Listening 1 – While Listening LASERS

Answer Key

1. Why did Ebru choose the topic of laser for her presentation?
   _____ because Prof. Malcolm had done research on it.____________

2. What is the definition of laser? (the order of the information is important)
   
   stimulates atoms or molecules
   wavelengths
   radiation

3. Einstein suggested that under proper circumstances atoms could release excess energy as light when stimulated.

4. Charles Townes found a way to generate stimulated emission at _____microwave frequencies____ and he demonstrated his device in ______1953_____. He called his device _____maser______. (0.5 each)

   He had a patent for laser (so anyone who wanted to use it had to pay him) / He won an army contract

6. Why did scientists call laser ‘a solution looking for a problem?’
   _____they didn’t have much use for it______________________________

7. What was the earliest success of lasers?
   _______3d holograms______________________________________________

8. A visible beam more preferable than an invisible infrared beam because it is possible to
   _____ to project straight lines for positioning and construction _______

9. What was the first large-scale use of lasers?
   _______ the laser scanner for automated checkout in supermarkets ____________

10. How can scientists benefit from the use of lasers in their work?
    _______They can use lasers to cool atoms to absolute zero_/ NASA profiles surface of Mars________________
11. When atoms are excited, they _____move up to higher orbits of atoms/leave their normal positions_____. However, they do not stay there forever, and they come back to where they were before losing energy in the form of _____a photon_____________. (0.5 point each)

12. Write the missing information about the laser diagram. (0.5 point each)

a. ___flash tube/lasing medium/stimulating source______

b. _partially mirrored surface / partial mirror_

13. What are two properties of laser beam?

a. ____ it is monochromatic ________________________________

b. ____it is coherent ________________________________

   it is directional.

14. Complete the missing information in the table. (0.5 point each)

<table>
<thead>
<tr>
<th>Type of laser</th>
<th>Lasing medium</th>
<th>Type of beam</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid-state lasers</td>
<td>ruby</td>
<td>Visible red</td>
<td></td>
</tr>
<tr>
<td>Gas lasers</td>
<td>Helium, helium-neon CO2</td>
<td>Visible red</td>
<td>cutting hard materials</td>
</tr>
<tr>
<td>Excimer lasers</td>
<td>a. reactive gases__ like chlorine, fluorine, argon, xenon, krypton</td>
<td></td>
<td></td>
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<tr>
<td>Dye lasers</td>
<td>Organic dyes in b. <strong>liquid solution</strong>___</td>
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</tr>
<tr>
<td>Semi-conductor lasers</td>
<td></td>
<td>c. <strong>writing source in printer or CDs</strong></td>
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</tbody>
</table>

15. Why are lasers good for cutting? Write TWO reasons.

_____ (TWO of the following) precise / easy-to-automate / cut more accurately / cut faster / cut thicker materials / never need sharpening ____
16. How are lasers used in defense industry? Write ONE way.

_____ to lock bombs on targets / for measuring distances / for securing a place _________
ELAE Practice – Listening 1

Laser: history, principles, properties and applications

Knock on the door....

Prof Malcolm: Come in

Ebru : Hello Prof Malcolm. May I come in?

Prof : Of course, Ebru. Come in. What is it you wanted to see me about?

Ebru : I’ve started working on my presentation. I have done some research and I wanted to talk to you before I went on to design my slides.

Prof : Okay. So, how can I help you? Let’s get started by looking at your topic. What is your topic?

Ebru : Laser. More specifically, its history, production, characteristics, types and applications of laser.

Prof : Great. Laser is one of my interest areas.

Ebru : I know. To be honest, this is why I chose this topic. It was either laser or electromagnetism. I knew you had done research on laser technology, so I chose it.

Prof : That was clever. Let’s see if I can be as helpful as you think I might. ... you said you’ve done some research. Let’s look at what you have on laser.

Ebru : Okay. I first looked at its history and I fo....

Prof : Ebru, this is an academic presentation. Don’t you think you should start with a definition?

