Semester 1 exam 2015. Marking Key for extended answer questions,

1.

|  |  |
| --- | --- |
|  | Mark |
| Process is called Polymerase Chain Reaction | 1 |
| Steps |  |
| DNA is heated | 1 |
| DNA unwinds(denatured) | 1 |
| Gives to separate singe strands. | 1 |
| Enzyme DNA polymerase is added | 1 |
| Free nitrogen base nucleotides are added | 1 |
| Mixtures is cooled | 1 |
| The cooling allows the DNA polymerase to join the free nucleotides to the single strands of DNA giving two new double strands of DNA. | 1 |
| This is repeated over and over again to make many copies of the DNA | 1 |

**Maximum 8**

b. **Characteristics shared by all primates**.

Grasping hands

Forward facing eyes

Opposable thugs

Pentadactyl limbs

Finger nails instead of claws

Unspecialised limbs

Unspecialised body

Relatively large cerebral cortex

Increase in length of gestations

Reduction in litter size.

One mark each **Maximum 6**

**Evolutionary trends.**

Reduced reliance on smell

Increased reliance on sight

Increased size of cerebral cortex

Increased length in gestation time.

Increased length of parental care

Later age of sexual maturity.

Reduction in prognation.

General reduction in size and number of teeth.

One mark each **Maximum 6**

**2. A. I. Specific immunity=**the immune systems response to one particular antigen.(1)

**II.** Antibody response

|  |  |
| --- | --- |
| **Event** | **Mark** |
| Macrophage engulfs the antigen and displays parts of the antigen on its surface. | **1** |
| Helper T white blood cells are sensitised to the displayed antigen parts | **1** |
| Helper T cells in turn sensitise B white blood cells. | **1** |
| The B cells rapidly replicate (clone) making many copies of themselves called plasma B cells. | **1** |
| The B cells produce antibodies in response to the antigen | **1** |
| Memory B cells are also made | **1** |
| Memory B cells carry information on the specific antigen in case the body is ever exposed to it again. | **1** |

**111.** Any two of the following. The maximum is 3 for each. Total 6.

Diagrams must be annotated and relevant.

|  |
| --- |
| Opsonization. (1)Antibodies bind to antigens(1) and it and mark it for swallowing and destruction by macrophages(1) |
| Agglutination.(1) Makes particles such as bacteria or virus clump together.(1).  Prevents them entering cells or spreading. |
| Chemically combine with foreign enzymes(1) or bacterial toxins(1) to inactivate them(1). |
| React with soluble substances(1) to make them more insoluble(1) and thus more easily consumed by macrophages(1) |
| Bind with the surface of virus particles(1) and thus stop the virus entering(1) and infecting body cells(1) |

**IV.** In natural active immunity the unchanged (1) antigen enters the body naturally (1) and the body may suffer symptoms of infection(1) while the immune system responds. With attenuated antigens the antigens are weakened (1) and are artificially introduced (1).

**Maximum 4**

**b.**

**The proportion of people dying from infectious diseases has decreased (1) as people are now immune to certain life threating infectious diseases (1).**

**3. Comparison of ape and human skeleton with regard to bipedal locomotion. How features of human skeleton aid locomotion.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Structure** | **Comparison** | **Mark** | **How feature aids bipedal locomotion.** | **Mark** |
| Vertebral column | In the ape the spine has Single (“C” shaped) curve in spine. In humans Multiple(“S” shaped) curve in spine | 2 | Weight balanced over feet.  Or gravity directed through feet. | 1 |
| Pelvis | Pelvis long and narrow in ape. Pelvis broad and bowl-shaped | 2 | Bowl-shape cradles abdominal organs | 1 |
| Foramen magnum | Foramen magnum in humans is further forward compared to apes. Directly under skull | 1 | Head balanced over spine | 1 |
| Prognation | Humans have less prognation than apes | 1 | Head balance over spine | 1 |
| Toes | Big toe opposable in apes, non-opposable in humans | 1 | Energy transferred directly from heel to toe through foot | 1 |
| Foot arches | Apes have no foot arches, humans have two foot arches | 1 | Helps energy transfer | 1 |
| Helps absorb shock | 1 |
| Aids stability | 1 |
| Calcaneus | Larger in human | 1 | Able to absorb heel strike/impact/load of body/body weight. | 1 |
| Femur | The ape Femur is straight but in humans the Femur angled in towards knee(carrying angel | 1 | Centre of gravity (load or weight) directed through knee then foot. | 1 |
| In humans the Femur is longer | 1 | Longer step with each stride | 1 |
| Knee | Human knee is more large and stronger | 1 | Better load bearing | 1 |

**MAX 20**