

**Unit Code:** H422/03

**Qual Name:** A level Biology B

**Qual Title:** Practical skills in biology

Question Set	Q. No	Total Marks	AO	Spec Ref.	Topic	Question Subject, If required	Additional Notes/Comments
1	Q1a	2	AO2	3.1.2gii, 1.1.3dii	The developing individual: meiosis, growth and development	This question is about measuring fetal development and interpreting growth charts.	Calculating growth rates from fetal charts. Maths skills M3.6
1	Q1b	1	AO1	3.1.2gii, 1.1.3d	The developing individual: meiosis, growth and development	This question is about measuring fetal development and interpreting growth charts.	Interpreting growth charts
1	Q1c	2	AO3	3.1.2h, 1.1.4c	The developing individual: meiosis, growth and development	This question is about measuring fetal development and interpreting growth charts.	Using ultrasound to take measurements
2	Q2a*	9	AO1 and 2	1.1.1a, 1.1.1b, 4.4.1dii	Practical skills/Plant reproduction	This question is about germination of seeds.	This is a 9 mark LoR planning investigation into effect of gibberellic acid concentration on germination
2	Q2b	4	AO1 and 2	1.1.2a, 1.1.2b, 1.1.2c	Practical skills/Plant reproduction	This question is about germination of seeds.	Germinating seeds. Recording results. Note: change in scale of figure may affect mark scheme
3	Q3ai	1	AO1	1.1.1c, 4.1.1gii	Practical skills / Cellular respiration	This practical skills question is about respirometer investigations, use of data loggers and statistical analysis.	Using respirometer and data-logging in metabolic rate investigation (fish)
3	Q3aii	2	AO2	1.1.1b, 4.1.1gi	Practical skills / Cellular respiration	This practical skills question is about respirometer investigations, use of data loggers and statistical analysis.	Using respirometer and data-logging in metabolic rate investigation (fish), understanding control variables
3	Q3aiii	1	AO2	1.1.1.4d, 4.1.1gi	Practical skills / Cellular respiration	This practical skills question is about respirometer investigations, use of data loggers and statistical analysis.	Using respirometer and data-logging in metabolic rate investigation (fish)
3	Q3bi	1	AO2	1.1.3a, 4.1.1gii	Practical skills / Cellular respiration	This practical skills question is about respirometer investigations, use of data loggers and statistical analysis.	Null hypothesis in practicals
3	Q3bii	1	AO2	1.1.3b, 4.1.1gii	Practical skills / Cellular respiration	This practical skills question is about respirometer investigations, use of data loggers and statistical analysis.	Calculating variance
3	Q3biii	3	AO2	1.1.3a, 4.1.1gii	Practical skills / Cellular respiration	This practical skills question is about respirometer investigations, use of data loggers and statistical analysis.	Calculating t value. Maths skills M1.9.
3	Q3biv	3	AO3	1.1.3a, 4.1.1gii	Practical skills / Cellular respiration	This practical skills question is about respirometer investigations, use of data loggers and statistical analysis.	Data analysis from calculated t value. Maths skills M1.9

