



Orient BlackSwan

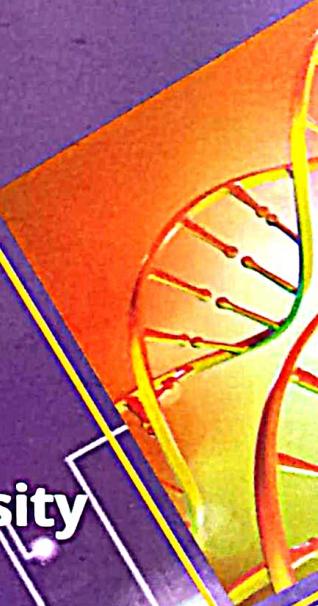
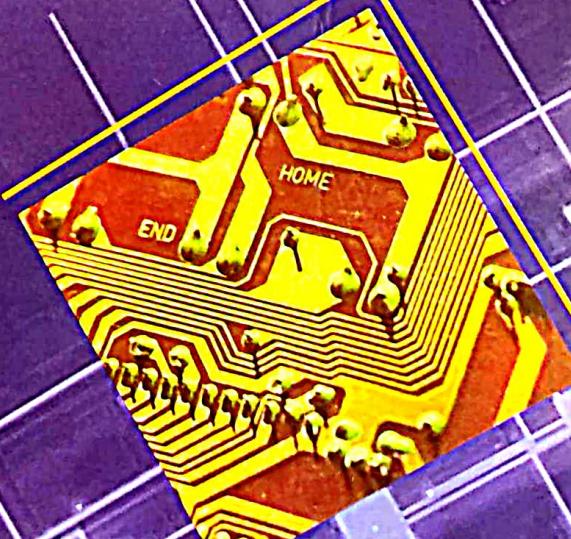
# English for Engineers and Technologists

Volume 1

*Third Edition*

Department of English, Anna University

Smart  
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# English for Engineers and Technologists

**Volume 1**

*Third edition*

**Department of English  
Anna University**



Orient BlackSwan

## **Course Writers**

**K N Shoba**

*Assistant Professor*

*Department of English, Anna University*

**Deepa Mary Francis**

*Assistant Professor*

*Department of English, Anna University*

## **Contributors**

*Faculty, Department of English, Anna University*

## **Course Consultants**

**Chris Jacques**

*ELT Consultant, UK*

**Catherine Thomas**

*English Language Specialist, RELO, U.S. Embassy, New Delhi,  
U.S. Consulate General, Chennai*

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# Syllabus

## Professional English I

	<b>Listening</b>	<b>Speaking</b>	<b>Reading</b>	<b>Writing</b>	<b>Grammar and Vocabulary</b>
<b>Unit I</b>	Listening and filling a form	Introducing oneself, introducing friend/family	Descriptive passage	Writing a paragraph (birthplace, school life)	Simple present, present continuous; one-word substitution
<b>Unit II</b>	Conversation (asking for directions, framing questions)	Short conversation (social conversation— asking for directions, making enquiries), role play	Reading a print interview	Checklist, dialogue writing	Simple past, question formation ( <i>Wh-</i> questions, Yes/No questions, tag questions); stress shift
<b>Unit III</b>	Listening to short speeches (gist of the speech, inferring the message, answering multiple-choice questions)	Five-minute talks on given topic	Autobiography and biography	Formal letter—letter to the Dean, letter of complaint	Future tense, subject-verb agreement; collocation, fixed expressions
<b>Unit IV</b>	TED talks (listening to a TED talk, filling in blanks, taking notes)	Small group discussions, making recommendations	Problem-solution articles (newspaper articles)	Formal letter, recommendations, letter to the editor, making notes	Modals, phrasal verbs; connectives, cause and effect sentences
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**Note:** Additional topics may be accessed through the Orient BlackSwan Smart App.

# Innovation

Listening	Speaking	Reading	Writing	Grammar and Vocabulary
Listening and filling a form	Introducing oneself, introducing friend/family	Descriptive passage	Writing a paragraph (birthplace, school life)	Simple present, present continuous; one-word substitution

## PREPARATORY

Here are six statements that discuss innovation. Read all the statements and pick the one that you find most interesting. Form groups with classmates who have chosen the same quote and explore more about the author together. Discuss and present your ideas and opinions about the statement to the class.

