



南洋女子中學校
NANYANG GIRLS' HIGH SCHOOL

End-of-Year Examination 2019
Secondary Three
IP BIOLOGY

Answers with Explanation

PAPER 1 [30 Marks]

MCQ	Answer	Explanation
1	C	Cells are at larger magnification, at higher power. Therefore fine adjustment knob is used to focus.
2	C	Bacteria are prokaryotic cells (2). Prokaryotes do not have a nucleus, their chromosome is suspended in cytoplasm not bound by a membrane (5). Not 1, 3, 4 as these characteristics can be found in prokaryotes & eukaryotes.
3	C	Our bodies cannot store amino acids. They have to be deaminated in the liver and the products excreted by the kidneys.
4	B	Results of food test for each tube: X: has reducing sugar, proteins and fats Y: has reducing sugar and starch Z: has proteins and starch
5	B	1 is phospholipid 2 is glycoprotein; when the carbohydrates are hydrolysed it will produce simple sugars
6	B	Concept on what is the structure and function of DNA. C will always base pair with G so the ratio of C: G will always be the same. Nucleotide is made of the same components whether in human or insect For DNA, the pentose sugar is always deoxyribose sugar. The sequences of nucleotides are different resulting in different proteins being formed thus giving us different characteristics.
7	C	By definition. The artery that branches off from the aorta to serve the liver would be an artery. The vena cava transports blood back to the heart; the blood vessel that transports blood away from the liver and empties the blood eventually into the vena cava would be a vein.

8	A	S, the colon absorbs water and mineral salts. If it is shorter, absorption of water and mineral salts will decrease.
9	A	Effects of alcohol.
10	A	X has a higher blood glucose concentration than Y. He has diabetes mellitus. Thus he produces less insulin resulting in a longer time for the rise in blood glucose to return to the norm. It takes a while for the glucose concentration to rise due to time needed for digestion and absorption.
11	C	Temperature and light intensity are not tested in this experiment, so we cannot tell if they are limiting factors. The data (graph) has not plateaued hence increasing mass of sodium carbonate can still increase rate of photosynthesis.
12	B	As carbon dioxide concentration increases, the rate of photosynthesis increases. So carbon dioxide concentration is the limiting factor at X. At 30 units of light intensity, the rate of photosynthesis increases. Hence in Y the rate of photosynthesis is limited by light intensity.
13	C	Carbon dioxide and light intensity increases rate of photosynthesis until they are no longer limiting factors. The graph will plateau as photosynthesis continues at the maximum rate and will not dip down as shown in the graph. Photosynthesis is an enzyme-catalysed reaction. So temperature and pH will affect the rate of the reaction as these factors affect the activities of the enzymes. If the factor is temperature, beyond the optimum temperature, the rate of photosynthesis decreases rapidly. Hence the graph would not be symmetrical.
14	C	Goblet cells (mucus secreting cells) and ciliated cells are found in the trachea and bronchus.
15	A	Inhalation increases thoracic volume. Contraction of the external intercostal muscles rises ribcage upwards and outwards. Diaphragm contracts and flattens.
16	B	No of breaths = 11 Volume of each breath = 1 dm^3 Only 4% of oxygen is absorbed. Vol of oxygen absorbed = $11 \times 4\% \times 1$ = 0.44 dm^3
17	A	Water will move from cells of less negative water potential to cells of more negative water potential. (-110 kPa is less negative than -200 kPa and -340 kPa) and (-200 kPa is less negative than -340 kPa). kPa : kiloPascals

18	D	The block with the highest surface area to volume ratio will absorb the stain the fastest. To solve this question, you may need to calculate the surface area to volume ratio for each block.
19	A	A is the sieve tube cell, which carries food substances (this can be deduced by presence of sieve plates). Aphids will insert their mouthparts into the phloem to feed on the sap. Not B (companion cell), C (cambium), D (xylem).
20	D	Transpiration occurs fastest at higher temperatures, and in sunlight. Transport of mineral ions is in the xylem. One of the mechanisms by which water is drawn up the xylem is transpiration pull.
21	B	Radioactive carbon dioxide is taken into leaves and used for photosynthesis, to make radioactive sugar. Radioactive sugar enters the phloem and reaches the root. A shows the position of ROOT xylem. B shows ROOT phloem. C shows STEM phloem. D shows STEM xylem.
22	B	R is xylem, S is phloem and T is mesophyll (photosynthetic) tissue. However, phloem transports SUCROSE, not glucose. Glucose made from photosynthesis must first be converted into sucrose before it is transported.
23	C	The adaptations shown are for conserving water / reducing transpiration. This implies the habitat is either very windy and / or dry. Amongst the habitats listed, rainforest, mangroves and pond are moist habitats. Coastal areas are windy, and sandy ground material does not retain much moisture.
24	A	Placing suberin in the cell wall in a strip makes the cell wall impermeable to water, forcing water into the cell. Therefore, the suberin material must be laid down perpendicular to the direction of water flow. B, C: water will move through the gaps in the suberin strips D: although D incorporates the correct pattern in A, there is extra material laid down, which serves no purpose. Plant cells are not likely to waste materials and energy to make a cross pattern.
25	D	Damaged tissues and platelets produce thrombokinase (P), which is used to convert prothrombin (Q) to thrombin (R), in the presence of calcium ions. Thrombin then converts fibrinogen (S) to fibrin (T). Fibrin threads form a mesh which trap blood cells, forming a clot.
26	C	Glucose should leave the blood, enter the tissue fluid, before diffusing into the liver cells. Insulin will also leave the blood, and cause liver cells to take in glucose.
27	D	D represents blood pressure in the veins. The diagram, showing a valve, indicates that the blood vessel is a vein. Not A (aorta), B (artery), or C (capillary)
28	D	(1) Rupture of the plaque creates damaged tissue, which produce thrombokinase, etc etc. A clot might form at the site of rupture. (4) The presence of the fatty plaque narrows the lumen and reduces blood flow. (3) Reduced blood flow to brain cells may result in a stroke. Not (2) as the blood vessel is not located in the heart, nor is it a coronary artery.
29	B	A quick calculation shows the blood pressure is high at 180/80, and the heart rate is high ($60/0.4 = 120$ bpm). This implies some kind of strenuous activity was occurring. Therefore, the best choices are climbing stairs and running.

30	C	Bacterial protein (antigen) is found in tuberculin. The infected patient who has tuberculosis, produces antibodies against the bacteria. When tuberculin is injected into the patient, the antibodies recognise and bind to the protein (antigen) in tuberculin. This results in the skin reaction seen.
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