

Physiology of Stress – Mark Scheme (MCQ)

Q1.

AO1 = 3

Main features are that the hypothalamus communicates with the pituitary gland, causing it to release ACTH. This hormone is then detected in the bloodstream by the adrenal cortex, which then releases corticosteroids. The corticosteroids have a range of effects, such as causing the liver to release glucose.

An accurate diagram could also receive credit.

1 mark for a brief outline and 3 marks for a correct and coherent outline of the features.

Q2.

AO1 = 3

Main features of the Sympathomedullary pathway are that the hypothalamus activates the sympathetic nervous system, which then stimulates the adrenal medulla to release the hormones adrenaline and noradrenaline into the bloodstream. This gets the body ready for fight-or-flight, eg increase blood pressure and heart rate.

An accurate diagram could also receive credit.

1 mark for a brief outline and 3 marks for a correct and coherent outline of the system.

Candidates who simply mention “the adrenal gland” without specifying whether it is the cortex or medulla do not gain credit for that part of their answer.

Reference to acute or chronic stress is not relevant.

Q3.

[AO3 = 2]

1 mark for brief limitation

Plus

1 further mark for accurate elaboration

Possible content:

- Selye argued that the GAS was a common response to all stressful situations. There is evidence, however, that physiological responses to stress can differ depending on the stressor.
- Selye thought that stress-related illness was linked to exhaustion of the physiological response systems such as the HPA, SMP and immune system. It is now thought that stress-related illness is caused by overactivity of the stress pathways and chronic high levels of circulating stress hormones.
- The model does not recognise the role of emotion and cognition in how a person perceives and evaluates the stressor. Although the three stages help understand the stress response, they merge into each other and overlap more than the model implies.

Credit other relevant material.

Q4.

[AO1 = 2]

1 mark for brief outline

Plus

1 further mark for accurate elaboration

Possible differences

- SAM activates the body ready for “fight or flight” - HPA helps the body cope with stress.
- The HPA releases corticosteroids such as cortisone - the SMP releases adrenaline into the bloodstream.
- HPA functions hormonally via the bloodstream and is therefore slower - the SMP operates through neural pathways so is faster.

Credit other relevant differences.

Q5.

(a) [AO1 = 2, AO2 = 2]

AO1

Up to two marks for a brief description of the role of the endocrine system in mediating and responding to stress. Credit: release of adrenalin and noradrenaline from the adrenal medulla, hypothalamic production of CRF and the release of ACTH from the pituitary leading to production of corticosteroids (cortisol) from the adrenal cortex.

AO2

Up to two marks for application of knowledge of the role of the endocrine system to Mannie and Jilly. It is likely that students will focus on the differing susceptibility to illness and the role of cortisol. In Mannie’s case the prolonged stress reaction leads to heightened cortisol levels which, over time, lower the immunity and hence make her susceptible to colds. Jilly responds to stress in the immediate term but then her endocrine system activity returns to normal. Credit references to GAS.

(b) [AO1 = 2, AO2 = 2]

AO1

Up to two marks for an outline of relevant personal variables. Students are likely to choose one of the following variables:

- Type A personality versus Type B / C – Type A’s show time urgency, competitiveness and are more prone to illness especially CHD
- Hardiness – hardy characters see stress as challenge, show

- commitment to society, work, relationships, etc, feel in control of own life
- Locus of control – having an internal locus of control tends to offer defence against the effects of stress.

One mark for a brief outline of a relevant variable. Two marks for an outline with some expansion / detail.

AO2

Up to two marks for discussion of how the variable (personality type, hardiness or locus of control) might explain the different responses of Mannie **and** Jilly.

Example: Mannie is probably a Type A personality which means that she tries to be over-controlling at work, cannot delegate responsibility to others and becomes easily angered and hostile – her personality leads her to experience more stress than Jilly who is probably a Type B (or C) who is less driven and less controlling and therefore less affected by stressful situations.

For full marks expect reference to both characters and the work context.