Ebru : Oh. I didn’t think I needed one. Doesn’t everyone know about it anyway?

Prof : Of course people have an idea, but they may not know the exact definition. For people, it’s light, isn’t it?

Ebru : Yes

Prof : But that is not completely true?

Ebru : Really? Why not?

Prof : Because laser isn’t only the light. It is a device that stimulates atoms or molecules to emit light at particular wavelengths and amplifies that light, producing a very narrow beam of radiation.
Ebru: Oh. It sounds rather complex. Let me write that down. So laser is a device and it stimulates atoms or molecules so that they emit light at particular wavelengths and it amplifies that light, so in the end it produces a narrow beam of radiation.

Prof: Yes, that’s right. And the word ‘laser’ stands for Light Amplification by the Stimulated Emission of Radiation.

Ebru: Yes, I knew that. I found it in one of the sources I looked at.

Prof: What else did you find out?

Ebru: I found a lot of information about its history. It was born out of one of Albert Einstein suggestions. In 1916 he said that under proper circumstances atoms could release excess energy as light when stimulated. And in 1928 a German Scientists named Rudolf Ladenburg observed stimulated emission for the first time, but at the time he didn’t think it would have any practical use.

Prof: Okay. Then, what happened?

Ebru: A scientist at Columbia University, let me find his name…. Charles Townes. Charles Townes thought of a way to generate stimulated emission at microwave frequencies and he demonstrated his device at the end of 1953.

Prof: And did he call that device laser?

Ebru: No, he didn’t. he called it maser.

Prof: Can you spell it? And what does it stand for?

Ebru: Sure, it is M-A-S-E-R. Maser stands for microwave amplification by the stimulated emission of radiation.

Prof: Right. Go on. Do you know how successful was maser?

Ebru: Umm…. Unfortunately, I don’t know.

Prof: Well, there was a lot of research into maser until mid-50s, but it found only a limited range of applications. Later Townes and his brother in law, Arthur Schawlow, who was working at Bell Laboratories at the time, tried to extend maser work to the much shorter wavelengths of visible or infrared light. Townes also had discussions with a graduate student at Columbia University, someone named Gordon Gould and Gould quickly developed his own laser ideas.

Ebru: So was it Gould who invented laser?

Prof: Well, it is a bit complicated really. Townes and Schawlow published their ideas for an ‘optical maser’ in a paper in 1958. Meanwhile, Gould coined the word ‘laser’ and wrote a patent application. So, this way whether Townes or Gould should be credited as the ‘inventor’ of laser became a matter of a long debate. They actually went to court.

Ebru: Really? Who won?
Prof: In the end Gould won and he received four patents starting from 1977 and these patents made him rich --- you see, because he had the patent, because anyone who wanted to build something using laser had to pay him. This way he earned millions of dollars and on top of that he won an army contract. So we can say the Gould is the first man that benefited from laser.

Ebru: So, he built the first laser application.

Prof: Actually no. it was Theodore Maiman. Maiman took a different approach from the ones before him. He used a photographer’s flash lamp and a synthetic ruby crystal to excite chromium atoms. He kept on working with ruby, but other researchers used gas instead of a hard object like ruby, especially the mixture of helium and neon was experimented on. Lasers were intensely researched for many years. Scientists liked working with it but, they didn’t really have much use for it. So one scientist actually called lasers a solution looking for a problem.

Ebru: I know. I read it in a book too. It is surprising isn’t it – that they worked on something, but they didn’t know if it will be useful to humans. I guess this is what it feels like to be a scientist. Studying because you are curious.

Prof: That’s right. Anyway, do you know when they realized lasers can have practical applications? Do you know the first lasers with broad commercial applications?

Ebru: Yes, I do. The first commercial success came in 1963. Researchers at University of Michigan used lasers to make the first three dimensional holograms. They were able to create these holograms by using the helium-neon lasers. These types of lasers had more successful commercial applications because they could be adjusted to generate a visible red beam rather than an invisible infrared beam.