1. Imagination is not only the uniquely human capacity to envision that which is not, and therefore the fount of all invention and innovation.

*J. K. Rowling*

2. Exploration is the engine that drives innovation. Innovation drives economic growth.

*Edith Widder*

3. Changes call for innovation, and innovation leads to progress.

*Li Keqiang*

4. There is no innovation and creativity without failure. Period.

*Brene Brown*

5. Every once in a while, a new technology, an old problem, and a big idea turn into an innovation.

*Dean Kamen*

6. Our future growth relies on competitiveness and innovation, skills and productivity... and these in turn rely on the education of our people.

*Julia Gillard*

## SECTION 1

Read the following passages on inventions that changed the world.

### The Wheel

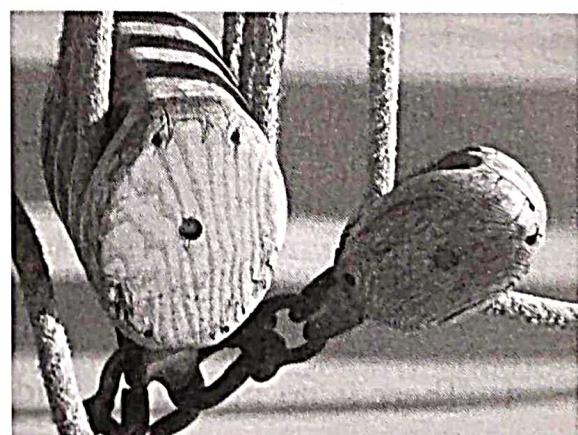
The wheel, technically the wheel and axle, is one of the six simple machines defined in **antiquity** and expanded during the Renaissance in the fifteenth century. The first depictions of wheeled-vehicles appear on an earthenware pot from Poland and date back to around 4000 BCE. The pot clearly depicts a wagon of some kind with four wheels set on two **axles**. The earliest **evidence** of a physical wheel-axle combination comes from Slovenia and dates back to around 3360–3030 BCE. The invention of the wheel changed the world and since then wheels have been a constant feature of human transport devices the world over.



### The Pulley

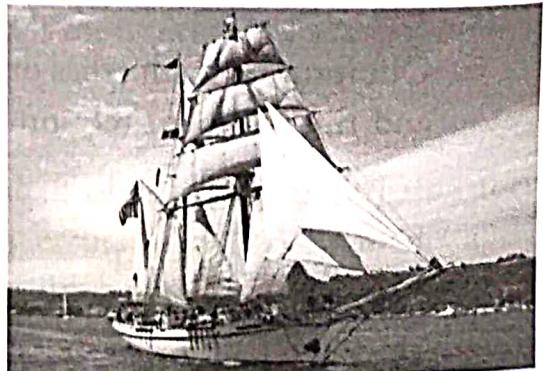
A pulley is one, or several wheels, on an axle or shaft that supports the movement and a change of direction of a cable or belt. They transfer power between the shaft and **cable** and provide an immense mechanical advantage for applying large forces **ideal** for lifting heavy objects. Pulleys can be of various types:

- (a) a fixed pulley has an axle mounted in the bearings attached to a supporting structure
- (b) movable pulleys have axles mounted on movable blocks
- (c) compound pulleys are a combination of the two



### Sails

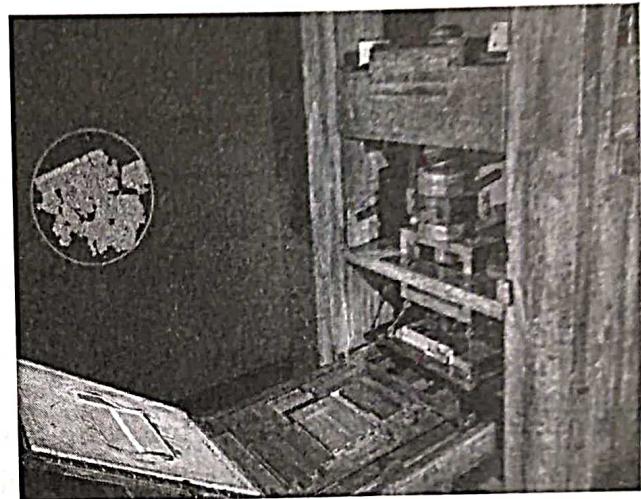
The very first depiction of a sailing ship can be found in an Egyptian painting that dates back to around 3300 BCE. These early boats featured a square sail as well as banks of oars (lines of rowers). As they were **confined** to the Nile River and depended on winds within the narrow channel, it was vital to retain oars



