**Model Answers**

**MBBS/BSc Year 1 Peer Marked Self Assessment (PMSA)**

**Wednesday 12 December 2012**

 **9.30 am to 10.10 am**

This assessment contains:

Single Best Answer Questions (SBAs) x 14: spend approximately 18 minutes on these

Assertion Reason Questions (ARQs) x 7: spend approximately 12 minutes on these

Short Answer Question (SAQ) x 1: spend approximately 10 minutes on this

**Do not open this paper until instructed to do so.**

**Write your Name at the top of each page.**

**Circle your SBA and ARQ answers on the question paper.**

**Write your SAQ answers in the space provided.**

**Following the test Dr Sbaiti and Dr Gould will go through all the answers in Lecture Theatre G16 at approximately 10.15 am.**

**SBAs:** *select the* ***single best*** *answer for each numbered item 1 to 14 below:*

|  |  |
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| 1. | Choose the correct statement on the use of data on frequency of distribution: |
|  | a) | All frequency graphs of measurable health outcome are normal |  |
|  | b) | Income per household in the UK is normally distributed |  |
|  | c) | Frequency graphs are useful in aiding medical diagnosis |  |
|  | d) | Frequency distributions of measurable outcomes remain unchanged over time |  |
|  | e) | A child’s growth can be classified as normal or abnormal solely based on the distribution data of the children’s growth in the population |  |

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| 2. | In relation to social norms: |
|  | a) | An understanding of social norms does not aid the medical diagnosis |  |
|  | b) | Social norms and health-related behaviours can be measured using statistical tools |  |
|  | c) | A society defines deviance solely through its laws  |  |
|  | d) | An understanding of social norms is important for successful patient-doctor communication |  |
|  | e) | The concept of social normality is constant in time |  |

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| 3. | Choose the correct statement regarding the population of the Royal Borough of Westminster: |
|  | a) | Most people were born in the United Kingdom |  |
|  | b) | The variation found in men’s life expectancy in Westminster is the highest in the United Kingdom |  |
|  | c) | A minority of children live in poverty |  |
|  | d) | It is mostly an elderly population |  |
|  | e) | There are low levels of deprivation  |  |
| 4. | Regarding the definition of disease, illness and sickness:  |
|  | a) | A person with a disease is necessarily ill |  |
|  | b) | A person who is ill always has a disease |  |
|  | c) | Illness is defined as a biological abnormality |  |
|  | d) | A person with a disease is always considered to be sick |  |
|  | e) | Illness is a subjective state involving the experience of symptoms |  |
| 5. | Concerning definitions of health, choose the **INCORRECT** statement: |
|  | a) | Health can be defined as the absence of disease |  |
|  | b) | Health can be defined positively as a state of well-being |  |
|  | c) | Health can be defined as the ability to do things |  |
|  | d) | The World Health Organisation (WHO) defines health as the absence of disease  |  |
|  | e) | Health can be defined as fitness |  |
| 6. | Which ONE of the following trends has **NOT** been observed in the National Health Service in England in recent years? |
|  | a) | An increase in total spending on the National health Service  |  |
|  | b) | A rise in the percentage of patients receiving thrombolysis for a myocardial infarction within an hour of calling an ambulance  |  |
|  | c) | A rise in the percentage of Coronary Heart Disease patients successfully achieving blood pressure and cholesterol targets  |  |
|  | d) | An achievement of equal rates across Primary Care Trusts in England, of known diabetics having lower limb amputations  |  |
|  | e) | The introduction of Clinical Commissioning Groups  |  |

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| 7. | Regarding the NHS workforce, the largest employment group within the NHS is: |
|  | a) | Doctors  |  |
|  | b) | * 1. Nurses
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|  | c) | * 1. Therapists, scientists, technical
 |  |
|  | d) | * 1. Support to clinical staff
 |  |
|  | e) | * 1. Ambulance staff
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| 8. | With respect to breast cancer, the estrogen receptor is a particularly important protein. Which of the following best describes the function of the estrogen receptor? |
|  | a) | A membrane bound receptor tyrosine kinase |  |
|  | b) | An RNA splicing factor |  |
|  | c) | A DNA repair enzyme |  |
|  | d) | A transcription factor |  |
|  | e) | A tumour suppressor gene |  |

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| 9. | A 52-year-old man has returned recently from a holiday in the tropics complaining of general malaise, abdominal discomfort and diarrhoea. Stool analysis shows numerous parasitic worms. What type of inflammatory cell is most likely to be elevated on full blood count? |
|  | a) | Eosinophil |  |
|  | b) | Neutrophil |  |
|  | c) | Mast cell |  |
|  | d) | Lymphocyte |  |
|  | e) | Monocyte |  |

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| 10. | Gap junctions: |
|  | a) | Are formed by clusters of cadherin proteins |  |
|  | b) | Allow small molecules to pass between adjacent epithelial cells |  |
|  | c) | Connect skeletal muscle fibres |  |
|  | d) | Allow proteins to pass between adjacent cells |  |
|  | e) | Are only found in epithelia |  |