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3	Q3c	2	AO3	1.1.1a	Practical skills	This practical skills question is about respirometer investigations, use of data loggers and statistical analysis.	Limitations of laboratory investigations
4	Q1ai	2	AO2	1.1.3a, 5.2.3bii	The effect of ageing on the nervous system	This question is about investigations into effects of ageing on reaction times and data analysis using statistics	Use secondary data from reaction rate practical to calculate median and mean. Maths skills M1.2, M1.10
4	Q1aaii	2	AO3	1.1.3b, 5.2.3bii	The effect of ageing on the nervous system	This question is about investigations into effects of ageing on reaction times and data analysis using statistics	Usefulness of data in analysis. Maths skills M1.2
4	Q1aiii	1	AO3	1.1.3b, 5.2.3bii	The effect of ageing on the nervous system	This question is about investigations into effects of ageing on reaction times and data analysis using statistics	Limitations of data. Maths skills M1.10
4	Q1b	2	AO3	1.1.4c, 5.2.3bii	The effect of ageing on the nervous system	This question is about investigations into effects of ageing on reaction times and data analysis using statistics	Understanding t test
4	Q1c*	6	AO3	1.1.4c, 5.2.3bii	The effect of ageing on the nervous system	This question is about investigations into effects of ageing on reaction times and data analysis using statistics	LoR question about the ethics of laboratory investigations and the effect of drugs on reaction times
5	Q1a	2	AO2	1.1.3b, 3.3.1a	The cellular basis of cancer and treatment	This question is about diseases of respiratory system and link with smoking. There is also link to antibiotics and Kirby-Bauer testing.	Smoking and respiratory infections. Using data for percentage calculation. Maths skills assessed M0.2, M0.3
5	Q1bi	3	AO2 AO3	1.1.4a, 3.3.1a	The cellular basis of cancer and treatment	This question is about diseases of respiratory system and link with smoking. There is also link to antibiotics and Kirby-Bauer testing.	Smoking and respiratory infections
5	Q1bii	1	AO3	1.1.3b	Practical skills	This question is about diseases of respiratory system and link with smoking. There is also link to antibiotics and Kirby-Bauer testing.	Statistical tests. Maths skills M1.9
5	Q1biii	1	AO3	1.1.3b	Practical skills	This question is about diseases of respiratory system and link with smoking. There is also link to antibiotics and Kirby-Bauer testing.	Statistical tests. Maths skills M1.10
5	Q1c	1	AO3	1.2.1a, 1.1.4a, 3.3.2a	Respiratory diseases and treatment	This question is about diseases of respiratory system and link with smoking. There is also link to antibiotics and Kirby-Bauer testing.	Components of respiratory system involved in primary defence
5	Q1d	4	AO1	1.1.3a, 2.2.3aai	Gas exchange in mammals and plants	This question is about diseases of respiratory system and link with smoking. There is also link to antibiotics and Kirby-Bauer testing.	Serial dilutions

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5	Q1e	3	AO1 AO2	1.1.4a, 1.1.2a	Practical skills	This question is about diseases of respiratory system and link with smoking. There is also link to antibiotics and Kirby-Bauer testing.	Analysis of Kirby-Bauer tests
6	1a	1	AO1	4.3.1h	Photosynthesis, food production and management of the environment	This question is about crops and nitrogen fixation including bacteria, Rhizobium. There is a link to gene technologies and RNA interference.	Crops and nitrogen-fixation
6	1bi	1	AO1	1.1.1a, 4.3.1hii	Photosynthesis, food production and management of the environment	This question is about crops and nitrogen fixation including bacteria, Rhizobium. There is a link to gene technologies and RNA interference.	Nitrogen-fixing bacteria
6	1bii*	6	AO1 AO2	1.1.1a, 1.1.1b, 1.1.2a, 1.1.2c, 1.2.2i, 4.3.1hii	Photosynthesis, food production and management of the environment	This question is about crops and nitrogen fixation including bacteria, Rhizobium. There is a link to gene technologies and RNA interference.	LoR about preparing bacterial cultures
6	1biii	2	AO2	1.1.1a, 1.1.1b, 1.1.2a, 1.1.2c, 1.2.2i, 4.3.1hii	Photosynthesis, food production and management of the environment	This question is about crops and nitrogen fixation including bacteria, Rhizobium. There is a link to gene technologies and RNA interference.	Laboratory conditions for bacteria
6	1ci	3	AO2	1.1.3a	Practical skills	This question is about crops and nitrogen fixation including bacteria, Rhizobium. There is a link to gene technologies and RNA interference.	Gene technologies. Calculation from data. Maths skills M0.3
6	1cii	3	AO1 AO2	2.1.4g, 5.1.3h	Gene technologies	This question is about crops and nitrogen fixation including bacteria, Rhizobium. There is a link to gene technologies and RNA interference.	Gene technologies and RNA
6	1ciii	1	AO2	5.1.3h	Gene technologies	This question is about crops and nitrogen fixation including bacteria, Rhizobium. There is a link to gene technologies and RNA interference.	Gene technologies and RNA
7	1ai	1	AO2	1.1.2a, 1.2.2b	Practical skills / Cells and microscopy	This question is about investigating rates of diffusion and use of a colorimeter.	Effect of temperature on rate of diffusion
7	1aai	1	AO3	2.1.1k, 2.1.1l, 2.1.1n	Practical skills / Cells and microscopy	This question is about investigating rates of diffusion and use of a colorimeter.	Effect of temperature on rate of diffusion and colorimeter
7	1b	1	AO3	1.1.3a, 1.1.4b	Practical skills / Cells and microscopy	This question is about investigating rates of diffusion and use of a colorimeter.	Identifying anomalies in data. Maths skills M0.4
7	1c	6	AO3	1.1.1b, 2.1.1m	Practical skills / Cells and microscopy	This question is about investigating rates of diffusion and use of a colorimeter.	Effect of temperature on rate of diffusion-control variables
7	1di	1	AO2	1.1.3a, 2.1.1m	Practical skills / Cells and microscopy	This question is about investigating rates of diffusion and use of a colorimeter.	Calculation from graph. Maths skills M1.3

