

Golden Knowledge Multiple Choice Question sheet: Topic 1: Cell Biology (TRILOGY COURSE)

Use the table below to help you identify which questions are for each lesson / section of learning within this topic:

Lesson Ref	Specification ref (Trilogy)	Lesson content	Question numbers
B1.1	1.1.5	The world of the microscope	1-5
B1.2	1.1.2	Animal and plant cells	6-13
B1.3	1.1.1	Eukaryotic and prokaryotic cells	14-17
B1.4	1.1.3	Specialisation in animal cells	18,19
B1.5	2.3.2	Specialisation in plant cells	20-23
RP1		Required practical 1 - Investigating plant cell structure and size	24
B1.6	1.3.1	Diffusion	25-35
B1.7	1.3.2	Osmosis	36-40
B1.8	1.3.2	Osmosis in plants	41-45
RP3		Required practical 3 - Osmosis in a root vegetable of salt/sugar	46-51
B1.9	1.3.3	Active transport	52-61
B1.10	1.3.1	Exchanging materials	62-71
B2.1	1.2.1	Cell division	72-75
B2.2	1.1.4	Growth and differentiation	76-80
B2.3	1.2.3	Stem cells	81-85
B2.4	1.2.3	Stem cell dilemmas	86-92

1. What does the term resolution in microscopy primarily refer to?
 - a) The ability to make an object appear larger than its actual size
 - b) The clarity of the image and its ability to reveal fine details
 - c) The type of microscope being used
 - d) The magnification level of the microscope
2. How have microscopy techniques developed over time to enhance our understanding of the microscopic world in biology?
 - a) By reducing the complexity of sample preparation
 - b) By decreasing the use of microscopes
 - c) By enhancing visualization and increasing detail
 - d) By providing lower resolution for microscopic structures
3. In microscopy, what does the term magnification primarily refer to?
 - a) The ability to see objects that are too small to be visible
 - b) The ability to distinguish different colours in an image
 - c) The ability to see objects in three dimensions
 - d) The ability to make an object appear larger than its actual size
4. How have electron microscopes contributed to our understanding of sub-cellular structures in biology?
 - a) By making cells easier to study due to larger size
 - b) By revealing artistic representations of cells
 - c) By offering low-resolution images for better visualization
 - d) By providing high-resolution images that reveal fine details
5. What is the primary advantage of electron microscopes over light microscopes regarding resolution and resolving power?
 - a) Electron microscopes have lower resolution and resolving power
 - b) Both types of microscopes have similar resolution and resolving power
 - c) Electron microscopes have higher resolution and resolving power
 - d) Resolution and resolving power are not relevant in microscopy

6. What is the primary function of cellulose in plant and algal cells?
 - a) Facilitating cell division
 - b) Regulating DNA replication
 - c) Providing structural support
 - d) Storing energy

7. What is the main objective when estimating the relative size or area of subcellular structures in biology using various visual aids?
 - a) Making precise measurements with specialized tools
 - b) Scaling the image to match real-life dimensions
 - c) Using abstract symbols to represent cellular components
 - d) Making informed judgments based on visual information

8. In a eukaryotic cell, which structure is primarily responsible for photosynthesis?
 - a) Nucleus
 - b) Chloroplast
 - c) Mitochondria
 - d) Cell membrane

9. When interpreting images of cells in a scientific context, what is the main goal?
 - a) Assessing the artistic quality of the image
 - b) Identifying the age and location of the cell
 - c) Extracting meaningful scientific information from the image
 - d) Creating a detailed artistic rendering of the cell

10. What skill does the ability to recognize images of cells primarily involve?
 - a) Drawing cells from memory
 - b) Identifying the function of cellular structures
 - c) Observing and correctly identifying different types of cells
 - d) Calculating the size of cells

11. How do microscopy techniques impact the estimation of relative size or area of subcellular structures using visual aids?
 - a) They make precise measurements unnecessary
 - b) They create a consistent scale for all images
 - c) They allow for more accurate estimations based on provided visuals
 - d) They limit the use of visual aids in biology

12. What is the primary purpose of drawing images of cells in a scientific context?
 - a) Creating aesthetically pleasing artwork
 - b) Depicting cells with exaggerated features
 - c) Accurately representing observed cell structures
 - d) Adding artistic flair to scientific publications