during times of insufficient wind speed. The first sails were probably made from animal skin but these were later replaced by woven reed mats and eventually cloth in predynastic Egypt. Later, sails were made from woven flax fiber in Europe, which is still used today though cotton has largely replaced it. Ships with sails enabled mass **exploration** of the seas and opened up new trade routes. They would, in effect, shrink the world and allow previously disconnected nations to exchange goods and knowledge. They would also enable nations to expand their influence around the world and, in some cases, become the workhorses of different empires.

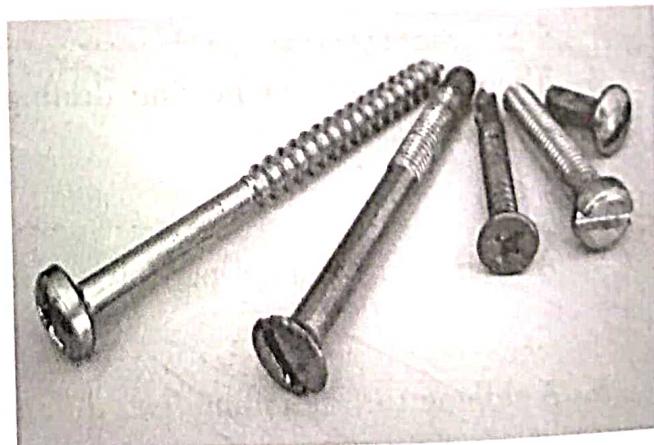
## The Printing Press

The printing press was one of the most important inventions in the field of **mechanical engineering** and for the population at large. Johannes Gutenberg's machine was groundbreaking in its own time and set the stage for **enormous** advancements made during the Renaissance and Industrial Revolution. Movable type printing had been around for some time before Gutenberg, notably in China, but his **device** was the first to mechanise the process of applying text and images to paper en masse. Gutenberg's press was modelled on the ancient wine presses of the Mediterranean and in fact, was made from a modified wine press. The invention of the printing press would mark a watershed moment in human and engineering history.



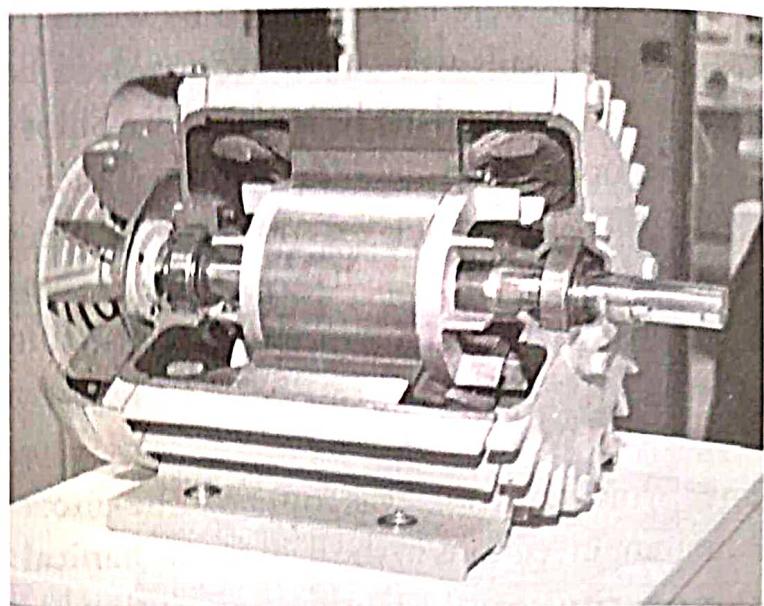
## Screws

Screws are yet another simple machine used since antiquity. They tend to consist of a cylindrical rod with one or more helical spiralling threads or **ridges** on the outside. This ingenious mechanical engineering **innovation** converts rotational motion into linear force. Screws can also be perceived as a very narrow inclined plane, or **ramp**, that is wrapped around the cylinder. Its mechanical advantage changes depend on the distance between the screw's threads. They are widely used today as **fasteners** or as basic pumps, presses and as **precision** devices.



