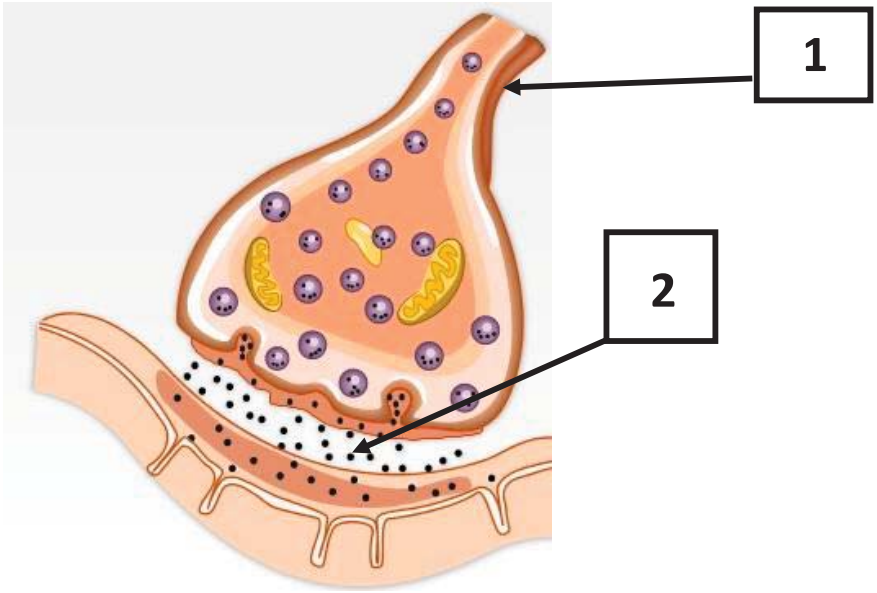


(Total 2 marks)

Box 1: E.
Box 2: D.
Line 14 – diagram.

Label the two areas of the synapse in the diagram below by putting the appropriate letter in each box.

A	Axon
B	Dendrites
C	Neurotransmitters
D	Receptor sites
E	Vesicle



Box 1: A.
Box 2: c.
Line 14 – diagram.

Briefly outline the process of synaptic transmission.
(Total 2 marks)
Lines 9-13.

Raoul has recently been prescribed a drug for a mental illness. He looks on the internet to find out more about the drug but he does not understand the phrase 'synaptic transmission'.
Write a brief explanation of synaptic transmission in the brain to help Raoul understand how his drug might work.
(Total 3 marks)
Lines 9-13.

Outline the structures and processes involved in synaptic transmission.
(Total 6 marks)
Lines 5-21.

Describe the difference between sensory, motor and relay neurons.
(Total 4 marks)
Lines 22-26.

Briefly explain the difference between sensory, motor and relay neurons.
(Total 4 marks)
Lines 22-26.

Read the following statements and decide whether they are TRUE or FALSE.
(a) Motor (efferent) neurons carry messages to the central nervous system.
(Tick the correct box)

TRUE	FALSE

(1)
False.
Lines 24-25.

(b) The nucleus of a neuron is found outside the cell body (soma).
(Tick the correct box)

TRUE	FALSE

(1)
(Total 2 marks)
False.
Line 4 – diagram.

Briefly explain how excitation and inhibition are involved in synaptic transmission.
(Total 4 marks)
Lines 16-21.

Read the following statements and decide whether they are TRUE or FALSE.
(a) The hindbrain is mainly composed of sensory and motor neurons.
(Tick the correct box)

TRUE	FALSE

(1)
True.
Lines 30-32.

(b) The hindbrain contains the limbic system, basal ganglia and neocortex.
(Tick the correct box)

TRUE	FALSE

(1)
(Total 2 marks)
False.
Lines 30-43.

Briefly explain the main structures and functions of the forebrain.
(Total 6 marks)
Lines 33-43.

Read the following statements and decide whether they are TRUE or FALSE.
(a) Activation of the sympathetic branch of the autonomic nervous system results in a release of adrenaline from the adrenal medulla.
(Tick the correct box)

TRUE	FALSE

(1)
True.
Lines 85-94.