13. In the context of cell biology, which organelle is responsible for photosynthesis?
 - a) Nucleus
 - b) Golgi apparatus
 - c) Endoplasmic reticulum
 - d) Chloroplast

14. What key difference distinguishes bacteria from eukaryotic cells like animal and plant cells?
 - a) Bacteria have a larger cell size
 - b) Bacteria lack a cell membrane
 - c) Bacteria are unicellular and much smaller
 - d) Bacteria have a nucleus

15. In cell biology, what term refers to the different orders of making an image appear larger or smaller?
- Cell diversity
 - Magnification variation
 - Microscopic adjustment
 - Resolution transformation
16. When identifying and remembering the structures in a bacterial cell (prokaryote), which of the following would you primarily focus on?
- Identifying membrane-bound organelles
 - Recognizing the presence of a nucleus
 - Understanding the unique features of prokaryotes
 - Identifying and remembering the structures in plant and animal cells
17. What is the primary distinction between eukaryotic cells (found in animals and plants) and bacterial cells (prokaryotes)?
- Eukaryotic cells are generally larger than bacterial cells
 - Eukaryotic cells have a cell wall, unlike bacterial cells
 - Eukaryotic cells have a simple cellular structure
 - Eukaryotic cells are always unicellular
18. How do the structures of different types of animal cells relate to their functions?
- Animal cells have the same structure and function.
 - Animal cells have different structures, but their functions are unrelated.
 - The structure of animal cells is closely related to their specific functions.
 - The structures of animal cells vary, but their functions are determined by their size.
19. What is the relationship between the structure and function of various types of plant cells?
- Plant cell structures have no impact on their functions.
 - Plant cell structures are determined by external factors, not function.
 - The structure of plant cells is closely linked to their diverse functions.
 - Plant cell functions are identical, regardless of their structures.
20. What is the primary function of Xylem cells in plants?
- Transporting sugars from leaves to other plant parts
 - Transporting water and minerals from roots to other plant parts
 - Providing support and structural rigidity
 - Facilitating gas exchange during photosynthesis
21. How are Phloem cells adapted to their function in plants?
- They have thick walls for structural support
 - They are dead cells with empty lumens
 - They contain chloroplasts for photosynthesis
 - They form tubes for the transport of sugars and nutrients
22. What is the main role of Root hair cells in plants?
- Photosynthesis and sugar production
 - Water absorption and nutrient uptake
 - Supporting the plant's structure
 - Transporting minerals to the leaves
23. How are Palisade cells adapted to their function in leaves?
- They are specialized for water transport
 - They have a waxy cuticle for protection
 - They contain chloroplasts for photosynthesis
 - They provide structural support to the plant

24. Arrange the following steps in the correct order for using a light microscope to observe specimens:
- 1 Turn on the microscope's light source and adjust the intensity.
 - 2 Place your specimen on the stage of the microscope.
 - 3 Turn off the light source, lower the stage, and switch to the lowest magnification.
 - 4 Use the coarse focus knob to bring the specimen into rough focus.
 - 5 Start with the lowest objective lens (usually 4x or 10x) in position.
 - 6 Carefully observe the specimen and adjust the level of magnification if necessary.
 - 7 Clean the lenses and stage and cover the microscope with its dust cover for storage.
25. What is the process that involves the movement of substances in and out of cells from an area of high concentration to low concentration?
- a. Photosynthesis
 - b. Osmosis
 - c. Diffusion
 - d. Active transport
26. Which term refers to the process of substances spreading from areas of high concentration to low concentration?
- a. Osmosis
 - b. Respiration
 - c. Diffusion
 - d. Photosynthesis
27. Which of the following is NOT a biological example of diffusion?
- a. Oxygen entering the bloodstream in the lungs
 - b. Glucose moving from the blood into cells
 - c. Perfume scent spreading through a room
 - d. Water moving through a semipermeable membrane
28. How do different factors affect the rate of diffusion?
- a. They have no impact on diffusion rates.
 - b. Temperature and concentration gradient can increase the rate.
 - c. Diffusion is only influenced by the size of the particles.
 - d. Only the shape of the cell matters in diffusion.
29. Why does a single-celled organism have a large surface area to volume ratio?
- a. To store more nutrients
 - b. To maintain a constant shape
 - c. To facilitate efficient exchange of substances with the environment
 - d. To decrease the rate of diffusion
30. What is the primary importance of having a large surface area to volume ratio?
- a. To prevent cell growth
 - b. To provide structural support
 - c. To allow for maximum exchange of substances with the surroundings
 - d. To isolate the cell from its environment
31. Why are isotonic and high-energy drinks used in sports?
- a. To increase body weight
 - b. To cause dehydration
 - c. To provide energy and replace lost fluids during physical activity
 - d. To reduce muscle mass