## Electric Motors

Most common electrical motors work through the interaction of a **magnetic field** and winding **currents** to generate a force. The basic principle behind electric motors, Ampere's Force Law, was first described by Ampere in 1820 and was first demonstrated by Michael Faraday in 1821. One of the first practical motors was created by Hungarian physicist Anyos Jedlik in 1828. Electric motors are found in many applications around the world, from **industrial** fans to power tools to computer disk drives.



*Source:* Christopher McFadden, Interesting Engineering, URL at <https://interestingengineering.com/19-mechanical-engineering-innovations-that-helped-define-mechanics-today>

## TASK 1: VOCABULARY

Read the following phrases; find one-word substitutes for the phrases from the above passages. Read the passages quickly again scanning for the words in bold.

1. A rod or spindle passing through the centre of a wheel or a group of wheels  
.....
2. A thick rope of wire or hemp used for construction, mooring ships, and towing vehicles  
.....
3. The branch of engineering dealing with the design, construction, and use of machines  
.....
4. A long, narrow raised part of a surface, especially a high edge  
.....
5. A sloping surface joining two different levels, as at the entrance or between floors of a building  
.....

6. A device that closes or secures something  
.....
7. Refinement in a measurement, calculation, or specification, especially as represented by the number of digits given  
.....
8. A region around a magnetic material or a moving electric charge within which the force of magnetism acts  
.....

Here are some more phrases. Find one-word substitutes for these and write them in the space provided.

1. A small mechanical or electronic device or tool, especially an ingenious or novel one  
.....
2. An artificial body placed in orbit round the earth or moon or another planet in order to collect information or for communication  
.....
3. A metal made by combining two or more metallic elements, especially to give greater strength or resistance to corrosion  
.....
4. A licence conferring a right or title for a set period, especially the sole right to exclude others from making, using, or selling an invention  
.....
5. The treatment of injuries or disorders of the body by incision or manipulation, especially with instruments  
.....
6. The occupation of measuring eyesight, prescribing corrective lenses, and detecting eye diseases  
.....
7. The branch of science which deals with celestial objects, space, and the physical universe as a whole  
.....

8. An optical instrument designed to make distant objects appear magnified  
.....
9. A semiconductor device with three connections, capable of amplification in addition to rectification  
.....
10. A naturally occurring solid material from which a metal or valuable mineral can be extracted  
.....

## TASK 2: READING COMPREHENSION

Reread the passage and answer the following questions.

1. According to you, which are the top three inventions that have made life easier on the planet? Justify your choices.  
.....  
.....  
.....
2. Name three inventions that have helped humans move from one place to the other conveniently.  
.....  
.....  
.....
3. Which two inventions have contributed immensely to the growth and spread of knowledge?  
.....  
.....
4. Name any two inventions that you think are significant but have not been mentioned here.  
.....  
.....

## SECTION 2

We have read about inventions that have changed the course of human lives throughout history. In this section we will find out about path-breaking innovators.

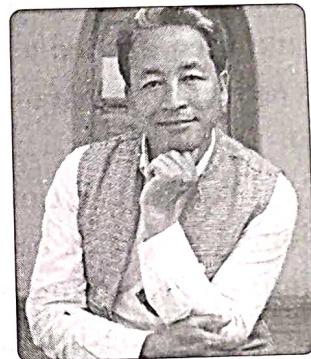
### 1. Sonam Wangchuk

I was born in Ladakh in 1966. I did not attend school till the age of nine, since there were no schools in my village. I attended school later in Srinagar but disliked the atmosphere there since I did not understand or speak the language of instruction. Due to this I escaped to Delhi in 1977 and joined Vishesh Kendriya Vidyalaya. I went on to earn my B.Tech degree in Mechanical Engineering from National Institute of Technology (Srinagar) in 1987.

After my graduation, I started the Students' Educational and Cultural Movement of Ladakh (SEMCOL) with the help of my brother and a few of my peers. SEMCOL launched Operation New Hope in collaboration with the government and the village communities, to bring about reforms in the government school system. The SEMCOL campus I designed is famous today, since it runs purely on solar energy and uses no fossil fuels for cooking, lighting or heating. Over the next few years I continued working with several NGOs as well as government committees for formulating policies on educational reforms and tourism.