Prof: Can you explain why this was practical?

Ebru: Let me see….Ok it’s here. I’ve noted something about it. With visible light it was possible to project straight lines. This allowed precise positioning and construction.

Prof: Correct. Ruby lasers found some applications too. For example, eye surgeons started using them to put detached retinas back in place without cutting into the eye. But neither of these is the first large scale application of lasers. I am sure you’ve found the real one, haven’t you?

Ebru: Yes I have. It was the laser scanner for automated checkout in supermarkets. And it was developed in mid-1970s. Compact disc audio players and laser printers appeared soon after those.

Prof: Yes, lasers have found a place in diverse applications. Do you have any more examples?

Ebru: Well, one example is laser pointers that our lecturers, including you, use in lecture halls.

Prof: True.

Ebru: Something like pointers are used by the military to lock bombs to their targets. Another example is the use of lasers to write patterns on objects. ... Scientists use them too in their research. For example, NASA uses lasers to profile the surface of Mars. And in the laboratory, lasers help physicists to cool atoms to nearly absolute zero. In addition to all that, maybe this is the one ordinary people can relate to more than the other examples. It is using lasers to remove unwanted hair and clean tattoos.
Prof: Great. Looks like you have a lot of examples to give. What else are planning to include in your presentation?

Ebru: Well, I was planning to talk about the how a laser beam is produced, but to be honest, I had a hard time understanding the diagrams and explanations I found. This type of Physics is beyond my grasp. Can I leave this part out?

Prof: Well, if this weren’t a presentation in a Physics course, I would say you could. But this is Physics 101. It is time you got to know some concepts.... Come, let me show you how it is produced and then you can put what you remember on your presentation slides. OK?

Ebru: Alright. I guess you’re right.

Prof: I must have a book somewhere here.... Here it is. Okay, let’s find the chapter we need... yes, I found a diagram we can use. Come, have a look...

Ebru: Okay, ... I see a cylinder with dots in it. I've seen similar things while doing my research. But what does it show?

Prof: I’ll explain it, but first tell me what you know about excited electrons.

Ebru: If we excite electrons, they leave their normal position, that is their ground state, and they move up to higher levels of orbits around the atom.

Prof: And how do we excite atoms?

Ebru: By applying heat, light and electricity.

Prof: That’s right. After a while they go back to their original place, to their ground state. During this time, they lose energy in the form of a photon, which is a particle of light. Scientists used this principle to produce lasers. Let’s look at the diagram again. You see actually two cylinders. The one at the top is our lasing medium, our stimulating source. In this case it is a flash tube, like the ones in cameras. The big cylinder itself is ruby. At the both ends of our ruby tube, there are mirrors. However, one of these is a normal mirror but the other one is partial mirror, so it won’t reflect all of the light ...This is our basic equipment.

Now, we use the small cylinder, the flash tube to give light pulses to the ruby cylinder. This excites the atoms in the ruby and some of them start giving out photons. And some of these photons hit the mirrors. The mirrors reflect them back, and as they travel they hit other atoms, and cause those atoms to release photons. Remember, one mirror was not a complete mirror, that mirror allows some photons to get out. And that’s our laser beam.

Ebru: Now I got it. So it’s not a complicated phenomenon at all.

Prof: No, not really. Okay, so will you use this part in your presentation?

Ebru: Of course.

Prof: Good. So, what are you planning to move on to after this? Properties of the laser beam maybe? Tell me what you have on that.
Ebru: Sure. Well, I found three main properties of the laser light that makes it different from normal light. First of all, it is monochromatic. It contains one specific wavelength, and one specific color. Secondly, it is coherent. I mean it is organized. Each photon moves in step with others... they act in unison. And finally, it is directional. A laser light has a very tight beam and it is very strong and concentrated. Unlike a flashlight, which releases light in many directions, which is weak and multidirectional.

Prof: Excellent summary, Ebru. I think it will be enough for this part. What is your next section going to be?