32. What is the primary need for exchange surfaces and transport systems in multicellular organisms?
- To enhance cellular respiration
 - To ensure efficient nutrient storage
 - To facilitate the exchange of gases, nutrients, and waste products
 - To regulate temperature
33. What are the specialized characteristics of an exchange surface primarily designed for?
- To block the entry of foreign particles
 - To maximize the surface area and minimize diffusion
 - To ensure one-way flow of substances
 - To facilitate efficient exchange of substances
34. How do exchange surfaces typically adapt to their function?
- By reducing their surface area
 - By increasing their thickness
 - By having thin, moist, and selectively permeable features
 - By having rigid structures
35. Why is it important for exchange surfaces to have sufficient molecules transported into and out of cells?
- To slow down cellular processes
 - To prevent substances from entering or leaving the cell
 - To meet the metabolic needs of the cell
 - To maintain a constant cell shape
36. How does water primarily move across a cell membrane when there is a difference in solute concentration between the inside and outside of the cell?
- Through active transport
 - By facilitated diffusion
 - Via osmosis
 - By endocytosis
37. What term describes the movement of water across a semi-permeable membrane from an area of lower solute concentration to higher solute concentration?
- Diffusion
 - Active transport
 - Osmosis
 - Filtration
38. Which term best characterizes a solution with a low concentration of solutes?
- Saturated
 - Concentrated
 - Dilute
 - Isotonic
39. How would you describe a solution with a high concentration of solutes?
- Saturated
 - Concentrated
 - Dilute
 - Isotonic
40. What can you recognize when observing a substance passing through a barrier that allows some molecules to pass while blocking others?
- A selectively permeable membrane
 - An impermeable membrane
 - A transparent membrane
 - A rigid membrane

41. What is the primary process by which water moves across a cell membrane due to differences in solute concentration?
- Diffusion
 - Osmosis
 - Active transport
 - Filtration
42. How would you define the term osmosis?
- The movement of water from an area of high solute concentration to low solute concentration
 - The movement of solute particles from an area of low concentration to high concentration
 - The diffusion of gases in and out of cells
 - The active transport of water molecules
43. What characterizes a solution with a low concentration of solutes?
- Concentrated
 - Saturated
 - Dilute
 - Opaque
44. How do you describe a solution with a high concentration of solutes?
- Concentrated
 - Saturated
 - Dilute
 - Transparent
45. When a substance can pass through a barrier, allowing some molecules to pass while blocking others, what is this barrier known as?
- An impermeable membrane
 - A semi-permeable membrane
 - A translucent membrane
 - A rigid membrane
46. What process involves the movement of water across a semi-permeable membrane from areas of lower solute concentration to areas of higher solute concentration?
- Active transport
 - Osmosis
 - Photosynthesis
 - Transpiration
47. In the case of hypertonic solutions with higher solute concentration, what happens to plant cells?
- They become turgid
 - Water moves into the cells
 - Water moves out of the cells
 - The cells remain unchanged
48. What is the result of water loss from plant cells in hypertonic solutions?
- Increased cell turgidity
 - No change in cell turgidity
 - Decreased cell turgidity and wilting
 - Increased cell growth
49. In the case of hypotonic solutions with lower solute concentration, what happens to plant cells?
- They become turgid
 - Water moves into the cells
 - Water moves out of the cells
 - The cells remain unchanged