I am perhaps most well-known for inventing and building a prototype of the 'Ice Stupa' that creates artificial glaciers in order to store water in the form of a conical ice heap. I wanted to find a solution to the water crisis that farmers in Ladakh faced in the early spring months before the natural glacial melt waters started flowing. As part of the Ice Stupa project, I built an artificial glacier that stores water from melting streams during the winter months in the form of giant ice cones or stupas. This water is then released as the ice stupas start melting in summer when the farmers need water for their crops. Each of these stupas can store roughly 150,000 litres of water. I was also invited to build the first Ice Stupa of Europe in the Swiss Alps. In 2018 I was awarded the Ramon Magsaysay Award for my contribution in harnessing nature, culture and education for community progress.

Source: Adapted from [https://en.wikipedia.org/wiki/Sonam\\_Wangchuk\\_\(engineer\)](https://en.wikipedia.org/wiki/Sonam_Wangchuk_(engineer))



Picture courtesy  
Sonam Wangchuk

## 2. Rajendra Singh

I was born in a village named Daula, in Uttar Pradesh, in 1956. My father was an agriculturist and I completed my early schooling in the village. I first became interested in rural development when Ramesh Sharma, a member of the Gandhi Peace Foundation, visited our village. Sharma made substantial efforts to clean the village and even opened a library. He also involved me in an alcoholism eradication program. This inspired me to work for the betterment of people in rural areas.



I began my career as a National Service Volunteer for education in Jaipur. I also joined and later became the General Secretary of the Tarun Bhagat Sangha (TBS). An important turning point in my career came in 1984, when I quit my job and travelled deep into the interior of Rajasthan, till I reached Kishori village in the Alwar district. At the time, this district was completely dry and barren due to the absence of ground water in the last five years. This was mainly a result of deforestation, mining and the abandonment of traditional water conservation techniques. I realised that the only way to restore farming in this region was to recharge ground water and store rainwater through the use of traditional techniques such as building dams or johads. With the help of the local people I desilted the Gopalpura johad and that monsoon the johad filled up. Wells which had been dry for years now had water. After this I started a padayatra through the villages in the area to educate people about the benefits of old check dams. Over the next few years, under my leadership and through the collective efforts of the villagers and the Tarun Bhagat Sangha, we built over 8,600 johads in several villages of Rajasthan. As a result, we were able to revive five rivers that had dried up and bring water to over 1,000 villages, repopulating the area and renewing farming efforts. My water conservation efforts and achievements have earned me the title of 'Waterman of India'. I received the Ramon Magsaysay Award for Community Leadership in 2001 and the Stockholm Water Prize in 2015.

*Source:* Adapted from [https://en.wikipedia.org/wiki/Rajendra\\_Singh](https://en.wikipedia.org/wiki/Rajendra_Singh)

## TASK 3: SPEAKING

1. You have read accounts of famous innovators talking about their lives and achievements. Now note down certain key ideas about yourself that you would like to share with others. For example,
  - your name
  - the place you were born in

- a few interesting facts about your place of birth
- your parents and siblings if any
- your passion or dream
- your hobbies
- one interesting and memorable incident so far in your life

Introduce yourself to the class using the above facts.

2. Bring to class a photograph of one of your family members or somebody you would like to introduce to your class. Collect enough information about them and share it with your class.

#### **TASK 4: WRITING A PARAGRAPH**

Here is Parimala's description of her village. Read the passage and underline any similarities that you find with the place you grew up in.

I am from Poovezhil in Tamil Nadu. It is a beautiful village and we have been there several times. Most of the people there earn their living through agricultural income or through small scale business income. My father relocated from there when he got a job opportunity in the city, following which we settled in the city where we are now. Poovezhil has many beautiful places and is very quiet and calm. Since it does not have a lot of traffic like in cities, the air is pure and fresh and we had a lot of place to play around. During vacations, my cousins used to come to our home and we all had a lot of fun playing around together.

We had a small garden where we used to cultivate vegetables and fruits. I also tried my hand at organic farming with the help of my grandfather. We had many different kinds of vegetables and fruits, all of it healthy and natural. Our neighbours were also very friendly; we all knew one another and lived almost like a family. Sometimes, living amidst this maddening city crowd, I recall those days full of fun and fresh air that we enjoyed. Good food, healthy environment and happy surroundings were what my place of birth offered me, when compared to the fast moving and competitive lifestyle in the cities.

Now write a short paragraph about the place where you grew up in the space given below.