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7	1dii	2	AO2 AO3	1.1.4a, 2.1.1i, 2.1.1m	Practical skills / Cells and microscopy	This question is about investigating rates of diffusion and use of a colorimeter.	Analysis of colorimeter data
7	1diii	2	AO2	1.1.3dii, 1.2.1f, 2.1.1m	Practical skills / Cells and microscopy	This question is about investigating rates of diffusion and use of a colorimeter.	Analysis of colorimeter data including use of log graph. Maths skills M0.4, M0.5
8	1ai	1	AO1	1.1.3a, 2.2.2bii,	Transport systems in mammals	This question is about structure and function of blood vessels and tissue fluid formation.	Structure of arteries as seen in micrographs TS
8	1aii	1	AO1	2.2.2bi	Transport systems in mammals	This question is about structure and function of blood vessels and tissue fluid formation.	Structure and function of artery
8	1bi	2	AO2	1.1.2c, 1.1.3b, 1.1.3c, 2.1.1d, 2.2.2bii	Cells and microscopy / Transport systems in mammals	This question is about structure and function of blood vessels and tissue fluid formation.	Calculation and manipulation of magnification formula. Maths skill M1.8. Note: change in scale of figure may affect mark scheme.
8	1bii	2	AO2	1.1.3a, 1.1.3b, 2.2.2bi, 2.1.1d	Cells and microscopy / Transport systems in mammals	This question is about structure and function of blood vessels and tissue fluid formation.	Calculation and manipulation of magnification formula. Maths skill M1.8, M0.2. Note: change in scale of figure may affect mark scheme
8	1c	2	AO3 AO2	1.1.3a, 1.1.4a, 2.2.2c, 2.2.2e	Transport systems in mammals	This question is about structure and function of blood vessels and tissue fluid formation.	Structure and function of artery
8	1di	1	AO2	2.2.2c	Transport systems in mammals	This question is about structure and function of blood vessels and tissue fluid formation.	Formation of tissue fluid
8	1dii	4	AO1	2.2.2a, 2.2.2c	Transport systems in mammals	This question is about structure and function of blood vessels and tissue fluid formation.	Formation of tissue fluid. Gap fill style question
9	1ai	2	AO2	1.1.4d, 3.2.2f	The immune system	This question is about immune response and testing for disease in the context of TB, including Spearman's rank	Mantoux test for TB. Understanding of % error required. Maths skill M1.11
9	1aii	2	AO3	1.1.4e, 3.2.2f	The immune system	This question is about immune response and testing for disease in the context of TB, including Spearman's rank	Mantoux test for TB and improvement to methodology
9	1b*	6	AO3	1.1.4a, 1.1.4c, 1.1.4d, 3.2.2f	The immune system	This question is about immune response and testing for disease in the context of TB, including Spearman's rank	LoR evaluating methodologies for TB testing using data
9	1ci	3	AO2	1.1.3b	Practical skills	This question is about immune response and testing for disease in the context of TB, including Spearman's rank	Calculating spearman's rank using data. Maths skill M1.9
9	1cii	3	AO2	1.1.4	Practical skills	This question is about immune response and testing for disease in the context of TB, including Spearman's rank	Conclusions from data. Maths skill M1.9. Comment on null hypothesis
10	1a	2	AO3	1.1.2c, 1.2.1d, 2.2.1bii	Practical skills / The heart and monitoring heart function	This question is about the heart and blood vessels. In particular drawing skills associated with dissection and observing micrographs.	Heart dissection and student drawings