Ebru: I am going to talk about the types of lasers. And I found 5 types. The first one is solid-state lasers. These have a solid material to produce laser beams. A good example is the one that uses ruby. The second type is the gas lasers and they usually use helium or a mixture of helium and neon. They produce visible red light. There are also CO2 lasers, and they emit infrared beams. These ones, are used for cutting hard materials. Thirdly, there are excimer lasers. They use reactive gases such as chlorine and fluorine mixed with gases such as argon, krypton or xenon. The fourth type is the dye lasers, in which organic dyes in liquid solution are used as the lasing media. And finally, there are semiconductor lasers, and these are not solid-state lasers. These devices are generally very small and use low power. They are used as the writing source in some laser printers or CD players.

Prof: This is quite informative. Great. Ebru, I know we mentioned a few places where lasers are used, but I think you should have a special section at the end just to summarize or categorize these.

Ebru: Oh. ... I think I can do that. Let me see, I can have a category for tools. Maybe I can include cutting tools used in the industry in it. They are precise, easy-to-automate and they never need sharpening. They can cut things faster, and more accurately than humans. ... ummm....They can cut thicker materials, and this improves efficiency and productiveness....

In medicine, lasers are used to cut tumors, to fix blood vessels or for eye surgery because they are precise....

And another category could be communications. As we said, they are used in supermarkets as barcode scanners. Another example here could be DVD or CD players. Let me see, what else do I have?... Oh, the use of lasers and fiber-optic cables, in which lasers are used to communicate or send vast streams of data over the internet.

I guess this is all.

Prof: There is also the defense industry where they use lasers to lock bombs on targets as you mentioned before, also there is the use of them for measuring distances. And securing a place, like you see in movies, is possible with laser beams. When the light is interrupted, the system senses it and rings the alarm.

Ebru: Ok. I’ll add this category too....

I think this is all I need professor Malcolm. Thank you very much for sparing your time for me.

Prof: You’re welcome Ebru. I’m looking forward to your presentation. It will be a great one.

Ebru: Let’s hope so. Thank you. And Bye.

Prof: Bye.
Listening TWO – Perfumes

ANSWER KEY

1. How does the speaker define perfume?

Perfume is a fragrant product that results from the artful blending of substances that smell in appropriate proportions / Perfume is the product of careful mixing of appropriate amounts of fragrant substances.

2. What are two reasons why people wear perfume?

a. to enhance the odor of their own bodies / to mask body smell
b. to increase one’s attractiveness to the opposite sex

3. What kind of physical effects can perfume have on people’s bodies? Write two.

lowering blood pressure / improving people’s alertness/ pain reduction/increasing concentration/ energizing

4. What were two ways the Egyptians used perfume in their religion?

a. to please gods
b. to perfume the dead

Also possible: they had a god of perfume.

5. How did the following cultures, people or events contribute to the development of perfume?

<table>
<thead>
<tr>
<th>Greeks</th>
<th>Arabs</th>
<th>Persians</th>
<th>Hungarians</th>
<th>An Italian barber</th>
<th>modern chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. created liquid perfume</td>
<td>efficient distillation techniques → cheaper perfumes</td>
<td>refined the distillation process and created the rose water.</td>
<td>b. created the first modern perfume</td>
<td>c. invented cologne</td>
<td>d. use of synthetic chemicals in perfume production</td>
</tr>
</tbody>
</table>

6. What is one thing other than the smell of the perfume that plays a role in the success of a perfume?

The perfume bottle / the wrapping / advertising

7. What is one development that took place at the beginning of the 20th century?

Perfumes began to include many chemicals / natural and synthetic chemicals began to be mixed / perfumes became affordable
8. How big was the perfume industry last year?