50. What is the result of water uptake by plant cells in hypotonic solutions?
- Decreased cell turgidity
 - No change in cell turgidity
 - Increased cell turgidity and swelling
 - Decreased cell growth
51. In isotonic solutions, what happens to the plant tissue's mass?
- It increases
 - It decreases
 - It remains relatively stable
 - It becomes turgid
52. What is the term for the process that requires energy to move particles across a membrane against a concentration gradient?
- Diffusion
 - Osmosis
 - Active transport
 - Passive transport
53. How do mineral ions get absorbed into plant root hairs, primarily?
- Through passive transport
 - By osmosis
 - Via active transport
 - By simple diffusion
54. From where does active transport derive the energy required for moving particles across a membrane?
- Photosynthesis
 - Cellular respiration
 - Photosystem II
 - Fermentation
55. What is the main source of energy for active transport processes?
- Sunlight
 - Fossil fuels
 - Food
 - Cellular respiration
56. How do plants acquire the ions they need for healthy growth?
- By excreting them from the leaves
 - Through passive transport
 - By active transport from the soil
 - By evaporating water
57. What happens in root hair cells when mineral ions are actively transported into them?
- Osmosis of water out of the cells
 - No change in water movement
 - Osmosis of water into the cells
 - Active transport of water into the cells
58. How do sugar molecules get absorbed in the gut when their concentration is lower than in the blood?
- Active transport
 - Osmosis
 - Diffusion
 - Passive transport

59. For what purpose are sugar molecules primarily used within cells?
- As structural components
 - For cell division
 - As an energy source in respiration
 - For photosynthesis
60. What processes transport substances into and out of cells, involving diffusion, osmosis, and active transport?
- Passive transport
 - Facilitated transport
 - Homeostasis
 - Active diffusion
61. How can you differentiate between diffusion, osmosis, and active transport?
- By their dependence on cellular respiration
 - By their reliance on photosynthesis
 - By their direction of particle movement
 - By their involvement of passive processes
62. What is the term for the passive movement of substances in and out of cells due to a concentration gradient?
- Osmosis
 - Active transport
 - Diffusion
 - Respiration
63. How can you define the process of diffusion?
- The active transport of molecules across a membrane
 - The movement of water from a higher solute concentration to a lower one
 - The passive movement of particles from an area of high concentration to low concentration
 - The process of cell division
64. Which of the following is an example of diffusion in biology?
- Pumping water into plant roots
 - Digesting food in the stomach
 - Oxygen moving from the lungs into the bloodstream
 - Active transport in root hairs
65. What factors can affect the rate of diffusion?
- Particle size and colour
 - Temperature and concentration gradient
 - Cellular respiration and photosynthesis
 - Osmosis and active transport
66. In terms of surface area to volume ratio, what's a characteristic of single-celled organisms?
- They have a small surface area to volume ratio
 - They have a large surface area to volume ratio
 - They have a balanced surface area to volume ratio
 - They have no surface area to volume ratio
67. Why is it important for cells to have a large surface area to volume ratio?
- It allows for greater cellular division
 - It increases cell size
 - It facilitates efficient exchange of substances with the environment
 - It conserves energy

68. Why are isotonic and high-energy drinks used in sports?
- To reduce the intake of fluids
 - To provide a quick source of energy
 - To dehydrate athletes
 - To increase body weight
69. In multicellular organisms, why is there a need for exchange surfaces and transport systems?
- To support cellular respiration
 - To enable cell division
 - To provide structural support
 - To facilitate the distribution of substances throughout the body
70. What are specialized characteristics of exchange surfaces in organisms?
- Small surface area and limited exposure
 - Low permeability and reduced surface area
 - Large surface area and thin, moist membranes
 - High rigidity and low surface area
71. Why is it important for exchange surfaces to have sufficient molecules transported into and out of cells?
- To maintain a constant internal temperature
 - To support cellular respiration and remove waste products
 - To generate energy for cell division
 - To enhance cell growth and differentiation
72. What is found in the nucleus of a cell and contains chromosomes made of DNA molecules?
- Ribosomes
 - Mitochondria
 - Endoplasmic reticulum
 - Chromosomes
73. What do chromosomes in a cell carry, which includes a large number of genetic instructions?
- Proteins
 - Genes
 - Carbohydrates
 - Lipids
74. In most cells, what is the typical arrangement of chromosomes?
- Single, unpaired chromosomes
 - Multiple, dispersed chromosomes
 - Chromosomes found in threes
 - Chromosomes normally found in pairs
75. How can models and analogies be used to explain the process of cell division?
- By demonstrating cellular respiration
 - By simulating protein synthesis
 - By showing the movement of mitochondria
 - By aiding in the understanding of complex processes
76. Why is cell differentiation important in multicellular organisms?
- To increase the number of cells
 - To make all cells identical
 - To reduce the need for cell division
 - To allow cells to carry out specific functions

