Your exam will comprise 12 questions.

It will be laid out very similar to the LC paper with slightly fewer questions.

Section A - Short Answer Questions (80 marks)

Answer 4 of 6 questions

Section B - Experiment Questions (60 marks)

Answer 2 out of 3 questions

Section C - Long Answer Questions (180 marks)

Answer all 3 questions. The last question will have 4 parts (a, b, c and d). You only need to do 2 parts. Each part is worth 30 marks.

Section	Question	Unit	What I need to know/be able to do
A	**1**	**1.1**	Define what is meant by the scientific method Outline steps of the scientific method Define what is meant by a hypothesis and a theory What is an experiment? What is meant by data? Why do we need a control in experiments? List limitations of the scientific method
	2	**2.1**	List the main structures of plant and animal cells Define what is meant by prokaryotic and eukaryotic cells What type of microscope not used in the lab is used to generate high quality images of cells What is the main composition of a cell membrane? (Phospholipid and protein) Outline how the cell wall and cell membrane differs in terms of their permeability
	3	**2.3**	Define what is meant by the terms mitosis, meiosis, haploid and diploid

			Outline the events that take place in interphase, prophase, metaphase, anaphase and telophases associated with mitosis making sure you know the labels involved in diagrams How does the parent cell split in two in both plant and animals cells (cell plate and cleavage furrow What is cancer? State two causes of cancer
	4	**2.5**	Define what is meant by evolution and variation Name two reasons for variation (environment, inheritance etc.) Name the two scientists involved in the study of evolution initially Outline evidence that exists to show support for the theory of evolution
	5	**3.3**	Distinguish between mechanical and chemical digestion Outline structures of digestive system and give their functions What is peristalsis What is bile? What is it's role
	6	**3.4**	Outline the main structures of the human breathing system and give their functions Why do we need cartilage? Where exactly are the intercostal muscles located? Describe what happens to the main structures (lungs, diaphragm etc.) during inhalation and exhalation What part of the brain controls our breathing (medulla oblongata)
B	**7**	**2.1** **2.5**	**Preparation of animal and plant cells** How did you obtain your plant and animal cells Why did you add water? Why did you add the coverslip at an angle? What stains did you use? **Isolation of DNA**

			What plant did you use? Why did you cut the plant? Why did you use washing up liquid? Why did you filter it with coffee paper? Why did you use salt? Why did you add ethanol? How did you add it?
	8	**2.2**	**Effect of pH/temperature on enzyme activity:** What is meant by enzymes being specific? What part of an enzyme is responsible for the specificity What equipment did you use? What enzyme did you use? What substrate did it act on? What variable did you change? How did you change it? What variables did you keep the same (constant). How did you keep them constant What steps did you follow? How did you record the rate of enzymatic activity? What was the optimum pH and temperature for the catalase enzyme we used Draw a suitable graph of results
	9	**3.2**	**Prepare and Examine a transverse section of a dicot stem** What is a dicot? Give an example of a dicot Why did you use a herbaceous stem and not a woody stem? What plant did you use? How did you cut the stem safely? Why were the sections placed in water? How did you view it under the microscope? What lens did you start with? Did you draw sketches etc. What did you see? Draw a labelled diagram

C	**10**	**1.4/1.5**	Define the terms habitat, ecosystem, biosphere, niche and trophic level and predation Draw the diagram to represent the predator-prey cycle Name an adaptive feature of any predator you know that helps it catch prey Outline what you did in your field study. How did you collect fauna and identify them? What is the difference between a quantitative and qualitative study How did you make sure you used the quadrat randomly Were there any safety hazards you had to take into account? How did you present the results of your survey? Were there any possible sources of error?
	11	**2.5**	Explain the term genetics What base pairs are complementary to each other in DNA What are the purine and pyrimidine bases? Give differences between DNA and RNA Which scientist is known best for his work on genetics State Medel's law of segregation and his law of independent assortment Perform a monohybrid cross involving incomplete dominance Perform a dihybrid cross Outline the stages of protein synthesis, making reference to initiation, transcription and translation and where in a cell each stage occurs . What enzyme is involved in transcription? What does t, m and r stand for in tRNA, mRNA and rRNA. What does tRNA do?
	12	**2.2**	**D**efine what is meant by an enzyme and which food biomolecule group they belong to (proteins)

		3.1	Outline how enzymes work (induced-fit theory): active site, shape changing, enzymes specific to substrates, return to normal shape after products formed (diagram included) Outline what is meant by enzymes being specific State what immobilized enzymes are What is a bioreactor? Give an example of a named enzyme that acts on a named substrate in a bioreactor to give a named product (glucose isomerase acts on glucose to make fructose)
		3.2	What kingdom do bacteria belong to? What structures do they have and what are their functions? Name the process by which bacteria replicate and outline the stages involved using a labelled diagram Describe how bacteria can survive in unfavourable conditions (endospore formation) Name two types of parasitic bacteria (tetanus, e.coli, cholera etc.) Outline what happens in batch and continuous flow processing Which growth stage, during batch processing, might a bacteria form an endospore to allow it to survive while other bacteria are dying
		3.3	Draw and label a diagram of the heart Outline how blood flows through the heart, mentioning the main chambers and using terms such as oxygenated and deoxygenated Outline the positions of the SA and AV nodes and how they are responsible for regulating/controlling heartbeat Distinguish between diastole and systole

			Outline functions of the main tissue types - ground, vascular and dermal and where they are located in a plant Know what xylem (water and minerals) and phloem (food)transports What features do xylem and phloem have that allow them to carry water/food efficiently With reference to the cohesion-tension model, transpiration and root pressure outline how water is moved through the plant Name the two Irish scientists involved in formulating this model