PART ONE - WHILE LISTENING

Answer Key- All answers are worth one point with the exception of Question 5 and 9 where each answer =0.5. Total points =16

1. What was the definition of DNA given by Dr Roberts in her lecture?
   *The hereditary material passing on genetic information / the code that passes on our inherited traits*

2. Why does Dr Roberts reject the idea that we will be an exact copy of our parents?
   *Some of these traits are activated/turned on and some of these are not*

3. Why was Miescher not interested in DNA at first?
   *They believed proteins carried the hereditary material.*

4. What characteristics of amino acids made people believe that they were the hereditary material?
   *The number of ways that amino acids could be combined
   The number of the combinations of amino acids (explained the variety)*

5. Fill in the process:

   DNA - Carries the instructions To RNA

   RNA produces (1) a copy of DNA

   This process is known as (2) transcription

   Amino acids carry the instructions to make proteins

   (3) RNA code (is) translated into amino acids.

   Proteins are turned into (4) Muscle/hair

6. What explanation does the tutor give to the student for the confusion over Frederick Griffith’s experiment?
   *Re-examined by Avery*

7. What was the initial aim of Griffith’s research?
   *To develop a vaccine against a bacteria (responsible for a serious lung disease)*
8. What is the definition of strain given by Dr Roberts?

*an element or part (of the bacteria) which has clear physical characteristics from the other elements (in the bacteria.)*

*A (kind of) group that shares the same properties or characteristics.*

9. Fill in the table with the details of Griffith’s experiments:

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Strain(s) injected</th>
<th>Outcome for mice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R</td>
<td>Didn’t die</td>
</tr>
<tr>
<td>2</td>
<td>S</td>
<td>(a) Died</td>
</tr>
<tr>
<td>3</td>
<td>(b) heated S</td>
<td>(c) didn’t die</td>
</tr>
<tr>
<td>4</td>
<td>(d) Heated S + R</td>
<td>Died</td>
</tr>
</tbody>
</table>

10. What conclusion did Griffith finally reach to explain the reason for the death of the mice in the fourth experiment?

*Genetic material passed from (heated) S to R (strains)*

11. Give two reasons why Avery’s discovery was not recognized as groundbreaking:

(1) *Experiment used bacteria*

(2) *Released during World War II*

(3) *The Atom bomb was more important*

12. Why did Avery never receive the Nobel Prize for his work involving DNA?

*Died (before the importance of his work was understood)*
Tutor: In this context, our inherited characteristics from our parents or ancestors. OK, now I understand.

Tutor: Good. So OK some of these heritable traits in our DNA are turned on and become active while some of them might remain inactive or are never passed on. Just because the information is there in the DNA doesn't always mean that we will get all the traits that our parents have. Some of these traits are activated and some of them are not.

Student: Oh I see.

Tutor: Now coming back to your comment about how we all could look so different due to DNA, well, if we look at the history of the discovery of DNA scientists also had a real problem believing that this one molecule could be responsible for heredity. Did you find anything about this in your reading?

Student: Just a moment. Let me look at my notes. OK, yes. First of all, I think the substance DNA was discovered by Miescher in 1868.

Tutor: Good. Go on.

Student: He had gradually become interested in studying the chemistry of a cell's nucleus. To understand the chemistry he examined pus, a yellowish liquid found in open wounds and cuts and fish sperm and discovered that there was an acid material called deoxyribonucleic acid, now shortened to DNA, in the nucleus of cells. But neither Miescher or other biochemists paid that much attention to it because at that time they believed that it was proteins that carried the hereditary information. But I don't really understand why?

Tutor: Well, until the end of the 1940s or early 1950s this was a common belief among scientists. Proteins seemed to have the necessary properties to explain inheritance and the variety found in species on earth. Proteins have a combination of 20 different amino acids. Scientists thought that because of the number of ways that amino acids could be combined it seemed to explain inheritance and the variety of species. In other words it seemed logical to scientists that this could explain inheritance due to the variety of the various combinations of amino acids in proteins. Do you see now?

Student: Yes, now I remember they looked at the variety of species around us and the number of the combinations of amino acids seemed to explain this variety.

Tutor: Yes, so scientists could not even imagine that something as basic and simple as DNA could be the genetic material for a process that was so complicated. However now we know that proteins are at the end of the chain of production not the hereditary material. The DNA code carries a set of instructions to build protein. Did you find out how DNA makes protein?