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10	1b	4	AO3	1.1.2c, 1.2.1d, 1.2.2e, 2.2.1bi, 2.2.1bii	Practical skills / The heart and monitoring heart function	This question is about the heart and blood vessels. In particular drawing skills associated with dissection and observing micrographs.	Observing and drawing arteries from micrograph
11	1a	1	AO1	3.3.1b	The cellular basis of cancer and treatment	This question is about development of tumours and methods for detecting cancer. This is linked to scenario of infertility treatments for cancer patients.	Cell division in tumour development
11	1b	5	AO1 AO2	3.3.1f	The cellular basis of cancer and treatment	This question is about development of tumours and methods for detecting cancer. This is linked to scenario of infertility treatments for cancer patients.	Methods for detecting cancer
11	1ci	1	AO2	1.1.3b, 4.2.1i, 4.2.1j	Fertility and assisted reproduction	This question is about development of tumours and methods for detecting cancer. This is linked to scenario of infertility treatments for cancer patients.	Data analysis of infertility treatments for cancer patients. Knowledge of developing null hypotheses required
11	1cii	1	AO2	1.1.3b, 4.2.1i, 4.2.1j	Fertility and assisted reproduction	This question is about development of tumours and methods for detecting cancer. This is linked to scenario of infertility treatments for cancer patients.	Data analysis of infertility treatments for cancer patients. Maths skills M1.9. Calculating variance from data
11	1ciii	3	AO2	1.1.3b, 4.2.1i, 4.2.1j	Fertility and assisted reproduction	This question is about development of tumours and methods for detecting cancer. This is linked to scenario of infertility treatments for cancer patients.	Data analysis of infertility treatments for cancer patients. Maths skills M1.9. Calculating t- value from data
11	1civ	3	AO3	1.1.3b, 4.2.1i, 4.2.1j	Fertility and assisted reproduction	This question is about development of tumours and methods for detecting cancer. This is linked to scenario of infertility treatments for cancer patients.	Data analysis of infertility treatments for cancer patients. Maths skills M1.9. Use of probability tables
11	1d	4	AO3	1.1.4a, 4.2.1j	Fertility and assisted reproduction	This question is about development of tumours and methods for detecting cancer. This is linked to scenario of infertility treatments for cancer patients.	Ethical issues associated with IVF
12	1a	1	AO3	1.1.1c, 2.1.2cii	Water and its importance in plants and animals	This question is about composition of body fluids and tests for biochemicals.	Methods for testing glucose concentration in body fluids
12	1b*	6	AO1 AO2	1.1.1a, 1.1.1b, 1.1.2a, 1.2.1a, 2.1.2ci, 2.1.2cii	Water and its importance in plants and animals	This question is about composition of body fluids and tests for biochemicals.	LoR question about Methods for testing glucose concentration in body fluids
12	1c	3	AO3	1.1.4a, 1.1.4b, 1.1.4c, 1.1.4d, 2.1.2cii	Water and its importance in plants and animals	This question is about composition of body fluids and tests for biochemicals.	Evaluating practical methodology. Gap fill style question

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12	1di	4	AO2	1.1.3di, 5.3.3ci, 5.3.3ci	Practical skills / Kidney functions and malfunctions	This question is about composition of body fluids and tests for biochemicals.	Body fluids. Using data to plot graph Maths skills M1.3
12	1dii	1	AO3	5.3.2d	The hormonal control of blood glucose and the management of diabetes	This question is about composition of body fluids and tests for biochemicals.	Body fluids. Conclusion from data
13	1ai	1	AO1	1.1.3a, 3.1.1d	The developing cell: cell division and cell differentiation	This question is about cell structure, plant tissues and classification.	Apoptosis
13	1aai	1	AO2	1.1.3a, 1.2.2d, 2.2.4ci, 3.1.1d	The developing cell: cell division and cell differentiation / Transport systems in plants	This question is about cell structure, plant tissues and classification.	Plant tissue types
13	1b	1	AO2	1.1.3a, 2.2.4b, 3.1.1d	The developing cell: cell division and cell differentiation / Transport systems in plants	This question is about cell structure, plant tissues and classification.	Root structure and function. Needed in colour.
13	1c	2	AO2	1.1.3b, 1.1.3c,	Practical skills	This question is about cell structure, plant tissues and classification.	Calculation from data. Maths skills M0.3, M1.1
13	1di	1	AO1	3.1.3a	The development of species: evolution and classification	This question is about cell structure, plant tissues and classification.	Taxonomy
13	1dii	4	AO1	2.1.1g	Cells and microscopy	This question is about cell structure, plant tissues and classification.	Structure of animal and plant cells
14	1a	5	AO2	1.1.3a, 4.2.1bii, 4.2.1e, 4.2.1f	Fertility and assisted reproduction	This question is about structure of female reproductive system and effect of ageing.	Structure and function of parts of ovary as seen on micrograph
14	1b*	6	AO3	1.1.3a, 1.1.4a, 4.2.2a, 4.2.1bi, 4.2.1.bii	The effects of ageing on the reproductive system / Fertility and assisted reproduction	This question is about structure of female reproductive system and effect of ageing.	LoR about the effect of ageing on female reproductive system