________48 billion dollars___________________________________________________

9. What are two types of perfumes which are popular today?

___brand perfumes and artisan perfumes_________________________________________

12. What is the percentage of fragrant oils in eau de perfume?

_____10 – 15_______________________________________________________________

13. What does the phrase ‘base notes’ refer to?

____the expression of the perfume / the scent produced when the fragrance has dried (and it is only the smell that stays) __
LISTENING 2 - PERFUME

Listening 2. This part of the exam aims at testing your note-taking ability from a lecture. You are going to listen to a lecture about perfume, its history and production. Take notes on the following pages as you listen to the lecture. Your notes will not be marked. You will hear the lecture only ONCE. You now have 1 minute to look at the note-taking headings before the lecture starts.

Now listen...

Good afternoon, everybody. I am happy to see so many of you here so late in the afternoon. In this session of chemistry for everyone series, we’ll be looking at perfumes. To be more specific, we are going to define what exactly perfume is and then talk about why people wear perfumes and how it affects people. After this, we are going to look at its history. And we’ll finish off with a few notes about perfumes.

Right, let’s begin with a definition then. Perfume is a fragrant product that results from the artful blending of odiferous substances in appropriate proportions. Now, what does this mean? Let’s look at the parts of the definition one by one. The definition begins with the part that says perfume is the result of artful blending. This means the ingredients are mixed in a careful and skillful way. The second part refers to odiferous substances, which refers to substances which give off a smell. And finally we have appropriate proportions. In other words, we mix these substances in appropriate amounts. So if we have to rephrase our definition, then, perfume is the product of careful mixing of appropriate amounts of fragrant substances. And I hope this is a clearer definition.

The word perfume comes from two Latin words ‘per’ – that’s P-E-R, which means ‘through’; and ‘fumum’, which is spelt F-U-M-U-M, meaning ‘smoke.’ So perfumum means to smoke through. The French later used the word ‘parfum’, that’s P-A-R-F-U-M. They used the word parfum for smells produced by burning incense. Do you know this word? It’s I-N-C-E-N-S-E. Actually incense was the first form of perfume.

After giving its definition, we can now move on to our second point, which is why people wear perfume. When we look at the history of perfume, we see that people have used perfume for two main purposes. The first one is to mask or to enhance the smell of their own bodies by using perfume. When you are in the company of other people, you don’t want to smell bad. So fragrances are used to mask your own body smell if you haven’t had the chance to shower after some hard work. Even if you didn’t do any hard work, you may still want to wear perfume to give yourself a better smell. The second purpose people have for perfume is to increase their attractiveness to the opposite sex. Our sense of smell may not be very strong, but smells still affect our perceptions and we are more likely to notice people who smell nice. For this reason, when we want someone from the opposite sex to notice us or when we want to attract someone, we wear perfume.

But people don’t always use perfume to smell nice to others. Smells may actually have some positive effects on a person’s psychological well-being. For example, some fragrances are known to reduce stress, or lift the mood of a person or help with concentration and emotions. Let me tell you about a study that was conducted in New York. In this study, the researchers focused on patients undergoing MRI scans. Now, I don’t know if you ever experienced it, but being in an MRI scanner can be a stressful and worrying experience for most people. In this study, researchers pumped vanilla scent into the air around the patients when they were in the scanner and then they measured their stress levels. They found that there was a 63% reduction in the level of stress the patients experienced. This is a huge difference and it is just because of a fragrance.

Smells can have an impact on a person’s physical well-being, as well. There is research that shows that smells can make people feel more energetic, or they can reduce the pain a person feels. For instance, it has been
shown that the scent of roses lowers blood pressure and the smell of eucalyptus improves people’s alertness. Some people believe in the effect of scents so much that they have developed something called aromatherapy. Aromatherapy uses scents to heal physical or psychological problems of people.

Let’s now have a look at the history of perfume. As I said before, the first perfumes were incense and the first incense perfume was made in the Mesopotamia about 5000 years ago. Ancient cultures of Mesopotamia burned some type of wood at their religious ceremonies... so this is the origin of perfume. Then, around 3000 B.C., incense made its way to Egypt. Like Mesopotamians, Egyptians used perfume in religious ceremonies. For example, they burned incense type fragrances in their temples to please the gods. In fact, the Egyptian word used for perfume is translated as ‘the fragrance of gods.’ Perfume was very important in the early Egyptian religion. They assigned specific fragrances to different gods, so each god was associated with one scent. They even had a god of Perfume. Egyptians also perfumed their dead. Before they put the dead people in their graves, they used fragrant oils to make the dead body smell nice.