.....  
.....  
.....  
.....  
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## SECTION 3

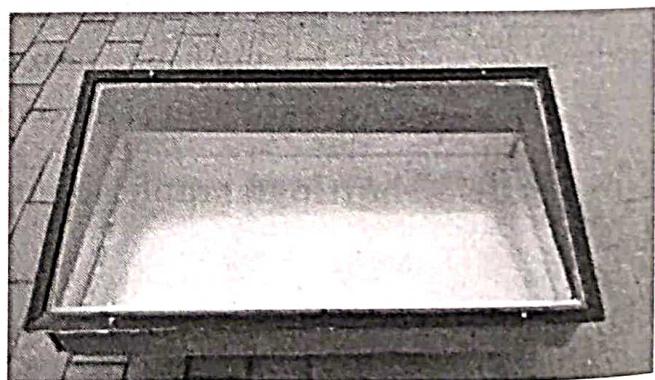
Innovations are not everyone's cup of tea. They require observation, passion, patience and perseverance. More than anything else, they need gumption and hard work. However, truly transformative innovations happen when idealism meets the incredible ideas of people who question the status quo, who defy logic, and those who love to take the road less travelled. The following passages showcase several ingenious innovations, with people across the country picturing a better world and finding solutions to make it happen. From solar trees to self-repairing roads, these innovations have the potential to dramatically impact the way people live.

### TASK 5: READING

Read the passages given below. You may need to read them more than once.

#### 1. SuryaGen Solar Water Purifier

Developed by IISc researchers and Suryagen Renewables, this open source solar water purifier can transform water from any source—be it from a sea, river, pond, well, or even water collected from rain—into potable water. This low-cost device can thus provide clear drinking water in areas where the only sources are contaminated with arsenic, fluoride or sewage. This device works by evaporating impure water using solar energy and then condensing the vapour to pure water on a cold surface. This leaves behind bacteria, heavy metals, arsenic, fluoride and other impurities. It can effectively produce 1.5 litres of potable water from 3 litres of impure water daily.



## 2. EnviGreen Edible Bags

India has been moving away from plastics for many years and several cities have already issued plastic bag bans. While legislation like this helps to protect our environment and wildlife, a young entrepreneur, Ashwath Hegde, noticed that it was a hardship for many Indians. 'People were concerned about how they would carry products from the market now. Everyone cannot afford a bag worth Rs. 5 or Rs. 15 to carry a kilogram of sugar,' says Hegde. So he decided to come up with a solution that would be sustainable and affordable. He eventually landed on a combination of natural starch (obtained from potato and tapioca) and vegetable oils to make a bag that looks and feels just like plastic with none of the negative environmental impacts of a plastic bag. EnviGreen's bags will naturally degrade in 180 days and if they are submerged in water they disappear in a day. Since they are made from starch and vegetable oils, these bags are edible as well. This means that when animals encounter non-degraded bags, they can eat them with no adverse effects.



## 3. Self-Repairing Roads

Nemkumar Banthia, a professor of the Civil Engineering Department at University of British Columbia (UBC), has developed roads that are self-repairing and sustainable. Built using ultra high-strength concrete and special fibres developed at UBC, the first such road in Karnataka is not only cost-effective, but has greater longevity. Unlike regular concrete roads, in which cement is a key component, Banthia's self-repairing road uses 60 per cent fly-ash and only 40 per cent cement. The fibres used have a hydrophilic nano-coating, which attract water in the event of rains. The water then becomes a key component in healing cracks. When a crack appears, this water provides hydration capabilities to the un-hydrated cement, and produces more silicates, which actually close the crack before they grow larger.



## 4. Ulta Chaata Harvester

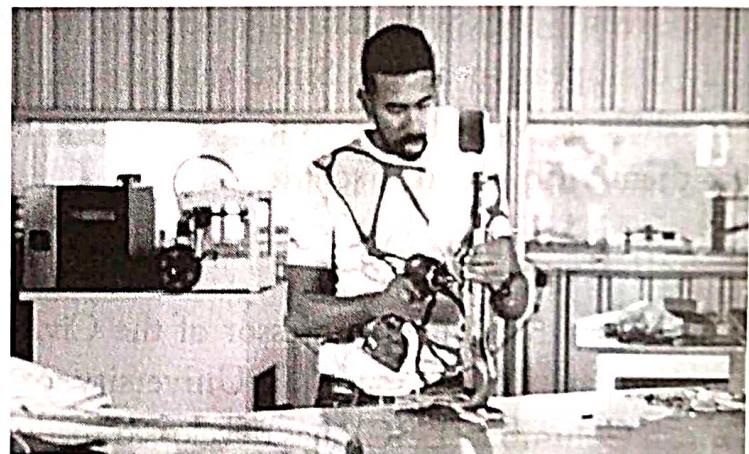
A couple passionate about conservation, Samit and Priya Choksi's first product is Ulta Chaata, an indigenous patented system that smartly combines rainwater harvesting and

