MODULE ONE SELF-TEST

All these questions are things you really should know before you sit module one. What I recommend is that you have a go at all the questions - then check your answers - then try it again at a later date - keep going until you get all these questions right.

1. Give an example of a monosaccharide
2. Give an example of a disaccharide
3. Give an example of a polysaccharide
4. How many carbon atoms are there in a glycerol molecule
5. Which biological molecule has glycerol in its structure
6. What's the name of the bonds that hold saccharide molecules together in carbohydrates
7. What's the name of the bonds that hold amino acids together
8. What type of chemical reaction occurs when two monosaccharides join to form a disaccharide
9. Which of these is an atom:
    a. H_2O
    b. CO_2
    c. C
    d. $C_6H_{12}O_6$
10. What type of chemical reaction occurs when a triglyceride is broken into glycerol and fatty acid molecules.
11. In which molecule would you find ester bonds?
12. What is the main additional element present in proteins but not carbohydrates or lipids
13. Describe how you could perform a test to detect the presence of lipids
14. What level of protein structure determines the overall three dimensional shape of a polypeptide?
15. What feature do carbohydrates and proteins have in common that lipids do not have.
16. Give one function of triglyceride fats in living organisms
17. What is the name of the reagent used in the protein test?
18. How many carbon molecules are there in a molecule of glucose
19. When separating a mixture of amino acids using chromatography what properties of the amino acids cause them to separate on the chromatography paper?
20. The presence of what turns iodine blue/black?

21. How many micrometers in a millimetre
22. Give the main functions of the following organelles:
    a. Mitochondrion
    b. Chloroplast
    c. Nucleus
    d. Rough Endoplasmic Reticulum
    e. Ribosomes
    f. Smooth Endoplasmic Reticulum
    g. Golgi Apparatus
    h. Cell Membrane
23. What type of cells are bacteria
24. Give the advantages and disadvantages of using electron microscopes to view cells
25. What are microvilli?
26. Where does the construction of a polypeptide occur?
27. What might you find in a lysosome?
28. What are the components of the fluid mosaic membrane
29. Give two functions of proteins in membranes
30. If you were using centrifugation to separate cell organelles from a mixture which organelles would you expect to sediment out first?

31. Through which part of the membrane do things move by active transport?

32. What is meant by the term osmosis
33. Give two differences and one similarity between facilitated diffusion and active transport
34. If a plant cell has a WP of -560 kPa and an OP of -600 kPa, what would its wall pressure be?
35. If a red blood cell bursts when placed in a solution of distilled water (WP=0) Why doesn't a plant cell?
36. What features do specialised gas exchange surfaces share?
37. Which muscles are involved in inspiration in humans?
38. What keeps the trachea open in humans?
39. In humans what is the path of an oxygen molecule from the mouth to the alveoli
40. Explain what happens to an enzyme molecule when it is denatured by high temperatures.
41. Why does an enzyme only speed up one (or at the most a few) different chemical reaction(s)?
42. How do enzymes speed up the rate of chemical reactions
43. Describe the effect of increasing substrate concentration on the rate of an enzyme controlled reaction
44. Why would increasing the temperature from 15 to 25 degrees increase the rate of an enzyme controlled reaction
45. Using your knowledge of enzyme structure explain how a non-competitive inhibitor works

