

## Answers for extension worksheet – Chapter 3

- 1    **a**    glycolysis (1)
- b**    pyruvate (1)
- c**    Y = ATP, Z = carbon dioxide (2)
- d**    **i**    lactate (1)
- ii**    ethanol and carbon dioxide (1)
- 2    Messenger RNA is formed by the process of **transcription** from nuclear DNA. It passes through pores in the **nuclear envelope** into the cytoplasm. Here it attaches to a **ribosome** on the **endoplasmic reticulum**. Amino acids are brought to the mRNA by tRNA, which attach to the **codons** of the mRNA by their **anticodons**. Amino acids are joined together by **peptide** bonds to form a **polypeptide**. This molecule is released from the **ribosome** and moves to the **Golgi apparatus**, where it is modified to form **protein**. (11)
- 3 (10)

Property	mRNA	tRNA
contains codons	yes	no
may contain several genes	yes	no
associates with any amino acid	no	no
contains the base uracil	yes	yes
contains 70–90 nucleotides	no – more	yes

- 4    **a**    Graph should have:
- correctly labelled axes (1)
- points plotted correctly, with lines to connect them (2)
- lines labelled with carbon dioxide concentration (1)
- b**    As light intensity increases, the rate of photosynthesis also increases until the lamp is 0.50 m from the plant, after which the rate remains constant even if the light intensity is increased. After this point, the rate of reaction is limited by another factor. (2)
- c**    At 1% carbon dioxide, the rate of photosynthesis reaches its maximum at a lower light intensity than at 2% carbon dioxide. This indicates that at the 1% concentration carbon dioxide becomes a limiting factor at this low light intensity, whereas at 2% the rate of photosynthesis continues to increase until a higher light intensity is reached. Additional carbon dioxide has enabled the plant to photosynthesize at a faster rate. (2)
- d**    a direct method (1)



- e** measuring uptake of carbon dioxide (a direct method); measuring increase in biomass (indirect) (2)
- 5 a** proteases and lipases to digest, for example, food stains and blood (2)
- b** Use the powder at a low temperature so that enzymes are not denatured.  
Allow sufficient washing or soaking time to enable the enzyme to process all the substrate (stain) molecules.  
Ensure there is sufficient powder (enzyme concentration) for the amount of laundry. (3)
- c** protease – used for meat tenderizing, removing hair from hides  
cellulase – used for softening vegetables, removing the testa from grains  
amylase – used for fruit juice production, making syrups (6)