

Name of the Student: _____

Max. Marks : 23 Marks

Time : 23 Minutes

Mark Schemes

Q1.

- (a) (i) (In all organisms / DNA,) the same triplet codes for the same amino acid;
Accept codon / same three bases / nucleotides
Accept plurals if both triplets and amino acids
Reject triplets code for an amino acid
Reject reference to producing amino acid 1
- (ii) 64; 1
- (b) Splicing;
Ignore deletion references
Accept RNA splicing 1
- (c) (i) 1. (Mutation) changes triplets / codons after that point / causes frame shift;
Accept changes splicing site
Ignore changes in sequence of nucleotides / bases
2. Changes amino acid sequence (after this) / codes for different amino acids (after this);
Accept changes primary structure
Reject changes amino acid formed / one amino acid changed
3. Affects hydrogen / ionic / sulfur bond (not peptide bond);
4. Changes tertiary structure of protein (so non-functional);
Neutral 3-D structure 3 max
- (ii) 1. Intron non-coding (DNA) / only exons coding;
Context is the intron
Do not mix and match from alternatives
Neutral references to introns removed during splicing
1. and 2. Ignore ref. to code degenerate and get same / different amino acid in sequence
2. (So) not translated / no change in mRNA produced / no effect (on protein) / no effect on amino acid sequence;
Accept does not code for amino acids

OR

3. Prevents / changes splicing;
4. (So) faulty mRNA formed;
Accept exons not joined together / introns not removed
5. Get different amino acid sequence;

2 max

[8]

Q2.

- (a) (i) Centromere;
Accept: if phonetically correct
Reject: centriole

1
- (ii) 1. Holds chromatids together;
2. Attaches (chromatids) to spindle;
3. (Allows) chromatids to be separated / move to (opposite) poles / (centromere) divides / splits at metaphase / anaphase;
3. **Q** *Neutral: chromosomes or chromatids split / halved / divided*
3. *Reject: reference to homologous chromosomes being separated*
Accept 'chromosomes' instead of 'chromatids'
Ignore incorrect names for X

2 max
- (iii) (Homologous chromosomes) carry different alleles;
Accept alternative descriptions for 'alleles' eg different forms of a gene / different base sequences
Neutral: reference to maternal and paternal chromosomes

1
- (b) (i) (In **Figure 2**)
1. Chromatids have separated (during anaphase);
1. **Q** *Neutral: split / halved / divided*
1. *Reject: reference to homologous chromosomes being separated*
or
2. Chromatids have not replicated;
1. & 2. *Accept 'chromosomes' instead of 'chromatids'*
or
3. Chromosomes formed from only one chromatid;
*Accept converse arguments for **Figure 1***
Ignore references to the cell not dividing as in the question stem
Ignore: named phases

1 max
- (ii) 1. Three chromosomes;
Ignore shading
2. One from each homologous pair;
Only one mark for three chromosomes shown as pairs of chromatids

2
- (iii) Crossing over / alleles exchanged between chromosomes or chromatids / chiasmata formation / genetic recombination;
Accept: description of crossing over eg sections of chromatids break and rejoin
Neutral: random fertilisation
Reject: reference to sister chromatids

Q *Neutral: genes exchanged*
Neutral: mutation

1

[8]

Q3.

- (a) 1. Group of similar organisms / organisms with similar features / organisms with same genes / chromosomes;
1. *Accept: same number of chromosomes*
1. *Accept: smallest taxonomic group*
1. *Reject: genetically identical. Only allow 1 max if mentioned*
1. *Q Neutral: similar genes / chromosomes*
2. Reproduce / produce offspring;
2. *Accept: breed / mate*
3. That are fertile;
3. *Neutral: that are 'viable'*
'Produce fertile offspring' = 2 marks

2 max

- (b) (i) Correct answer of 6.97 to 7 = 2 marks;
One mark for 6320 as numerator or 906 as denominator;

2

- (ii) 1. Decrease in variety of plants / fewer plant species;
1. *Accept: reference to monoculture or description*
1. *Neutral: fewer plants*
2. Fewer habitats / niches;
2. *Neutral: fewer homes / less shelter*
3. Decrease in variety of food / fewer food sources;
3. *Neutral: less food*
3. *Accept: less variety of prey*

3

[7]