77. When do most types of animal cells primarily undergo differentiation?
- In the later stages of life
 - During the reproductive phase
 - At an early age
 - In response to injury
78. In many types of plant cells, what is unique regarding their ability to differentiate?
- They never differentiate
 - They differentiate only during reproduction
 - They can differentiate throughout their entire lifespan
 - They differentiate into animal cells
79. In mature animals, when is cell division predominantly limited to?
- Creating new organisms
 - Aiding in digestion
 - Repairing and replacing cells
 - Facilitating photosynthesis
80. As a cell undergoes differentiation, what happens to the number of sub-cellular structures it acquires?
- It remains the same
 - It decreases
 - It becomes identical to other cells
 - It increases to carry out specific functions
81. What is the term for a cell that has the potential to develop into various specialized cell types?
- Tissue cell
 - Embryonic cell
 - Stem cell
 - Skin cell
82. What is the primary function of stem cells in organisms?
- To carry out photosynthesis
 - To maintain the cell's shape
 - To transport oxygen
 - To differentiate into various cell types
83. Stem cells from human embryos have the ability to:
- Only differentiate into muscle cells
 - Reproduce asexually
 - Clone themselves
 - Differentiate into most types of human cells
84. In plants, which tissue has the capability to differentiate into any type of plant cell?
- Root tissue
 - Leaf tissue
 - Meristem tissue
 - Stem tissue
85. Why are stem cells from adult bone marrow restricted in terms of the types of cells they can specialize into?
- They are not actually stem cells
 - They have no differentiation potential
 - They are affected by gravity
 - They have limited differentiation capabilities due to their specialization

86. What can you do when it comes to stem cells for medical requirements?
- Create new stem cells from scratch
 - Describe different treatment options
 - Only use them for research purposes
 - Sell them on the market
87. What is the result of therapeutic cloning when the cloned embryo has the same genes as the parent?
- It leads to the development of a new species
 - The cloned embryo has entirely different genes
 - It has the same genes as the parent
 - It only happens in animals, not humans
88. When cells are not genetically the same as the patient's, what can be the consequence?
- They are readily accepted by the patient's body
 - The patient becomes healthier
 - Rejection by the patient's body, potentially making them ill
 - No effect on the patient's health
89. What is a critical aspect of evaluating the risks associated with stem cell treatments?
- Ignoring any potential risks
 - Assessing only the short-term risks
 - Evaluating the risks carefully
 - Assuming there are no risks involved
90. In plants, what are stem cells used for?
- Creating energy for photosynthesis
 - Producing plant clones
 - Preventing diseases
 - Absorbing water from the soil
91. What are some of the benefits of growing plants from meristem cells?
- Producing genetically identical plants
 - Creating a wide genetic diversity
 - Increasing disease resistance
 - Reducing the need for photosynthesis
92. When evaluating the practical risks and benefits of using stem cells in medical research and treatments, what else should be considered?
- The colour of the stem cells
 - Only the immediate benefits
 - Social and ethical issues
 - Ignoring the potential risks

Marksheet – Fill in your answers using this grid:

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Feedback and Review

Reviewing and providing feedback on your GCSE biology questions is an important part of the learning process. Here's a list of tasks to help you effectively review and learn from the content you didn't know:

Identify Weak Areas: Go through the questions you answered and identify the specific topics or concepts you struggled with.

Revisit the Questions: Re-read the questions you answered incorrectly to understand the context and what was expected in your response.

Consult Textbooks and Notes: Refer to your GCSE biology textbooks, revision guides and class work to find information related to the topics you found challenging.

Online Resources: Use online resources and educational websites, videos, or articles to gain a deeper understanding of the topics you struggled with. Ask if you are unsure which to use.

Create a Summary: Summarize the key points for each topic or concept in your own words. This will help reinforce your understanding.

Practice Problems: Look for additional practice questions or worksheets related to the weak areas you identified and attempt them.

Flashcards: Create flashcards for important terms, definitions, and concepts. Use them for quick and effective review.

Mind Maps: Create visual mind maps or concept maps to connect related ideas and concepts. This can help you see the bigger picture.