In time, perfume spread to Greeks. And it was Greeks who created the liquid form of perfume. They mixed fragrant powders with heavy oils to create liquid perfume. From Greeks, perfume spread to Rome, Persia and Arabia. Perfume was really important for Romans and they used it extensively in their homes and on their dogs and horses. At that time, the manufacture of perfume was very expensive, so only the rich people could afford it.

After Romans, perfume became popular in Arabia and Arabs are responsible for making perfume cheaper. Arabs developed efficient distillation, I mean concentration, techniques. These distillation techniques made the production of perfume somewhat cheaper. After Arabs, Persians borrowed these techniques and refined these processes further. Persians are also the people who created the rose water for the first time. Rose was important in their culture, so it is not surprising that they focused on making a perfume from rose before other flowers.

After the fall of the Roman Empire and the rise of Christianity, perfume lost its importance in Europe, but with the Renaissance it became popular again. In the 14th century Hungarians created the first modern perfume, which they called ‘Hungary Water.’ This perfume Hungary Water, did not spread across the continent. It is important in the history of perfume making, but this Hungarian perfume was not really popular outside Hungary. The real success of perfume in Europe took place during the 17th century in Europe, especially in France. In those days, hygiene was rather poor, so fragrances were used to mask the unpleasant body odors. So perfume came to be used widely. Actually it became so common that in the king’s palace, scents were used on skin, clothes, furniture and even on visitors. This kind of a popularity eventually made France the center of perfume production and industry. Today, France is still the center of world’s perfume industry.

Although France was the main producer and market of perfume in the 17th and 18th centuries, there were some people dealing with perfume production in other European countries. For example, an Italian barber who was living in Germany invented the world’s most commonly used perfume in the 18th century. He mixed perfume and alcohol, and he named his new invention Cologne. That is C-O-L-O-G-N-E, Cologne is the French word for the German city of Koln. This barber was living in Koln, so he gave the name of this city to his invention. The strange thing about this perfume, I mean cologne, was that the barber didn’t sell it as a perfume. He sold cologne as a miracle medicine that could heal some diseases. Here I should mention one important point. In the 18th century, in Europe fragrances were believed to have healing powers. Doctors would make use of fragrant flowers or spices to protect people from diseases or to heal their patients. Anyway, back to the cologne... this wonder water became highly popular. And today it is still produced. In fact, cologne is the world’s oldest continuously produced fragrance.
If we continue with the history of perfume, we see that major changes took place in perfume production in the 19th century. The first development was largely due to the development of modern chemistry. It was the use of synthetic chemicals. Perfume producers started using synthetic chemicals in the production of perfume. For example, by mixing nitric acid and benzene, perfumers were able to create the smell of almonds. Perfumers were also able to create chemical mixtures that smelled like vanilla, lemon, lily and so on.

The second development was the emergence of perfume houses. Different perfume producers became bigger and established themselves as important perfume houses around the continent, but it was mostly in France where they appeared.

Thirdly, the packaging of the perfume became important. Before this time, the main factor that determined the success of a perfume was its smell. In the 19th century, this changed. I mean the smell of a perfume stopped being the main factor that determined the success of a perfume. There were new factors like perfume bottle that played a role in how successful a perfume could get. Perfume bottles were designed very carefully. The producers wanted the bottle to reflect the character of the perfume it contained. This way they aimed to attract buyers to buy their perfume. In addition to the bottle, perfume producers started to give importance to the wrapping of the bottle. Again, they started to create interesting boxes with vibrant colors to make the perfume attract the attention of buyers. And finally, towards the end of the 19th century, advertising of the whole package began to play an important role. Producers realized that just preparing an attractive package and putting it on the shelves in stores was not enough to increase their sales. So they started giving advertisements in newspapers and magazines.

