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ST BENEDICT'S COLLEGE

SUBJECT	LIFE SCIENCES	DATE	4 JUNE 2024
GRADE	12	MARKS	50
EXAMINER	MRS S. STEGMANN	MODERATOR	MRS B. ZAJAC
		DURATION	50 MINUTES

MARKING GUIDELINES

Question 1:

1.1.

1.1.1.	1.1.2.	1.1.3.	1.1.4.
C ✓	C ✓	D ✓	D ✓

(4)

1.2.

1.2.1. Nucleotide ✓ (1)

1.2.2. Deoxyribose ✓ sugar (1)

1.2.3. Adenine ✓ and guanine ✓ (2)

1.2.4. Uracil ✓ (1)

1.3.

1.3.1.

	H	h	Hh	Hh
Mother's gametes	✓	✓	X	X
Father's gametes	X	✓	X	X

ONE MARK FOR EACH ROW ✓✓

(2)

1.3.2. (i) Hh and hh ✓

(1)

(ii)

	Mother	Father
Parental genotypes	Hh	Hh ✓
Parental gametes	H and h ✓	h
Possible genotypes of boy	hh	Hh
Possible phenotype of boy	Normal	White forelock ✓

(3)

[15]

Question 2

- 2.1. Protein synthesis ✓ (1)
- 2.2. Provide the:
- (i) DNA / deoxyribonucleic acid ✓
 - (ii) Ribosome ✓
 - (iii) 2 ✓
 - (iv) 7 ✓ (4)
- 2.3. GGA CAA ✓ AGG CCT ✓ (can accept backwards from CCT-GGA) (2)
- 2.4. mRNA attaches to the ribosome ✓
- each codon of the mRNA matches with its corresponding anticodon on the tRNA ✓
- tRNA carries amino acids to the ribosome ✓
- amino acids are bonded to one another by peptide bonds to form a polypeptide/protein ✓ (4)
- 2.5. PRO ✓- VAL ✓- SER ✓- GLY ✓ (4)
- [15]

Question 3

- 3.1. Due to non-disjunction ✓ / non-separation of a chromosome pair during Anaphase ✓
Two chromosomes moved to the one pole ✓ and none moved to the other ✓ (any 3)
- 3.2. Gamete A will have 24 chromosomes/ an extra chromosome ✓
And when it fertilizes a normal gamete with 23 chromosomes ✓
The zygote will have 3 chromosomes at position 21/ 47 chromosomes in total ✓ (any 2)
- 3.3.
- i. Prophase I ✓ (1)
 - ii. It allows for genetic variation amongst organisms ✓
This improves survival of the species OR eradicates weaker genes OR allows for survival of the fittest ✓ (2)
 - iii. Two daughter chromosomes ✓
1x fully shaded, 1 x fully unshaded ✓
Any 1 label ✓ (3)
- 3.4. To reduce the chromosome number from diploid to haploid/ to haploid ✓
to prevent the doubling effect in fertilisation ✓ (2)
- [13]

Question 4

- 4.1. Cut non-coding DNA into different lengths ✓ (1)
- 4.2. PCR/ polymerase chain reaction ✓ (1)
- 4.3. WBCs contain a nucleus with DNA **or** RBCs do not contain nuclei with DNA ✓ (1)
- 4.4. Non-coding DNA- not involved with direct code for protein synthesis ✓
Coding DNA- provides code for protein synthesis ✓ (2)
- 4.5. Diagnosing inherited disorders
Identifying casualties
Paternity testing
Fighting illegal trade ✓✓ (any 2)

[7]

TOTAL: 50 MARKS