European School of Molecular Medicine

SEMM SELECTION
WRITTEN TEST INFORMATION

Multiple choice test will be held remotely. It includes 60 questions as detailed below. Questions from past years' selections will not be made available to the candidates.

- 25 questions on general biology including the following topics:
  - *Macromolecules (proteins and nucleic acids, basic structure and function), The prokaryotic cell (general);*
  - *The eukaryotic cell (biological membranes and organelles, the nucleus, cellular communication);*
  - *General information on DNA duplication;*
  - *RNA and transcription;*
  - *Genetic code and protein synthesis;*
  - *Cell division (mitosis and meiosis),*
  - *Gene definition, allele, character, genotype and phenotype;*
  - *Mendel's laws;*
  - *Spontaneous and induced mutations;*
  - *Gene, chromosomal and genomic mutations.*

Reference Books: any available book that includes these topics will be fine. Some examples of useful books are: Genes (Lewins); Molecular biology of the cell (Alberts); Biology (Campbell).

- 10 questions on logic:
  - *Alphanumeric series;*
  - *small problems;*
  - *logical reasoning.*

Reference Books: any book with logical reasoning examples is fine. Some examples of useful books are: Alfa Test Logics, Critical thinking and problem solving (Butterworth and Thwaites).

- 25 questions on specific topics reflecting the research areas of the PhD program.

  The candidate will be asked to choose 5 among a list of different sets of 5 questions each, so to compose the final 25 questions that best fit their background and/or interest.

  The sets of questions will cover the topics listed below:
  - *Algorithms and data structures*
  - *Biochemistry*
  - *Cell biology*

- *Computational genomics*
- *General Omics*
- *Genetics*
- *Human/Medical genetics*
- *Image analysis*
- *Immunology*
- *Machine learning*
- *Medical Humanities – Decision making*
- *Medical Humanities – Thinking & reasoning*
- *Medical Humanities – Health Psychology*
- *Medical Humanities – General Psychology*
- *Medical Humanities - Methodology*
- *Molecular Biology*
- *Molecular Oncology*
- *Neurobiology*
- *Programming & Bioinformatic resources*
- *Statistics and Combinatorial calculus*
- *Structural Biology*

Reference Books: no books are suggested, please use any source/bibliography you think is relevant for the specific topic of your interest.