

Markscheme

- ① Many possible answers. Some conditions include:
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|-------------------------------|----------------------------------|
| Down Syndrom (trisomy 21) | Turner's Syndrom (monosomy X) |
| Patau's Syndrom (trisomy 13) | Cri du chat (partial monosomy 5) |
| Edward's Syndrom (trisomy 18) | |

②

T A C A A T C G C T T T G G T A A A A C T	DNA gene
A U G U U A G C G A A A C C A U U U U G A	mRNA

③

A U G U U A G C G A A A C C A U U U U G A	codons
<div style="display: flex; justify-content: space-around; width: 100%;"> ↓ ↓ ↓ ↓ ↓ ↓ ↓ </div>	
met leu ala lys pro phe STOP	amino acids
met - leu - ala - lys - pro - phe	polypeptide

④

	DNA	RNA	
structure	double-stranded	single-stranded	
nitrogenous bases	A, C, G, T	uses A, C, G, U	
sugar	deoxyribose	ribose	* that's where its name comes from: <u>Ribonucleic Acid</u>

- ⑤
- Similar: Same chromosomes, genes, DNA base sequences. i.e. genetic composition is same
- Different: Stem cell has few genes 'turned off' and most of its genes can be freely expressed. Shape is generic - no adaptations.
- Lymphocyte has many genes 'turned off' and select genes 'turned on'. For example: genes for antibody production highly expressed.

- ⑥ Many possible answers. Some applications include:
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| <ul style="list-style-type: none"> ↳ Stem cells are mainly used to replace damaged/diseased cells in a patient that they otherwise cannot replace/heal ↳ stem cells are harvested, grown and we can induce them to differentiate into the type of cell we need in lab. Then the specialized cells are injected into patient | <ul style="list-style-type: none"> Type 1 diabetes Paraplegia (spinal chord injuries) Parkinson's disease stroke Leukemia Burn victims Heart disease Stargardt's disease |
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