When we look at the developments in history of perfume, we see that another development took place at the turn of the 20th century. Until that time perfumes were made from the fragrance of only one flower. This caused perfumes to be really expensive. For example, Chanel No 5 was made using one of the most expensive ingredients in the industry. It contained Rose Absolute. A milliliter of Rose Absolute cost a thousand dollars, which is why Channel No 5 was very expensive. But at the beginning of the 20th century, producers started including many different chemicals in one perfume. They also started mixing natural and synthetic chemicals to achieve different and unique smells. Adding synthetic chemicals to perfumes made perfumes cheaper and they became affordable to many more people.

When we come to 1950s, we see the arrival of scents for men. Before that perfume industry worked for mostly women, but with the 50s, men also became consumers of perfume.

With 1970s the time of designer perfumes began. Fashion designers like Estee Lauder, Armani, Christian Dior and Calvin Klein offered their version of a perfume. Today there are over 30,000 designer perfumes available. In my opinion, this is all due to chemistry. Isolation of smell molecules added an enormous number of new and unique combinations of scents. In other words, chemistry has freed the world of perfume from the limitation of what is found in nature.

Today perfume industry is a very big industry and it is still developing. Last year it was worth 48 billion dollars, which was a growth of 33 per cent on the previous year's 36 billion. What has happened in the new millennium is quite interesting. In the first 15 years, there was a big demand for celebrity perfumes. Singers, actors and famous sports people had their perfumes on the market. However, after 2015, popularity of celebrity perfumes started to decline. Instead of celebrity perfumes, people began to use brand perfumes of some clothing stores like Zara, Guess and H&M. Another type of perfume that is popular today is artisan perfumes. Artisan perfumes are fragrances that a chemist prepares especially for you according to your demand. For this reason, artisan perfumes are unique to one person and as a result, they are really popular.
Before we finish, I would like to talk about two points which I get asked about a lot during my talks. The first one is the categorization of perfumes. Fragrances are categorized according to the concentration of essential oils they contain. Perfumes are basically a mixture of essential oil and alcoholic solution. The most concentrated form of perfume, and so the most expensive form of perfume is called the full perfume. A full perfume is the strongest and the longest-lasting of all perfumes and it contains about 20 – 50 per cent perfume oils. If a fragrance has 10-15 percent perfume oils and the rest is alcoholic solution, it is called ‘eau de perfume.’ ‘Eau’, that’s E-A-U, means water in French. As you can imagine, an eau de perfume not as expensive as the full perfume because it has a smaller essential oil content. Then we have a fragrance which is even weaker than an eau de perfume and it is called eau de toilette. An eau de toilette contains only 3-5 percent perfume oils, and this makes it the least expensive form of fragrance.

The second point I’d like to talk about is the notes. Notes are the nuances of the fragrance. When you read the description of perfumes, you see that there are three notes. There are top notes, middle notes and base notes. What we call the top notes are the smells you get when you first sample the perfume. This lasts for only 5-10 minutes. After this, you get to smell the middle notes. This is the scent that begins to emerge after the perfume blends with your own skin. It takes about 20 minutes for the middle notes to develop fully. After this point, you get the base notes. This is the expression of your perfume; that is, it is the scent produced when the fragrance has dried and it is only the smell that stays. And one more point: because we all have different skin types, the same perfume can smell differently on different people. So this explains why a perfume you liked on your friend doesn’t smell so good on you.