Student: Yes. Turning DNA into protein is known as transcription and translation. Firstly DNA carries the instructions. An exact copy of the DNA is made by RNA DNA then carries the DNA's message. This part of the process is called transcription. Each code contains groups of three letters. Each of the three letters in the DNA relates to an amino acid. So, this code carries the instructions to make the protein. The RNA is then read and translated into an amino acid which in turn correlates to a protein. These proteins then become the muscle in our bodies or our hair and so on.

Tutor: An excellent explanation. Scientists however didn't actually begin to explore the structure of DNA until the 1940s or early 1950s due to their failure to believe that DNA was the genetic material of all living things. This issue was demonstrated in scientists' attitude towards the results of the experiments initially conducted by Frederick Griffith in 1928. Do you have any notes on this?

Student: Yes. But there was something I couldn't understand when researching this. In one text book it says that another researcher named Oswald Avery conducted this experiment in 1944 while in the other text book it says it was Frederick Griffith in 1928.

Tutor: OK. The original experiment was conducted by Griffith in 1928 but it was reexamined by Oswald Avery in 1944. That's why their names are accredited to the same experiment.

Student: Now I understand. OK. So in Griffith's experiment in 1928 he was trying to develop a vaccine against a bacteria, which scientist had discovered was responsible for a serious lung disease. He conducted 4 different experiments involving laboratory mice. Griffith took two different strains of the bacteria. What I want to check here is what strain means exactly? Is it a kind of part of the bacteria?
1. What did the earliest map produced in Catalhoyuk show?
   (Plan of) an urban area/ (positions of) streets and houses (of a town)

2. The purpose of the ancient maps showing local features was
to guide ancient people in (the activities of) daily life.

3. Maps from ancient Egypt helped Egyptians to __ restore / reestablish land boundaries ____ after the annual floods of the Nile.

4. Why weren’t the ancient world maps realistic?
   Any one of the following
   - Because the cartographers used their own views and philosophies about the world.
   - Early cartographer had very little knowledge of the world.
   - Early cartographers were severely limited by the lack of knowledge of the world.

5. Write TWO things that a cartographer needed to know in order to produce an accurate world map. (0.5 pt each; 1 point)
   Any two of the following (0.5 pt. each)
   - The shape of the Earth
   - The size of the Earth
   - (how to calculate) the distance between two points on the Earth’s surface

6. In what way did Greek philosophers like Aristotle contribute to produce an accurate world map?
   They claimed/ declared that the Earth was round / spherical.

7. Why is Ptolemy’s book “Geographia” important in the history of cartography?
   Any one of the following
   - It was used as a guidebook (by later cartographers)
   - Ptolemy’s maps / The maps (in the book) became models for later cartographers.
8. What was one flaw of Ptolemy’s maps?

Any one of the following

- He couldn’t calculate the size of the Earth correctly.
- He couldn’t work out how big the Earth was
- His world was much smaller (than its actual size.)

9. There wasn’t any development in cartography in the Middle Ages because

Any one of the following

- Maps were dominated by religious views
- Maps were strictly controlled by the church

10. How were later maps in the Middle Ages different from the earlier ones in the same period?

Any one of the following

- They were (highly) decorated with religious figures.
- There was no empty space on the map because of the decoration with religious figures.

11. In which ways did navigational charts help voyagers? Write TWO. (1 pt each; 2 points)

Any two of the following (1 pt. ea; 2 pts)

- for deciding the best times for sailing.
- for identifying places to stop during their journey.
- for determining where to seek refuge from pirates / for determining escape routes from pirate attacks.

12. What was the reason behind the increased interest in scientific and detailed world maps after the Middle Ages?

The discoveries of new lands

13. In the 17th and 18th centuries, world maps and navigational charts helped European countries to

Any one of the following

- colonise / conquer new lands.
- To develop strategic or tactical plans (before the ships set off) to conquer / colonise new lands.

14. Why were maps and charts protected so carefully in the past?

Any one of the following

- Because they were (potential) sources of information to the enemy.
- Because they were valuable information to the enemy.

15. The method of lead weighting was a very effective method in destroying the maps and navigational charts because

- Maps sank (to the bottom of the sea) very fast.
Lecture and Note-Taking - The History of Cartography

Hello everyone. The focus of today's lecture is the history of cartography, that is, the history of maps and map-making. Cartography is the scientific term for map-making. So, in this lecture, I will be talking about the development of maps and map-making throughout history. As you can see in your handouts, I will start with the maps in Ancient Times. Then I'll continue with the Middle Ages. Before we move onto the Renaissance era, I will give you information about a different type of maps that are called ocean maps or navigational charts. Finally, I will be focusing on the importance attached to maps and the way they were treated. So here we go. Ah, an important note - in this lecture I will be using the term 'cartography' for map-making and 'cartographer' for the person who produces maps.

