B3 Revision Questions

Higher only questions are in bold

Question 1

- What is the main function of a red blood cell?

Answer 1

- Carrying oxygen to tissues

Question 2

- What are the three main functions of white blood cells?

Answer 2

- Engulfing pathogens
- Producing antibodies
- Producing antitoxins

Question 3

- What is the main function of platelets?

Answer 3

- Blood clotting

Question 4

- What are the three main blood vessels for carrying blood around the body?

Answer 4

- Arteries
- Veins
- Capillaries

Question 5

- Which side of the heart is responsible for pumping blood to the lungs?

Answer 5

- Right

Question 6

- Which side of the heart is responsible for pumping blood around the body?

Answer 6

- Left

Question 7

- Why are arteries under higher pressure than veins?

Answer 7

- So blood flows away from the heart from areas of high pressure to areas of low pressure.

Question 8

- Describe the structure of a red blood cell

Answer 8

- A biconcave disc containing high levels of haemoglobin

Question 9

- **Explain how the structure of red blood cells relates to its function?**

Answer 9

- **Biconcave disc to increase surface area for diffusion of oxygen.**
- **High levels of haemoglobin to bind to and carry oxygen.**

Question 10

- Describe the passage of blood around the body through the circulatory system

Answer 10

- Artery → capillary → vein

- Arteries take blood away from the heart
- Capillaries exchange gases in the tissues
- Veins carry blood towards the heart

Question 11

- **Explain how arteries are adapted to their function**

Answer 11

- **Arteries have thick muscular and elastic walls to withstand the high pressures the blood is placed under**

Question 12

- **Explain how capillaries are adapted to their function**

Answer 12

- **Capillaries are very thin and permeable to allow substances to diffuse into and out of the blood.**

Question 13

- Draw the position of the four chambers of the heart

Answer 13

- RA LA
- RV LV

- R = Right L = Left
- A = Atrium V = Vein

Question 14

- **Explain the main advantages of the double circulatory system in mammals**

Answer 14

- **Allows the blood to be pumped around the systemic circulatory system at higher pressures, increasing the rate of flow to the tissues.**

Question 15

- What is the function of the vacuole, and cellulose wall?

Answer 15

- Vacuole: containing cell sap and providing support
- Cell wall: provides support

Question 16

- How can growth be measured?

Answer 16

- As an increase in height, wet mass and dry mass.

Question 17

- Describe the process of growth and cell division?

Answer 17

- Cells increase in size, replicate organelles and DNA and then split into two identical daughter cells through mitosis

Question 18

- Define differentiation?

Answer 18

- The specialisation of cells to take on a specific role within an organism

Question 19

- Describe the differences in growth between plants and animals.

Answer 19

- Animals grow more during early life whereas plants grow continuously
- All parts of animals grow whereas only specific parts of plants grow
- Plant cells retain the ability to differentiate whereas animal cells do not

Question 20

- What three things do bacterial cells NOT have?

Answer 20

- A ‘true’ nucleus
- Mitochondria
- Chloroplasts

Question 21

- **How is DNA arranged in bacterial cells compared to animal and plant cells?**

Answer 21

- **Bacterial cells do not have a nucleus whereas animal and plant cells do**
- **Bacterial cells have a single circular strand of DNA instead of chromosomes**

Question 22

- What is the best way to measure growth?

Answer 22

- Measuring the dry mass

Question 23

- **What are the advantages and disadvantages of measuring growth by length?**

Answer 23

- **Advantages – least invasive and does not require moving the organism**
- **Disadvantages – least accurate as organisms grow by different amounts in different directions**

Question 24

- **What are the advantages and disadvantages of measuring growth by wet mass?**

Answer 24

- **Advantages – doesn't kill the organism as it doesn't need drying out**
- **Disadvantages – Less accurate than dry mass as is influenced by changing levels of water in organism**

Question 25

- **What are the advantages and disadvantages of measuring growth by dry mass?**

Answer 25

- **Advantages – most accurate, not influenced by water**
- **Disadvantages – kills the organism as it must be dried out**

Question 26

- What is a stem cell?

Answer 26

- An undifferentiated cell that can specialise into any type of cell

Question 27

- **Explain the difference between adult and embryonic stem cells?**

Answer 27

- **Adult stem cells are only able to differentiate into certain types of cells**
- **Embryonic stem cells destroy the organism when harvested**

Question 28

- True / False, Animal cells retain the ability to differentiate throughout their entire life?

Answer 28

- False – it’s the other way round!

Question 29

- Describe the process of selective breeding?

Answer 29

- Animals with preferred characteristics are selected and then bred together. Offspring with both preferred characteristics are then selected of many generations

Question 30

- Define genetic engineering?

Answer 30

- The selection and transfer of a gene from one organism to another

Question 31

- Give two examples of genes which could be transferred from one organism to another

Answer 31

- Glow in the dark jelly fish gene into kittens
- Human insulin gene into e. Coli

Question 32

- **Why might selective breeding be bad?**

Answer 32

- **Reduction of gene pool resulting in accumulation of harmful recessive characteristics and reduction in variation**

Question 33

- What are the potential advantages and disadvantages of genetic engineering?

