



EDX.MED14 The Role of Science, Technology and Communication in Medical Change

EDEXCEL 1HI0 · Calculators not allowed · about 65 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Write in full sentences for Questions 13, 14 and 15. You are advised to spend about 65 minutes on this pack.

- 1** Give the name of the fifteenth-century invention that greatly increased the speed at which medical books could be copied and distributed.

(Total for Question 1 is 1 mark)

- 2** Name the sixteenth-century anatomist whose detailed printed illustrations challenged Galenic anatomy.

(Total for Question 2 is 1 mark)

- 3** State two ways in which printed medical books helped Renaissance physicians.

(Total for Question 3 is 2 marks)

- 4** Give the name of the seventeenth-century device that magnified small objects and became important for observing microbes.

(Total for Question 4 is 1 mark)

- 5** Name the learned society founded in the seventeenth century that promoted the exchange of scientific and medical knowledge.

(Total for Question 5 is 2 marks)

- 6** Give one modern imaging technology that uses electromagnetic radiation to create internal body images.

(Total for Question 6 is 1 mark)

- 7** State one way in which MRI scanning differs from X-rays in medical use.

(Total for Question 7 is 2 marks)

- 8** Name the twentieth-century project that used DNA sequencing to map the entire set of human genes and which transformed biomedical research.

(Total for Question 8 is 1 mark)

- 9** State two ways in which DNA sequencing has affected medical practice and research.

(Total for Question 9 is 2 marks)

- 10** Give the name of the seventeenth-century observer who used early microscopes to describe tiny organisms and is often cited for early microbial observation.

(Total for Question 10 is 1 mark)

- 11** State two roles the Royal Society and its journal Philosophical Transactions played in the development of medical science.

(Total for Question 11 is 2 marks)

- 12** Give the name of a modern imaging technique that can show metabolic activity in the body rather than just structure.

(Total for Question 12 is 1 mark)

- 13** Explain one way in which the invention of the printing press and the development of DNA sequencing were similar in their effects on medical knowledge.

(Total for Question 13 is 4 marks)

14 Explain why advances in technology have been important for medical change across c1250-present.

You may use the following in your answer:

- the printing press and the spread of anatomical knowledge in the Renaissance
- microscopes and the ability to observe microbes in the seventeenth century

You must also use information of your own.

(Total for Question 14 is 12 marks)

15 'Communication networks were as important as new technologies in producing medical change.' How far do you agree? Explain your answer.

You may use the following in your answer:

- the printing press and learned journals as channels for sharing discoveries
- modern digital communication, databases and international collaboration in projects such as the Human Genome Project

You must also use information of your own.

(Total for Question 15 is 16 marks)

Mark scheme · EDX.MED14 The Role of Science, Technology and Communication in Medical Change

Question 1

- **B1** the printing press
- **Answer: The printing press**

Question 2

- **B1** Andreas Vesalius
- **Answer: Andreas Vesalius**

Question 3

- **B1** made accurate illustrations and anatomical descriptions widely available
- **B1** allowed knowledge to spread faster between universities and cities
- **Answer: They made accurate illustrations and anatomical descriptions widely available, and allowed knowledge to spread faster between universities and cities.**

Question 4

- **B1** the microscope
- **Answer: The microscope**

Question 5

- **B1** the Royal Society
- **B1** founded in 1660
- **Answer: The Royal Society, founded in 1660.**

Question 6

- **B1** X-rays
- **Answer: X-rays**

Question 7

- **B1** identifies a difference, e.g. MRI uses magnetic fields rather than X-ray radiation
- **B1** supporting detail, e.g. MRI gives clearer images of soft tissue while X-rays are best for bones
- **Answer: MRI uses magnetic fields rather than X-ray radiation, and gives clearer images of soft tissue while X-rays are best for bones.**

Question 8

- **B1** the Human Genome Project
- **Answer: The Human Genome Project**

Question 9

- **B1** made it possible to identify genes linked to inherited diseases
- **B1** enabled personalised medicine and the development of targeted drugs
- **Answer: It has made it possible to identify genes linked to inherited diseases, and has enabled personalised medicine and the development of targeted drugs.**