So, let's start with the first maps in history, that is, the ancient times. Cartography dates back thousands of years. The oldest picture that resembles a map is the one discovered in Catalhoyuk in Anatolia. This map was created in the 7th millennium BCE, which means seven thousand years before the Christian Era, BCE. For short, this map is only 7000 years old, which means that the first maps were created some 7,000 years ago. Before we move on, let's try and understand what maps look like in this period. When we look at all other ancient maps, we notice that they have something in common. Yes, we see that they showed local details. By 'local features' I mean the features of the area belonging to the ancient civilizations. For example, in the Chinese old maps, the city of Beijing can be seen on the map. These maps were mostly used for military purposes. They were made in order to show the ancient people the path of the emperor. It meant, with the information provided in these maps, ancient people could quickly find their activities in their daily lives. For example, some maps in ancient Egypt showed land borders, or land boundaries. These maps were used for the ancient Egyptians. You see, the river Nile overflowed its banks every year, and flooded the land on both sides. Of course, this would affect the boundary of the land. And it was not the same as it was today. So, the ancient Egyptians were able to stabilize the floods in the flood plains and the new land formed. So, they had no choice but rely on their own resources. So, in order for the cartographers to create accurate maps of the world, they needed to learn these things: They had to learn about the shape of the Earth and most of all, they had to learn about the size of the Earth, and how to measure the distance between two points on the Earth's surface.

Now, at this point it is important to mention ancient Greeks, who played an important role in the development of cartography. In fact, it was the ancient Greeks who put forward theories about the shape of the Earth starting from ancient historical times through the ancient maps and cartography. They developed a great project called "Geographia," which covered the entire world. In other words, they were the first to create a map of the entire world. In the first century A.D., Ptolemy created maps that showed the Earth's surface. He divided the Earth into eight parts, and he also showed the distance between two points on the Earth's surface.

OK. That's enough of ancient times and Ptolemy. Let's move on to the Middle Ages. With the Middle Ages, a new era for cartography starts. This is the era of NO development in cartography. The era which started around the 11th century and lasted for almost a thousand years, until the 14th century A.D. Why was there no development in cartography during the Middle Ages? For one thing, as everything in the Middle Ages...
SKIMMING – ENVIRONMENTAL REQUIREMENTS FOR LIFE

Heading

a) The meteorites and comets as a source of organic molecules.

b) The unique conditions on Earth which make life possible.

c) The position of a planet in relation to the sun and its ability to support life.

d) An evaluation of the three requirements for life.

e) The creation of elements when solar systems appear.

f) The necessity of the existence of elements in molecules.

g) The advantage of water in solid form over the other liquids.

h) The necessity of a continuous chemical activity for life.

i) The way in which water separates charges in molecules.
Task 1

1. What was one reason that forced the tsar to create the Duma?
   widespread rebellion in the countryside / paralyzing strikes in the cities / and liberal professionals' demands for civil and religious liberties

2. What was the result of the leaders' incompetence in conducting the war?
   patriotic support disappeared

3. What were the expectations of the lower classes from the Provisional Government?
   an end of the war as well as an end to oppression in the factories and exploitation in the countryside

4. What triggered the lower classes to withdraw their support from the Provisional Government?
   deepening economic crisis

5. Why did the Provisional Government's rule of law fail with the lower classes?
   the "rule of law" offered little to the masses but protected the interests of elites

Task 2

1. What was the problem with Reza Shah's modernization attempts?
   Reza Shah was selective on what forms of modernization and secularization he would adopt

2. What was the main reason why religious groups were against the white revolution?
   Land reforms initiated the breakup of huge areas previously held under charitable trust (vaqfi) administered by members of the 'ulama' and formed a considerable portion of that class's revenue

3. Why was the land reform unsuccessful?
   The government was unable to put in place a comprehensive support system and infrastructure that replaced the role of the landowner (who had previously provided tenants with all the basic necessities for farming)

4. Why did the Majles, the Iranian Parliament, fail to offer any real political participation?
   The Majles was dominated by two parties, both of which were obedient to and sponsored by the shah. / Traditional parties such as the National Front had been marginalized, while others, such as the Tudeh Party, were outlawed and forced to operate in secret

5. How did the new Islamic government control political opposition in Iran after the revolution?
   With the Revolutionary Guards (a religious militia formed by Khomeini, intimidated and repressed political groups not under control of the ruling Revolutionary Council and its sister Islamic Republican Party)

Task 3

1. agriculture
2. parliament
3. political
4. modernization program / reform
5. clerics / ulema
6. dictatorship