**91156 Cells Exam Analysis 2013 - 2020**

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| **Year** | **Q** | **Theme/s** | **Excellence** |
| **2020** | **1** | Respiration/ Enzymes | Links inhibitors to enzyme structure.  Links inhibition to impacts on aerobic respiration on other cellular processes and  Links to anaerobic respiration |
|  | **2** | Photosynthesis/ Osmosis/ Chloroplast structure | Links different cell structures to osmosis  Links 3 or more parts of Chloroplast structure to phase of Photosynthesis  Links the products of one phase to next and to the rate of photosynthesis  Links two parts of cell structure to process of photosynthesis and the rate of photosynthesis |
|  | **3** | Cell cycle/ Mitosis | Links cell cycle to the process of growth and links this to different growth phases.  Links function of cell-to-cell division with example  Links DNA replication to growth  Links DNA replication to cell function |
| **2019** | **1** | Photosynthesis /Osmosis | Links limiting factor to different phases of photosynthesis  Links phase of photosynthesis and limiting factor to structure of plant relating to Hydrogen ions |
|  | **2** | Anaerobic and  aerobic respiration | Relates graph to different type of respiration  Links two areas of graph to level of oxygen and activity and links this to sites in mitochondria |
|  | **3** | Transport across the membrane  Co-factors and denaturation | Links transport of substances to denaturing of enzymes & links effects of denaturing of enzymes to DNA replication  Effect of co-factors and denaturation on enzymes  Links to enzymes in DNA replication and further links this to mitosis and cell cycle, however, DOES NOT require the processes of DNA replication, mitosis and cell cycle to be explained in depth. |
| **2018** | **1** | Active transport  Aerobic respiration | Links transport of oxygen to different type of respiration and links this to nutrient transport  Links changes in oxygen level to pump and effects and non-effect on passive transport |
|  | **2** | Photosynthesis  Structure of chloroplast  Enzymes | Links reactants of photosynthesis to structure of chloroplast and links this to enzyme inhibition  Links pH to enzyme structure and links this to effects on stages of photosynthesis  Links differences in type of inhibition to impact on enzyme structure and function |
|  | **3** | DNA replication  Mitosis  Photosynthesis | DNA replication is linked to stage of cell cycle and links this to need for mitosis  Links availability of raw material to level of mitosis to outcomes of photosynthesis  Links mitosis to key product of photosynthesis and links this to seasonal changes in mitosis |
| **2017** | **1** | Osmosis  Structure of chloroplast  Photosynthesis | Links different phases of photosynthesis to limiting factor of photosynthesis (water and one other) therefore linking mode of transport of limiting factor  Links understanding of a limiting factor to stage of photosynthesis to the origins of raw materials for photosynthesis |
|  | **2** | Anaerobic and aerobic respiration | Links advantage of type of respiration to relevant context in day in the life of a blue mussel  Links transport of oxygen from air to blue mussel and to tidal effects on type of respiration |
|  | **3** | Mitosis  DNA replication | Links rate of mitosis to data in table and need for mitosis in cell repair  Links Cell cycle to growth of organs all types |
| **2016** | **1** | DNA replication / Enzymes | Links 2 factors that affect enzymes and links to DNA replication  Links effects of factors to DNA replication  Links need for optimum conditions to enzymes to DNA replication and links effects outside the optimum to effects on Mitosis, can include effect of inhibitor |
|  | **2** | Mitosis / Surface area / cell transport | Links SA to transport process and links to cell division  Links products of respiration to cell transport and effects on cell division and link to SA to Volume |
|  | **3** | Photosynthesis / Respiration | Compares photosynthesis and respiration similarities  Links photosynthesis and respiration to role of enzymes  Contrast the process of photosynthesis and respiration , at least 2 |
| **2015** | **1** | Respiration / Enzymes | Links three factors affect enzymes activity to respiration and effect of oxygen concentration. |
|  | **2** | Cell transport / Respiration | Links oxygen consumption to salt concentration, types of transport and cellular respiration  Links ATP produced by respiration to active transport |
|  | **3** | Photosynthesis / chloroplast structure | Links light intensity to chloroplast size and to photosynthesis  Links chloroplast distribution to efficiency to role of light in photosynthesis. |
| **2014** | **1** | Mitosis / DNA replication | Links a specific cell to mitosis to the part of the cell’s life cycle or to repair or size or SA:V ratio or cell type (3 of the above) |
|  | **2** | Photosynthesis process and factors affecting including enzymes. | Links at least 2 factors affect enzyme activity and links to rate of photosynthesis  Links rate of Photosynthesis to limiting factor (SALE)  No details on enzyme structure required |
|  | **3** | Mitochondria structure / Respiration / RBC | Compares and contrast types of respiration  Links to different cells and links to ATP produced to that cell and function of that cell |
| **2013** | **1** | Structure of Mitochondria / respiration | Links cells with many and with few mitochondria to production of ATP by aerobic respiration  Links type of cell to ability to perform aerobic respiration  Links structure and function of mitochondria to aerobic respiration |
|  | **2** | Enzymes / Photosynthesis | Links structure of enzyme to effects of temperature on rate of reaction and links this to photosynthesis  Links structure and location of a cell with chloroplasts to rate of photosynthesis |
|  | **3** | Mitosis / DNA replication | Links Mitosis to place on organism  Links rate of mitosis to cell type or semi conservative nature or life cycle or external factors |