lysosomes / endoplasmic reticulum / Golgi / chloroplasts; Prokaryotic cells may have mesosomes; Prokaryotic cells smaller; May be enclosed by capsule;

What is the function of: a)Ribosome b)Smooth ER c)Golgi apparatus d) Chloroplast e)Mitochondria [5] - *CORRECT ANSWERS* -a)Protein synthesis b)Lipid synthesis and transport c)Processing and packaging proteins for secretion d)Photosynthesis e)Aerobic respiration to produce ATP

Explain the advantages and limitations of using a transmission electron microscope [5] - *CORRECT ANSWERS* -Advantages: Small objects can be seen; TEM has high resolution as wavelength of electrons shorter; Limitations: Cannot look at living cells as cells must be in a vacuum; must cut section / thin specimen; Preparation may create artefact; Does not produce 3D or colored image;

Why an electron microscope can be used to produce images [2] - *CORRECT ANSWERS* -EM gives high resolution due to short wavelength of electrons;

Explain how viruses cause damage to cells. [3] - *CORRECT ANSWERS* -uses / breaks up / digests host nuclear / genetic material (allow references made to DNA /RNA instead of nuclear /genetic); virus DNA / genetic material inserted into hosts DNA / chromosome / genetic material; host cells amino acids are used to synthesize viral proteins; cell lysis; by enzyme (produced by expressing a virus gene); toxin production;

Describe and explain how cell fractionation and ultracentrifugation can be used to isolate mitochondria from a suspension of animal cells. [5] - *CORRECT ANSWERS* -Cell homogenisation to break open cells; 1. Accept suitable method of breaking open cells. Filter to remove (large) debris /

Meiosis results in genetic variation in the gametes which leads to variation in the offspring formed by sexual reproduction. Describe how meiosis causes this variation and explain the advantage of variation to the species. (6/8 marks) - CORRECT ANSWERS -1. Crossing-over; [IGNORE any wrong ref. to timing] 2. Independent / random assortment / orientation / segregation of (homologous) chromosomes in meiosis I; 3. Independent / random assortment / orientation / segregation of chromatids in meiosis II; + Any three from: 4. Different adaptations / some better adapted; 5. Some survive / example described; 6. To reproduce; 7. Pass on gene / allele; 8. Allows for changing environment / different environment / example described;

Describe what happens to chromosomes in meiosis. (6 marks) - CORRECT ANSWERS -1. Chromosomes shorten / thicken / condense; 2. Chromosomes associate in homologous / (described) pairs / formation of bivalents / tetrads; 3. Crossing-over / chiasma formation; 4. Join to spindle (fibres) / moved by spindle;(*) 5. At) equator / middle of cell;(*) 6. (join via) centromere / kinetochore;(*) 7. (Homologous) chromosomes move to opposite poles / chromosomes separate / move apart; (ALLOW 'are pulled apart') 8. (Pairs of) chromatids separated in 2nd division; (*) OR " independent assortment"

If an organism has a diploid chromosome number of 28 (2n = 28) how many chromosomes will its gametes contain? (1 mark) - CORRECT ANSWERS - 14

What is non-disjunction? (1 mark) - CORRECT ANSWERS -Failure of chromosomes to separate properly resulting in daughter cells with wrong number of chromosomes

Describe how β-glucose molecule differs from a molecule of α-glucose. [1] - *CORRECT ANSWERS* -H at top right end (instead of OH) / OH at bottom (carbon 1)

Show two ways in which the structure of cellulose is different from the structure of starch. [2] - *CORRECT ANSWERS* -Starch 1,4 and 1,6 bonds / branching Cellulose 1,4 bonds / no 1,6 bonds / straight; starch All glucoses /monomers same way up cellulose Alternate glucoses upside down; starch Helix / coiled/compact cellulose Straight; Starch monomer Alpha glucose Cellulose monomer Beta glucose

Describe the structure of starch and explain how its structure is related to its function. [3] - *CORRECT ANSWERS* -Formed from α glucose; Joined by condensation/ by the removal of a water molecule / glycosidic bonds; Between (carbons) 1 and 4 (and 1 and 6); Coiled chain; compact; (Allows) storage of large amount in a small space; Insoluble so has no effect on osmosis/water potential; Branches; (Allows) rapid breakdown/release of glucose / hydrolysis;

The structure of a phospholipid molecule is different from that of a triglyceride. Describe how. [2] - *CORRECT ANSWERS* -triglyceride has three fatty acids and phospholipid has two; no phosphate group present in triglyceride but present in phospholipid.

What is an unsaturated fatty acid? [1] - *CORRECT ANSWERS* -Some / two carbons with only one hydrogen / (double bonds) between carbon atoms / not saturated with hydrogen;

Describe the structure of cellulose and explain how its structure is related to its function. [3] - *CORRECT ANSWERS* -Alternate β-glucose rotated 1800,