(b) The pituitary gland secretes melatonin and corticosteroids.
(Tick the correct box)

TRUE	FALSE

(1)
(Total 2 marks)
False.
Lines 61 + 64.

Describe some of the main structures and features of the central nervous system.
(Total 6 marks)
Lines 27-43.

Describe some of the main structures and features of the peripheral nervous system.
(Total 6 marks)
Lines 44-56.

Identify the two components of the peripheral nervous system, and explain two differences in their organisation and/or functions.
(4 marks)
Lines 47-56.
Identify means simply state what the parts are: somatic nervous system (SNS) and autonomic nervous system (ANS).
Differences are simply what their role/function/organisation is.

You are walking home at night. It is dark and you hear someone running behind you. Your breathing quickens, your mouth dries and your heart pounds. Then you hear your friend call out, "Hey, wait for me! We can walk back together." Your breathing slows down and after a couple of minutes you are walking home calmly with your friend. Explain the actions of the autonomic nervous system. Refer to the description above in your answer.
(Total 4 marks)
Lines 51-57 (more fully explained 78-112).

Martha was telling her friend Sanya about her recent frightening experience.
'I was walking home by myself in the dark. Suddenly, I heard footsteps behind me and I realised that someone was getting closer to me. I saw a bus at the bus stop and decided to run. I don't think I have ever moved with such speed. I leapt on the bus – shaking, sweating and my heart was beating so fast I nearly collapsed.'
Outline the role of the central nervous system and autonomic nervous system in behaviour. Refer to Martha's frightening experience in your answer.
(Total 4 marks)
A complicated question…
CNS

- *Lines 35-36 –thalamus relaying sensory information – hearing footsteps.*
- *Line 40 – limbic system – emotion of fear.*
- *Line 42-43 – neocortex/cerebral cortex – planning to run away.*
- *Line 41 – basla ganglia – running away.*

ANS

- *Lines 51-57.*

Relate all points to Martha's frightening experience.

Briefly explain one function of the endocrine system.
(Total 2 marks)
Lines 58-60.

Describe the main structures and features of the endocrine system.
(Total 6 marks)
Lines 58-64.

Describe the main structures and features of the pituitary gland.
(Total 4 marks)
Line 64.

In the table below, complete the missing boxes marked A, B, C and D.

ENDOCRINE GLAND	MAIN HORMONES	EFFECTS
A	Thyroxine	Regulates metabolic rate and protein synthesis
Adrenal medulla	Adrenaline and noradrenaline	B
Adrenal cortex	**C**	Release of glucose and fats for energy; suppression of the immune system
D	Melatonin	Sleep-wake cycle

Line 61.
Answer.
A = Thyroid
B = Fight or flight response: increased heart rate, blood pressure, release of glucose and fats.
C = Corticosteroids
D = Pineal

(a) Identify 2 glands. (2 marks)
(b) State which hormones these 2 glands secrete. (2 marks)
(c) Explain the effect these 2 hormones have on the body. (2 marks)
(Total 6 marks)
Lines 61 – table – choose any 2.

Identify two glands that form part of the endocrinal system and outline their functions.
(4 marks)
Lines 61 – table – choose any 2.

Describe the functions of the pituitary gland.
(Total 4 marks)
Lines 64 – table.

Which two of the following statements about the fight or flight response are correct?
Shade two boxes only.
During the fight or flight response:

A there is a decrease in the release of adrenaline ⬭

B the flow of blood is diverted from the surface of the skin ⬭

C the process of digestion is inhibited ⬭

D the parasympathetic division is in control of functioning ⬭

E there is a reduction in the rate of respiration ⬭

(Total 2 marks)
B+C.
Lines 104-106.

Outline the role of adrenaline in the fight or flight response.
(Total 2 marks)
Lines 87-106 – flow chart – simply state what causes its release and the effects it has on the body.