Answer 33

- Give organisms new characteristics
- Organisms with desired features are produced quickly
- Could have harmful effects on organism

Question 34

- **Describe the process of genetic engineering e. Coli to produce human insulin?**

Answer 34

- **Human insulin gene selected & isolated.**
- **Human insulin gene placed into plasmid and inserted into e. Coli**
- **e. Coli produce human insulin**

Question 35

- Why might some people disapprove of genetic engineering?

Answer 35

- Some people think it is interfering with nature or “playing god”

Question 36

- Define gene therapy?

Answer 36

- Changing a person's genes in an attempt to cure disorders

Question 37

- **Why would using gene therapy with gametes be more effective than in adults?**

Answer 37

- **The modified gene would be copied and placed into every cell in the person rather than just the targeted cells in adults**

Question 38

- **Why might some people disagree with gene therapy?**

Answer 38

- **People are unsure of the long term consequences and some people think it is interfering with nature or “playing god”**

Question 39

- Define asexual reproduction?

Answer 39

- Producing a cell which is genetically identical to the original – Sometimes called cloning

Question 40

- What is a natural clone?

Answer 40

- An identical twin

Question 41

- How do spider plants, potatoes and strawberries reproduce?

Answer 41

- Using asexual reproduction, runners are sent off to produce genetically identical copies of the original plant

Question 42

- How do you clone plants?

Answer 42

- Taking tissues cultures or cuttings

Question 43

- Name the first cloned animal.

Answer 43

- Dolly the Sheep

Question 44

- How do you take a cutting?

Answer 44

- Cut off a stem of a plant.
- Dip in rooting powder.
- Place in a pot with a plastic bag over the top and water well

Question 45

- **How was Dolly the sheep cloned?**

Answer 45

- **Nucleus removed form udder cell**
- **Nucleus removed from egg cell**
- **Udder cell nucleus placed into egg cell**
- **Egg cell given electric shock**

Question 46

- What are the advantages of cloned plants?

Answer 46

- Cut off a stem of a plant.
- Dip in rooting powder.
- Place in a pot with a plastic bag over the top and water well

Question 47

- What are the disadvantages of cloned plants?

Answer 47

- All genetically identical to each other so similar taste, size etc.
- Easier to mass produce plants where seeds are not effective

Question 48

- **Describe the main stages of cloning via plant tissue cultures.**

Answer 48

- **Sample of cells taken.**
- **Cells placed onto a petri dish under aseptic technique with a suitable growth medium**
- **New plants grow**

Question 49

- Chromosomes carry coded information in the form of genes. Where is this found in the cell?

Answer 49

- The nucleus

Question 50

- What molecule are chromosomes and genes made of?

Answer 50

- DNA

Question 51

- Where does respiration occur in a cell?

Answer 51

- In the mitochondria

Question 52

- Why do liver and muscle cells have MORE mitochondria than most other cells?

Answer 52

- Because they need to produce more energy from respiration.

Question 53

- Which two scientists worked out the structure of DNA?

Answer 53

- Watson and Crick

Question 54

- What does the ‘genetic code’ control?

Answer 54

- Cell activity and the production of different proteins

Question 55

- How did Watson and Crick manage to build a model of DNA?

Answer 55

- Used data from other scientists
- Franklin + Wilkins used x-rays to see the double helix structure
- Chargaff discovered the equal numbers of bases

Question 56

- What is a gene and what is it made up of?

Answer 56

- It is a small section of DNA that codes for making a particular protein. A gene is made up of a sequence of bases (A, T, C and G)

Question 57

- Describe the structure of DNA

Answer 57

- It is a double helix and contains for different bases → A, T, C and G

Question 58

- **What is it that determines the structure of the protein that is made in the ribosomes?**

Answer 58

- **The order or sequence of bases in the gene**

Question 59

- **In DNA, which bases pair together?**

Answer 59

- **A→T**
- **G→C**

Question 60

- **What happens in ribosomes?**

Answer 60

- **Protein synthesis**

Question 61

- Name some examples of proteins

Answer 61

- Collagen
- Insulin
- Haemoglobin

Question 62

- **Why are new discoveries like Watson and Crick's not accepted straight away?**

Answer 62

- **Results need to be repeated so that they are more easily believed.**

Question 63

- **What is the role of mRNA in protein synthesis?**

Answer 63

- **A copy of the sequence of bases in the relevant gene is made – this is called mRNA. mRNA is able to pass out of the nucleus and to the ribosomes**

Question 64

- What is a mutation?

Answer 64

- A change in a gene

Question 65

- Where do substrate molecules fit into?

Answer 65

- The active site of an enzyme

Question 66

- What do we call proteins that speed up (catalyse) chemical reactions?

Answer 66

- Enzymes

Question 67

- What is the role of haemoglobin?

