

BIOLOGY FORM 4 MID TERM 2 EXAMINATION - MARKING SCHEME

(a) Oxygen (O_2) - 1 mark

(b) At pH 4.0, enzyme activity is low due to denaturation by acidic conditions; at pH 9.0, enzyme activity is optimal leading to higher gas production - 2 marks

(a) Smaller animals (mouse) have higher metabolic rates per unit body mass than larger ones (dog), hence higher energy requirements - 2 marks

(b) During vigorous activity or oxygen deficiency - 1 mark

(a) All active sites are occupied (enzyme saturation); no more substrate to convert - 1 mark

(b) Add more enzyme or increase substrate concentration - 1 mark

Specimen bottle - 1 mark

Used to collect and temporarily store biological specimens - 1 mark

1. Incomplete records

2. Fossils may be destroyed or deformed

3. Some organisms do not fossilize easily - 3 marks

(a) Centrioles - 1 mark

(b) Root tips, shoot tips, or cambium - 1 mark

DNA - 1 mark

Presence of thymine or double-stranded structure - 1 mark

(a) Structures with similar functions but different origin - 1 mark

(b) Similar embryonic stages among vertebrates indicate common ancestry - 3 marks

1. Energy loss as heat

2. Not all biomass is consumed

3. Incomplete digestion - 2 marks

(a) F1 generation all Bb (heterozygous windows peak) - 4 marks

1. Increases survival of the fittest

2. Leads to adaptation and evolution - 2 marks

Different forms of the same gene - 1 mark

(a) Organs reduced in size and function due to disuse - 1 mark

(i) Divergent evolution

(ii) Convergent evolution - 2 marks

1. Have double circulation

2. Four-chambered heart increases efficiency - 2 marks

Development of an organism from an unfertilized egg - 1 mark

Genetic engineering Direct manipulation of an organism's genes using biotechnology - 1 mark

Gene mapping Determining the position of genes on a chromosome - 1 mark

Heterosis Hybrid vigor where offspring show superior traits - 1 mark

Gene sequencing Determining the order of nucleotides in a gene - 1 mark

(a) Discrete variation - 1 mark

(b) Convergent evolution - 1 mark

(c) Analogous structures - 1 mark

(a) Inheritance of traits through genes located on sex chromosomes - 1 mark

Traits are controlled by pairs of alleles; one inherited from each parent - 2 marks

Nitrosomonas Convert ammonia to nitrites - 1 mark

Nitrobacter Convert nitrites to nitrates - 1 mark

1. Sickle cell anemia

2. Hemophilia - 2 marks