MODULE ONE SELF-TEST ANSWERS

1. Give an example of a monosaccharide	Glucose, Fructose (check notes for others)
2. Give an example of a disaccharide	Maltose, Lactose, Sucrose (check notes for others)
3. Give an example of a polysaccharide	Starch, Glycogen, Cellulose (check notes for others)
4. How many carbon atoms are there in a glycerol molecule	3
5. Which biological molecule has glycerol in its structure	lipid/phospholipid
6. What's the name of the bonds that hold saccharide molecules together in carbohydrates	glycosidic
7. What's the name of the bonds that hold amino acids together	peptide
8. What type of chemical reaction occurs when two monosaccharides join to form a disaccharide	condensation
9. Which of these is an atom: a. H_2O b. CO_2 c. C d. $C_6H_{12}O_6$	C
10. What type of chemical reaction occurs when a triglyceride is broken into glycerol and fatty acid molecules.	hydrolysis
11. In which molecule would you find ester bonds?	lipid
12. What is the main additional element present in proteins but not carbohydrates or lipids	nitrogen
13. Describe how you could perform a test to detect the presence of lipids	dissolve in ethanol - decant into water - cloudy emulsion = lipid present
14. What level of protein structure determines the overall three dimensional shape of a polypeptide?	tertiary structure
15. What feature do carbohydrates and proteins have in common that lipids do not have.	they can form polymers/long chain molecules
16. Give one function of triglyceride fats in living organisms	energy storage (check notes for others)
17. What is the name of the reagent used in the protein test?	Biuret
18. How many carbon molecules are there in a molecule of glucose	6
19. When seperating a mixture of amino acids using chromatography what properties of the amino acids cause them to seperate on the chromatography paper?	molecular size - solubility in the solvent
20. The presence of what turns iodine blue/black?	starch
21. How many micrometres in a millimetre	1,000

22. Give the main functions of the following organelles: a. Mitochondrion b. Chloroplast c. Nucleus d. RER e. Ribosomes f. SER g. Golgi Apparatus h. Cell Membrane	Mitochondrion → Site of ATP synthesis / aerobic respiration Chloroplast → Site of photosynthesis Nucleus → Controls the cells reactions/contains genetic material RER → Polypeptide isolation and transport Ribosome's → site of protein synthesis SER → synthesis and transport of lipids Golgi apparatus → final stages of protein assembly and transport of proteins Cell Membrane → controls entry and exit of substances in and out of the cell
23. What type of cells are bacteria	prokaryotes
24. Give the advantages and disadvantages of using electron microscopes to view cells	EM gives greater resolution, specimen cannot be alive
25. What are microvilli?	infoldings of the cell membrane that increase surface area
26. Where does the construction of a polypeptide occur?	at the ribosome
27. What might you find in a lysosome?	digestive enzymes
28. What are the components of the fluid mosaic membrane	proteins + phospholipids
29. Give two functions of proteins in membranes	transport, receptor, membrane bound enzyme
30. If you were using centrifugation to seperate cell organelles from a mixture which organelles would you expect to sediment out first?	the nuclei
31. Through which part of the membrane do things move by active transport?	the proteins
32. What is meant by the term osmosis	the movement of water across a biological membrane from an area of less negative to an area of more negative water potential
33. Give two differences and one similarity between facillitated diffusion and active transport	similarity = both use proteins to cross membrane differences = active transport requires energy (ATP) facilitated diffusion does not, active transport is against the concentration gradient facilitated diffusion is with it.
34. If a plant cell has a WP of -560 kPa and an OP of -600 kPa, what would its wall pressure be?	40 kPa
35. If a red blood cell bursts when placed in a solution of distilled water (WP=0) Why doesn't a plant cell?	because of it's cellulose cell wall
36. What feature do specialised gas exchange surfaces share	large surface area, moist, thin (short diffusion distances), good vascular supply
37. Which muscles are involved in inspiration in humans	the diaphragm and intercostal muscles
38. What keeps the trachea open in humans?	cartilage
39. In humans what is the path of an oxygen molecules from the mouth to the alveoli	mouth - pharynx - larynx - trachea - bronchi - bronchiole - alveoli

40. Explain what happens to an enzyme molecule when it is denatured by high temperatures.	H-bonds between polypeptides broken, tertiary structure changed, shape of active site changed, therefore substrate no longer fits active site
41. Why does an enzyme only speed up one (or at the most a few) different chemical reaction(s)?	because active site is a specific shape only one (a few) molecules can fit into it
42. How do enzymes speed up the rate of chemical reactions	by lowering the activation energy required
43. Describe the effect of increasing substrate concentration on the rate of an enzyme controlled reaction	as substrate concentration increases the rate of reaction increases
44. Why would increasing the temperature from 15 to 25 degrees increase the rate of an enzyme controlled reaction	between 15 and 25 degrees the amount of kinetic energy increases therefore the number of successful collisions (between substrate and enzyme) per unit time increases
45. Using your knowledge of enzyme structure explain how a non-competitive inhibitor works	it binds at a site other than the active site causing a change to the enzymes tertiary structure - therefore changing the shape of the active site so the substrate can no longer fit.