Answer 67

- Binds with oxygen so it can be transported around the body

Question 68

- What does insulin do?

Answer 68

- Controls blood glucose levels (decreases glucose levels in the blood)

Question 69

- What are proteins made up of?

Answer 69

- A long chain of amino acids

Question 70

- What does the ‘lock and key’ theory describe?

Answer 70

- How the substrate fits into the active site of the enzyme if it is a complimentary shape

Question 71

- How does pH affect the rate of an enzyme controlled reaction?

Answer 71

- Rate of reaction increases with increased pH up to the optimum pH, after this the rate of reaction decreases

Question 72

- How does temperature affect the rate of an enzyme controlled reaction?

Answer 72

- Rate of reaction increases with increased temperature up until the optimum temperature. After this the rate of reaction will decrease if the enzyme is denatured by high temp's

Question 73

- **What does the Q_{10} value (or 'temperature coefficient') tell us?**

Answer 73

- **The effect of temperature on the rate of reaction**

Question 74

- **Why do enzymes have different shapes?**

Answer 74

- **Because they are made of different sequences of amino acids**

Question 75

- How do mutations occur?

Answer 75

- Naturally / spontaneously
- Radiation
- Chemicals

Question 76

- What is the symbol equation for aerobic respiration?

Answer 76

- $C_6H_{12}O_6 + 6O2 \rightarrow 6CO_2 + 6H_20$

Question 77

- What is the word equation for aerobic respiration?

Answer 77

- Glucose + oxygen → carbon dioxide + water

Question 78

- **When are genes switched on or off?**

Answer 78

- **Genes are switched on in cells where that protein is needed and switched off in areas of the body where the protein does not need to be made**

Question 79

- Why does breathing rate and pulse rate increase during exercise?

Answer 79

- Because MORE oxygen and MORE glucose are needed (supplied by the blood) for MORE respiration to create MORE energy for muscle cells

Question 80

- Describe examples of life processes that require energy

Answer 80

- e.g.
- Maintain body temperature
- Make proteins
- Contract muscles

Question 81

- What is the word equation for anaerobic respiration?

Answer 81

- Glucose → lactic acid

Question 82

- **How do we measure metabolic rate?**

Answer 82

- **It can be estimated by measuring the oxygen uptake**

Question 83

- **What is the name of the molecules that energy is stored in after it is created in respiration?**

Answer 83

- **ATP**

Question 84

- Why does anaerobic respiration occur during hard exercise?

Answer 84

- When your breathing rate is not fast enough to give enough oxygen to be able to do aerobic respiration

Question 85

- What is the difference between unicellular and multicellular organisms?

Answer 85

- Unicellular organisms are made of just one cell.

- Multicellular organisms are made of many cells and often organ systems

Question 86

- **Why is a build up of lactic acid bad?**

Answer 86

- **Lactic acid needs to be broken down as it is toxic/poisonous. To break it down, oxygen is needed. This creates an 'oxygen debt'**

Question 87

- **Why do temperature and pH affect respiration?**

Answer 87

- **Because respiration is controlled by enzymes**

Question 88

- What are the advantages of being multicellular?

Answer 88

- Can grow to a large size
- Cell differentiation takes place
- Organisms can be more complex

Question 89

- What happens in sexual reproduction?

Answer 89

- Gametes (sex cells) join together in the process of fertilisation (this doesn't necessarily involve sexual intercourse)

Question 90

- What needs to happen in the nucleus before cell division?

Answer 90

- Copies of all of the chromosomes need to be made

Question 91

- What type of cells are known as haploid?

Answer 91

- Gametes (sex cells) because they need to have half the amount of chromosomes in the nucleus

Question 92

- What type of cells are known as diploid?

Answer 92

- All cells apart from gametes (sex cells) because they have a FULL set of chromosomes

Question 93

- What type of cell division is involved in growth?

Answer 93

- Mitosis

Question 94

- Explain how the structure of sperm cells help them to do their job

Answer 94

- Lots of mitochondria for energy
- Tail to swim
- Streamline shape
- Haploid nucleus

Question 95

- Why does fertilisation result in genetic variation?

Answer 95

- Because a random 23 chromosomes (out of 46) are put into the sperm cell from the father and a random 23 go into each egg cell from the mother's diploid cells

Question 96

- What type of cell division produces gametes?

Answer 96

- Meiosis

Question 97

- **What happens in meiosis?**

Answer 97

- **The cell divides twice, four haploid cells are made**

Question 98

- **What happens in mitosis?**

Answer 98

- **Chromosomes are copied, chromosomes migrate to opposite sides of the cells, the cells divides into two, an identical copy of the cell is made**

Question 99

- **How does DNA replicate?**

Answer 99

- DNA unzips then new bases pair up onto the double strands and form bonds

Question 100

- What is a acrosome on a sperm cell for and what is in it?

Answer 100

- It contains digestive enzymes to help digest the egg cell membrane so the sp