

# BM5063 Mathematical Physiology and Systems Medicine

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## Exam 2

### Instructions

1. This exam is open notes where you can use any hand-written material. Photocopies/prints/books/electronic devices are not permitted to be used.
  2. Questions 1-5 are about location, location, location. Marks will be awarded based on the precision of the answer.
  3. For questions 6-8, please write your answers clearly. Use your notebook to do rough calculations, if required.
  4. You are expected to work on these problems on your own. **Any reasonable signs of 'copying/plagiarism' will attract penalties.**
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### Questions

1. Location of the hypothalamus gland in the body is \_\_\_\_\_
2. Location of the pituitary gland in the body is \_\_\_\_\_
3. Location of the thyroid gland in the body is \_\_\_\_\_
4. Location of the beta-cells in the body is \_\_\_\_\_
5. Location of the adrenal gland in the body is \_\_\_\_\_
6. In HPA and HPT systems, which component is directly stimulated by the circadian rhythm or day-night cycle?
7. Synthesis inhibitor drugs slow down the production rates of the hormones. For the HPA axis, identify the changes in the model for a person on a cortisol synthesis inhibitor. Will the sizes of the pituitary and adrenal glands be larger or smaller as compared to a healthy person not on drugs?

8. Receptor antagonist drugs block the effects of a hormone on its target glands. For the HPA axis, identify the changes in the model for a person on a CRH receptor antagonist. Will the sizes of the pituitary and adrenal glands be larger or smaller as compared to a healthy person not on drugs?



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