You are just about to cross the road when a car comes speeding round the corner and narrowly misses you. Afterwards, standing safely on the pavement, you notice that your mouth is very dry, your breathing is very fast and your heart is thumping.
Using your knowledge of the body's response to stress, explain why you are likely to have experienced these changes.
(Total 4 marks)
Lines 76-106 flowchart, mentioning stressor (car) and physical changes in context above: e.g. mouth dry, breathing fast, heart thumping.

Using an example, explain what is meant by the fight or flight response.
(Total 3 marks)
Lines 76-106 flowchart- give example – someone puts a shark in your swimming pool.

You are a passenger in a car that has suddenly slammed on its brakes to avoid hitting a dog. Your breathing quickens, your mouth is dry and you have a feeling of 'butterflies' in your stomach. But after a few minutes these physical changes start to disappear. Using your knowledge of the body's response to stress, explain why you are likely to have experienced:
1. The changes that occurred in the first 30 seconds. (2 marks)
2. The changes that occurred after a few minutes. (2 marks)

(Total 4 marks)
1. Lines 76-106.
2. Lines 110-112.

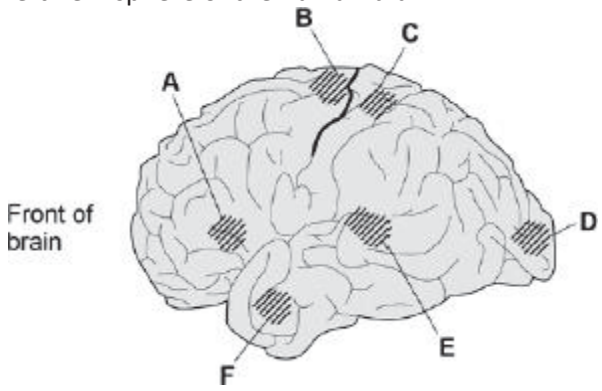
BIOPSYCHOLOGY – QUESTIONS + ANSWERS

LOCALISATION OF FUNCTION IN THE BRAIN AND HEMISPHERIC LATERALISATION

- **Motor, somatosensory, visual, auditory and language centres including Broca's and Wernicke's areas**
- **Split brain research**
- **Plasticity and functional recovery of the brain after trauma**

Read the item and then answer the questions that follow.
The image below shows the left hemisphere of the human brain. Six areas of cortical specialisation are labelled A, B, C, D, E and F.

Left hemisphere of the human brain



Using your knowledge of localisation of function in the brain, identify the area of cortical specialisation. Shade one box only for each area.

(a) Broca's area

A ⬭ B ⬭ C ⬭ D ⬭ E ⬭ F ⬭

(1)

(b) Somatosensory cortex

A ⬭ B ⬭ C ⬭ D ⬭ E ⬭ F ⬭

(1)

(c) Visual cortex

A ⬭ B ⬭ C ⬭ D ⬭ E ⬭ F ⬭

(1)

(d) Wernicke's area

A ⬭ B ⬭ C ⬭ D ⬭ E ⬭ F ⬭

(1)

(e) Motor cortex

A ⬭ B ⬭ C ⬭ D ⬭ E ⬭ F ⬭

(1)

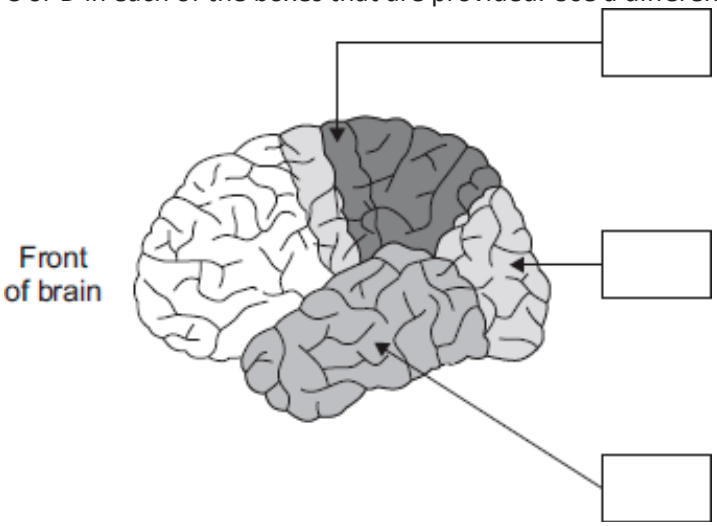
(Total 5 marks)

Line 145 – diagram.
a = A.
b = C.
c = D.
d = E.
e = B.