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| 11. | The enzyme lysozyme: |
|  | a) | Hydrolyzes polysaccharides found in bacterial cell walls  |  |
|  | b) | Is a major serum protein involved in host defence |  |
|  | c) | Uses NAD+ as a cofactor |  |
|  | d) | Owes its catalytic activity to 2 basic amino acids located within its active site |  |
|  | e) | In humans has 2 different isoforms, which exist as dimers |  |
| 12. | Cellular organelles: |
|  | a) | Vary in size from about 10 to 100 micrometers |  |
|  | b) | Are generally bounded by a polysaccharide membrane |  |
|  | c) | Are evolved from viruses |  |
|  | d) | That are involved in phagocytosis may contain fluid similar to that found in the extracellular space |  |
|  | e) | Known as liposomes are involved in protein synthesis |  |

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| 13. | Which enzyme joins DNA fragments to the lagging strand during DNA replication? |
|  | a) | DNA ligase |  |
|  | b) | DNA polymerase |  |
|  | c) | DNA helicase |  |
|  | d) | RNA primase |  |
|  | e) | Telomerase |  |

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| 14. | CD3 is a marker found on: |
|  | a) | All lymphocytes |  |
|  | b) | All T lymphocytes  |  |
|  | c) | Antigen presenting cells |  |
|  | d) | All granulocytes |  |
|  | e) | Natural killer cells |  |

**ARQs:** *select the* ***most appropriate option*** *for each numbered item 15 to 21 below:*

15. Glucose-6-phosphatase is predominantly a muscle enzyme

BECAUSE

Glucose-6-phosphatase activity releases glucose from stores of glycogen

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|   | **Assertion** | **Reason** |   |
| a) | True | True | Reason is correct explanation |
| b) | True | True | Reason is NOT a correct explanation |
| c) | True | False |   |
| d) | False | True |   |
| e) | False | False |   |

16. DNA replication is initiated by the production of a small piece of RNA

BECAUSE

All DNA polymerases require a primer as well as a template

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|   | **Assertion** | **Reason** |   |
| a) | True | True | Reason is correct explanation |
| b) | True | True | Reason is NOT a correct explanation |
| c) | True | False |   |
| d) | False | True |   |
| e) | False | False |   |

17. Common obesity is thought to have a significant genetic component

BECAUSE

Identical twins are more likely to have similar body compositions in later life than non-identical twins

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|   | **Assertion** | **Reason** |   |
| a) | True | True | Reason is correct explanation |
| b) | True | True | Reason is NOT a correct explanation |
| c) | True | False |   |
| d) | False | True |   |
| e) | False | False |   |

18. Transformation in bacteria requires cell to cell contact

BECAUSE

Transformation in bacteria requires uptake of DNA

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|   | **Assertion** | **Reason** |   |
| a) | True | True | Reason is correct explanation |
| b) | True | True | Reason is NOT a correct explanation |
| c) | True | False |   |
| d) | False | True |   |
| e) | False | False |   |

19. Cells phagocytose pathogens more efficiently after pathogens have been opsonised

BECAUSE

Pattern recognition receptors require pathogens to be opsonised for pathogen recognition to occur

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|   | **Assertion** | **Reason** |   |
| a) | True | True | Reason is correct explanation |
| b) | True | True | Reason is NOT a correct explanation |
| c) | True | False |   |
| d) | False | True |   |
| e) | False | False |   |

20. Acyclovir is effective in treating herpes simplex virus infections

BECAUSE

Acyclovir inhibits herpes virus-encoded thymidine kinase

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|   | **Assertion** | **Reason** |   |
| a) | True | True | Reason is correct explanation |
| b) | True | True | Reason is NOT a correct explanation |
| c) | True | False |   |
| d) | False | True |   |
| e) | False | False |   |

21. A normal blood film can be used to measure a patient’s haematocrit

BECAUSE

Haematocrit is a measure of red blood cell concentration in the blood

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|   | **Assertion** | **Reason** |   |
| a) | True | True | Reason is correct explanation |
| b) | True | True | Reason is NOT a correct explanation |
| c) | True | False |   |
| d) | False | True |   |
| e) | False | False |   |

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| SAQ  | **Examiner Use Only** |
| 1. Down’s syndrome is an example of aneuploidy in human disease. Define the genetic term “aneuploidy”. *(2 marks)*

*Aneuploidy is defined as “numerical abnormalities involving the loss or gain of one or more chromosomes”, i.e. a different number of chromosomes than the normal diploid number of 46 (but not a multiple of the haploid number, as found in triploidy/tetraploidy). (2 marks)*1. What is the specific form of aneuploidy found in Down’s syndrome? *(2 marks)*

*Trisomy (3 copies) (1 mark) of chromosome 21 (1 mark).*1. Name the **3** most common genetic mechanisms that can give rise to Down’s syndrome. *(3 marks)*

*1 mark for each, up to a maximum of 3 marks:** *Non-disjunction in meosis (95% of cases)*
* *Translocation/ Robertsonian translocation (4% of cases)*
* *Mosaicism/Mitotic non-disjunction (1% of cases)*
1. Imprinting is a reversible epigenetic effect. Define the term “epigenetic” *(2 marks),* and give **one** example of a human disease which may be caused by an imprinting defect.

*(1 mark)**Epigenetics is the study of heritable changes in the genome (1 mark) that do not affect the primary DNA sequence (1 mark).**Examples of human disease that may be caused by imprinting defects include Prader-Willi or Angelman syndromes (1 mark for either of these).* |  |
|  | **Total Mark** |