Question 10

- **B1** Antony van Leeuwenhoek
- **Answer: Antony van Leeuwenhoek**

Question 11

- **B1** provided a forum for scientists and physicians to meet and present findings
- **B1** published reports and experiments so knowledge could be shared and scrutinised across Europe
- **Answer: It provided a forum for scientists and physicians to meet and present findings, and published reports and experiments so knowledge could be shared and scrutinised across Europe.**

Question 12

- **B1** PET scan
- **Answer: PET scan**

Question 13

- **B2** identifies a similarity and supports it with detail, for example both greatly increased how quickly and widely medical information could be shared and standardised, reducing local variation in knowledge
- **B2** further supporting detail, for example printing made identical anatomical diagrams available across Europe while DNA sequencing created shared genetic data banks used by researchers worldwide
- **Answer: Both greatly increased how quickly and widely medical information could be shared and standardised: the printing press let identical anatomical diagrams and texts circulate across Europe, while DNA sequencing created shared genetic data banks used by researchers worldwide, so each reduced local variation in medical knowledge by standardising and spreading it.**

Question 14

- **Level 1** (1-3): Identifies one or two simple reasons why technology mattered for medical change, with little or no supporting detail.
- **Level 2** (4-6): Describes and begins to explain one or more reasons, with some accurate supporting detail.
- **Level 3** (7-9): Explains several reasons why technological advances were important, supported by accurate and relevant detail that shows links between technology and medical change.
- **Level 4** (10-12): Provides a well-developed explanation of why technology was important across the period, with precise, well-selected evidence and clear analysis of the connections between technological change and developments in medical knowledge and practice.
- **Indicative content:**
 - Technology allowed new phenomena to be observed and measured that were previously invisible, for example the microscope made microbes observable and DNA sequencing made genes readable, each creating entirely new areas of medical knowledge.
 - Technologies enabled faster and wider dissemination of knowledge, for example the printing press spread Vesalius anatomical diagrams, and later journals and digital databases distributed images and sequence data rapidly between practitioners and researchers.
 - Technological advances often changed diagnostic and treatment capabilities directly, for example X-rays and MRI scanning improved diagnosis, and DNA sequencing enabled genetic testing and personalised medicine.
 - Technology shaped the organisation of medical research and practice, for example laboratories and imaging departments became central institutions, while learned societies and journals created channels for validating and sharing technical advances.
 - A strong answer links specific technologies to measurable changes in outcomes or practice, and recognises that technology required other factors, such as training and institutional support, to produce lasting medical change.

Question 15

- **Level 1** (1-4): Shows limited relevant knowledge and offers only a simple judgement about the statement, with little or no supporting evidence.
- **Level 2** (5-8): Uses some relevant knowledge to describe arguments for and against the statement, but the conclusion is limited and not fully supported.
- **Level 3** (9-12): Explains a range of relevant points for and against the statement, supported by accurate evidence, and reaches a supported judgement on how far communication networks were as important as technologies.
- **Level 4** (13-16): Gives a balanced, well-developed assessment of the relative importance of communication networks and technologies across the period, using well-selected evidence and clear analysis to reach a sustained judgement.
- **Indicative content:**
 - For: communication networks multiplied the impact of technologies by spreading discoveries quickly; the printing press turned Vesalius's single workshop into a pan-European challenge to Galenic anatomy, and journals and societies in the seventeenth century created early peer review and standards.
 - For: in the twentieth and twenty-first centuries digital networks and shared databases allowed large-scale collaborations, for example the Human Genome Project depended on international data sharing as well as on DNA sequencing machines.
 - Against: some technologies produced change independently by making new observation or treatment possible, for example the microscope revealed microbes that could not have been deduced from communication alone, and X-rays immediately changed diagnosis once the device existed.
 - Balanced: the most powerful medical change often required both a technology and effective communication to spread and validate it, for example a new imaging or sequencing technique needs journals, conferences and training so clinicians can adopt it safely.
 - Good answers weigh specific historical examples across centuries and conclude whether communication networks were equally important, more important, or less important than the technologies themselves, supported by analysis of causation and consequence.