Psychologists have identified many areas of cortical specialisation in the brain.
These include:

A. the motor centre
B. the auditory centre
C. the visual centre
D. the somatosensory centre

Below is a diagram of the human brain. Identify three areas of cortical specialisation by writing A, B, C or D in each of the boxes that are provided. Use a different letter for each box.



(Total 3 marks)

Line 145 – diagram.
Top = D.
Middle = C.
Bottom = B.

Explain the difference between the motor cortex and sensorimotor cortex.
(Total 4 marks)

Lines 149-157.

Explain the role of the visual and auditory centres in the brain
(Total 6 marks)

Lines 158-170.

Briefly describe how the brain produces and comprehends language.
(Total 6 marks)
Lines 171-184.

Explain the role of Broca's Area and Wernicke's area in speech comprehension and production.
(Total 6 marks)
Lines 171-184

Discuss what research has shown about localisation of function in the brain.
(Total 8 marks)
Summarise lines 146-201.

Josie is twelve. Last year she was involved in a serious road accident and suffered head injuries that caused problems with speech and understanding language. Now, a year later, Josie has recovered most of her language abilities.
Using your knowledge of plasticity and functional recovery of the brain after trauma, explain Josie's recovery.
(4 marks)
Lines 171-184. Very briefly state that injury probably occurred to Broca's and Wernicke's areas.
Lines 252-256. Briefly define what plasticity and functional recovery are.
Lines 282-299. Briefly explain that brain has ability to 'rewire' itself via neuronal unmasking or stem cells and that younger people have better ability to recover than older people.

(a) Lotta's grandmother suffered a stroke to the left hemisphere, damaging Broca's area and the motor cortex.
Using your knowledge of the functions of Broca's area and the motor cortex, describe the problems that Lotta's grandmother is likely to experience. (4 marks)
Lines 171-175 + 149-154.
The grandmother's stroke would have caused damage to these areas via lack of oxygen as a result of a blood vessel in the brain becoming blocked. As the stroke occurred on the left hemisphere of the brain and the brain's 2 hemispheres control movement on the opposite side of the body, she would lose movement/experience paralysis on the right side of her body. Damage to Broca's means she would lose the ability to produce speech.

(b) Lotta worried that because of her grandmother's age will not be able to make any recovery.
Using your knowledge of brain plasticity and functional recovery of the brain after trauma, explain why Lotta might be wrong. (4 marks)
Lines 252-256. Briefly define what plasticity and functional recovery are.
Lines 282-299. Briefly explain that brain has ability to 'rewire' itself via neuronal unmasking or stem cells. State that younger people have better ability to recover than older people, therefore, grandmother may recover but this will be slower than in younger people.

(c) A researcher wants to investigate the effectiveness of physiotherapy in the recovery of stroke patients with brain damage. Carers of stroke patients will be sent questionnaires to produce quantitative data. Explain one disadvantage of obtaining quantitative data in this study. (2 marks)
A research methods question.
See Unit 2 Research Methods Syllabus Notes: lines 4-5 but relate to this study.

(d) Write one question that could be used in the researcher's questionnaire to produce quantitative data and one question which could be used in the researcher's questionnaire to produce qualitative data. (2 marks)
A research methods question.
See Unit 2 Research Methods Syllabus Notes: lines 4-9.
Use your imagination but keep it simple.
Answer.
"Quantitative: On a scale of 1-10 do you think that physiotherapy improved symptoms of the stroke? (1 = 'not all', 10 = 'a great deal'
Qualitative: Describe how you believe physiotherapy affected the symptoms of the stroke.

[end of sample questions]