Right. This is I have to say. I think we have a few minutes for questions. Is there anything you would like to ask?
<table>
<thead>
<tr>
<th>Paragraph Number</th>
<th>Heading</th>
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<tbody>
<tr>
<td>8</td>
<td><em>e.g.</em> Birds’ migration known more than other animals’</td>
</tr>
<tr>
<td>5</td>
<td>a) Insect migration mainly to find food, to mate or to sleep</td>
</tr>
<tr>
<td>3</td>
<td>b) Migration can be vertical or horizontal</td>
</tr>
<tr>
<td>12</td>
<td>c) Animals’ use of geographical features to find their way during migration</td>
</tr>
<tr>
<td>32</td>
<td>d) The benefits of migration for animals</td>
</tr>
<tr>
<td>9</td>
<td>e) Landscape determining the pace of birds’ migratory flight</td>
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<tr>
<td>4</td>
<td>f) Some sea creatures migrating unintentionally</td>
</tr>
<tr>
<td>21</td>
<td>g) Metabolic differences between migratory and non-migratory animals</td>
</tr>
<tr>
<td>17</td>
<td>h) Birds’ ability to find their way when flying at night</td>
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<tr>
<td>25</td>
<td>i) Environmental factors triggering migration</td>
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</tbody>
</table>
Task 1: Read Text A below and answer questions 1-5.

1. What do most people do to survive in capitalism?
   ______sell their ability to work in return for a wage__________________________

2. In this economic system, why do capitalists do business?
   ______to make profit / from their regard for their own interest ______________________________

3. What is the role that prices play in the capitalist market?
   ___allocate resources ______________________________

4. How do laizzes faire and mixed economies differ?
   _in laizzes faire economies markets operate with little or no regulation, but in mixed economies markets are regulated by governments_

5. What is the negative outcome of state-guided capitalism?
   One of the following:
   ______excessive investment / picking the wrong winners / susceptibility to corruption / difficulty withdrawing support when it is no longer appropriate__________________________

6. What can the public do prevent powerful capitalists from doing everything they want?
   ______The public needs to see the virtues of free markets and oppose government intervention in the market (to protect powerful players at the expense of overall economic prosperity)______

Task 2: Read Text B below and answer questions 7-11.

7. What idea do socialist democrats oppose?
   ______(Marxist concept of) the dictatorship of the proletariat / capitalism and communism____________

8. What are two characteristics of society in social democratic view?
   a. ______Society is equal to the sum of its parts / society is what people make of it._______
   b. ______Social change is possible.______________________________________________

Possible answer: division of society is artificial
9. What is the duty of the state to the people?

__to guarantee access to resources to meet basic needs / to promoting a good, healthy and just society / maintaining society’s values__

10. What is **one** reason why social democrats accept market economy?

____ because it is the most efficient means of allocating resources, stimulating initiative and rewarding effort and work (as long as it is regulated)___

11. According to the social democratic view, what is one thing that makes people free?

**One of the following:**

_____ having resources to do certain things / economic freedom / government’s providing some measure of support found in law / not being without work / having power in one’s workplace / having workplace protection____

12. Why do social democrats equate poverty with social exclusion?

______ because poverty prevents people from being able to participate in society (both as a member who can contribute to the society and as an individual who can benefit from being a member of it) __________

**Task 3**

Capitalism and social democracy are the two major ways most nations around the world have adopted to run their countries. While it may be rather hard to for many to tell the differences, these two political system do have a lot that separates them.

Capitalism, divides society into two and the main focus is on (1) __making profit__(EXAMPLE)____ and this is the aim of only one group in the society. However, social democracy sees each member of a nation as the same. They believe that (1) __education and persuasion_____ have the power to distribute wealth to all members of society. They also believe that it is the duty of the state to meet its people’s needs, but capitalism does not have such a concern. Capitalists believe that the state’s role is to ensure (2) __proper (efficient) functioning_____ of the market by monitoring it and protecting the rights of individuals. In a capitalist economy individuals are free to do act out of (3) __self-interest__, which is what leads to economic prosperity. However, in social democracy, individuals are part of the community and they are (4) __connected________ to the society and depend on other members. Although capitalist systems have led to more economic growth, one problem that continue to exist is that of (6) __inequality / equality_____ because the system allows a small number of people to keep hold of the capital. In contrast, there is ideally a fairer distribution of wealth in social democratic countries. Nevertheless, social democratic societies are believed to be (7) __financially unsustainable____ by some who say the way social welfare is planned does not reflect the realities of the economic balances.