Teach Someone Else: Explaining what you've learned to a friend or family member can be an effective way to reinforce your understanding.

Use the summary box below to annotate the ideas and information that you must use to provide your own feedback on what you are going to do next to develop and enhance your learning of this content:

Golden Knowledge Multiple Choice Question sheet: Topic 1: Cell Biology (TRILOGY COURSE)**Answers**

1	b) The clarity of the image and its ability to reveal fine details
2	c) By enhancing visualization and increasing detail
3	d) The ability to make an object appear larger than its actual size
4	d) By providing high-resolution images that reveal fine details
5	c) Electron microscopes have higher resolution and resolving power
6	c) Providing structural support
7	d) Making informed judgments based on visual information
8	b) Chloroplast
9	c) Extracting meaningful scientific information from the image
10	c) Observing and correctly identifying different types of cells
11	c) They allow for more accurate estimations based on provided visuals
12	c) Accurately representing observed cell structures
13	d) Chloroplast
14	c) Bacteria are unicellular and much smaller
15	b) Magnification variation
16	c) Understanding the unique features of prokaryotes
17	a) Eukaryotic cells are generally larger than bacterial cells
18	c) The structure of animal cells is closely related to their specific functions.
19	c) The structure of plant cells is closely linked to their diverse functions.
20	b) Transporting water and minerals from roots to other plant parts
21	d) They form tubes for the transport of sugars and nutrients
22	b) Water absorption and nutrient uptake
23	c) They contain chloroplasts for photosynthesis
24	The correct order is: 2, 1, 5, 4, 6, 7, 3
25	c) Diffusion
26	c) Diffusion
27	b) Glucose moving from the blood into cells
28	b) Temperature and concentration gradient can increase the rate.
29	c) To facilitate efficient exchange of substances with the environment
30	c) To allow for maximum exchange of substances with the surroundings
31	c) To provide energy and replace lost fluids during physical activity
32	c) To facilitate the exchange of gases, nutrients, and waste products
33	d) To facilitate efficient exchange of substances
34	c) By having thin, moist, and selectively permeable features
35	c) To meet the metabolic needs of the cell
36	c) Via osmosis
37	c) Osmosis
38	c) Dilute
39	b) Concentrated
40	a) A selectively permeable membrane
41	b) Osmosis
42	a) The movement of water from an area of high solute concentration to low solute concentration
43	c) Dilute
44	a) Concentrated
45	b) A semi-permeable membrane
46	b) Osmosis
47	c) Water moves out of the cells

48	c) Decreased cell turgidity and wilting
49	b) Water moves into the cells
50	c) Increased cell turgidity and swelling
51	c) It remains relatively stable
52	c) Active transport
53	c) Via active transport
54	b) Cellular respiration
55	d) Cellular respiration
56	c) By active transport from the soil
57	c) Osmosis of water into the cells
58	a) Active transport
59	c) As an energy source in respiration
60	a) Passive transport
61	c) By their direction of particle movement
62	c) Diffusion
63	c) The passive movement of particles from an area of high concentration to low concentration
64	c) Oxygen moving from the lungs into the bloodstream
65	b) Temperature and concentration gradient
66	b) They have a large surface area to volume ratio
67	c) It facilitates efficient exchange of substances with the environment
68	b) To provide a quick source of energy
69	d) To facilitate the distribution of substances throughout the body
70	c) Large surface area and thin, moist membranes
71	b) To support cellular respiration and remove waste products
72	d) Chromosomes
73	b) Genes
74	d) Chromosomes normally found in pairs
75	d) By aiding in the understanding of complex processes
76	d) To allow cells to carry out specific functions
77	c) At an early age
78	c) They can differentiate throughout their entire lifespan
79	c) Repairing and replacing cells
80	d) It increases to carry out specific functions
81	c) Stem cell
82	d) To differentiate into various cell types
83	d) Differentiate into most types of human cells
84	c) Meristem tissue
85	d) They have limited differentiation capabilities due to their specialization
86	b) Describe different treatment options
87	c) It has the same genes as the parent
88	c) Rejection by the patient's body, potentially making them ill
89	c) Evaluating the risks carefully
90	b) Producing plant clones
91	a) Producing genetically identical plants
92	c) Social and ethical issues