generation of renewable energy for open spaces in smart cities, industries, or large campuses. A single unit of Ulta Chaata can help harvest upto 100,000 litres of water and harness energy with maximum peak power of 1.5 kW. Ulta Chaata is basically a canopy that captures rain water and then filters it using an integrated five-step filtration unit. Taps fitted to the storage tank allow users to get purified drinking water. It also works as a solar electricity generation system to provide lighting at night and charge devices. It is also IoT (Internet of Things)-enabled, to collect useful environmental data.



## 5. Cane-based Prosthetic Limbs

Bengaluru start-up Rise Legs has come up with a prosthetic leg made of cane for amputees which is not only light but much more affordable. Conventional low-cost prostheses in India, made of rubberwood or plastic, are often rigid, heavy and cumbersome, which makes walking and engaging in high-level activities difficult for the user. Modern prostheses, while flexible, are made of materials such as carbon-fibre and Kevlar that make them far too expensive for most amputees in India. Rise Legs is the brainchild of Arun Cherian, a roboticist and engineer who noticed how cane furniture was made by bending the stem in beautiful shapes that could also hold human weight. Impressed by the pliability, strength and spring-like quality of the cane, Cherian had one question—Can you make a leg out of cane? Collaborating with a local cane artist, Rahman Abdul, Cherian created ‘legs with which people can not just walk, but also run, play and dance’, said the Rise Legs founder in a video that subsequently went viral, with more than 200,000 views in less than a day.



## 6. Low-Cost Wind Turbines

Avant Garde Innovations, the startup founded by siblings Arun and Anoop George from Kerala, has come up with a low-cost wind turbine that can generate enough electricity to power an entire house for a lifetime. The size of a ceiling fan, this wind turbine can generate energy upto 5 kWh per day and costs less than an iPhone! The company launched its pilot

project at a church in the capital city of Thiruvananthapuram in January this year. The small wind turbine prototype that it has developed is highly scalable for power capacities of 300 kW or even higher. This revolutionary product has also won them a spot in the Top 20 Cleantech Innovations in India.



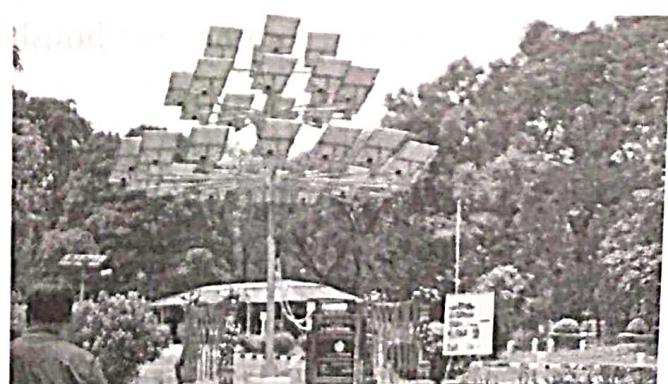
## 7. No-Fuel Plough

50-year-old Ram Prasad, a farmer in Banda in Uttar Pradesh, upcycled an old bicycle to make a low cost plough, and then inspired his neighbours to do the same. During a drought year, he had to sell his bullock to feed his family. Without his bullock and less money to maintain tractors and such equipment, times were difficult. Realising that all these factors only burdened farmers with rising costs and no returns, he decided to find an economical way to sustain farming. Over seven years he experimented with various materials. He finally had a breakthrough by converting an old cycle he found in his backyard, with some pieces of iron, into a plough. With a single wheel, front and rear handles, and three diggers attached to it, the machine does not require fuel such as diesel or kerosene to operate. It also costs only Rs 3000–4000, which when compared to the cost of a mini plough, bullocks or tractors, is a more economical option for farmers.



## 8. Solar Power Tree

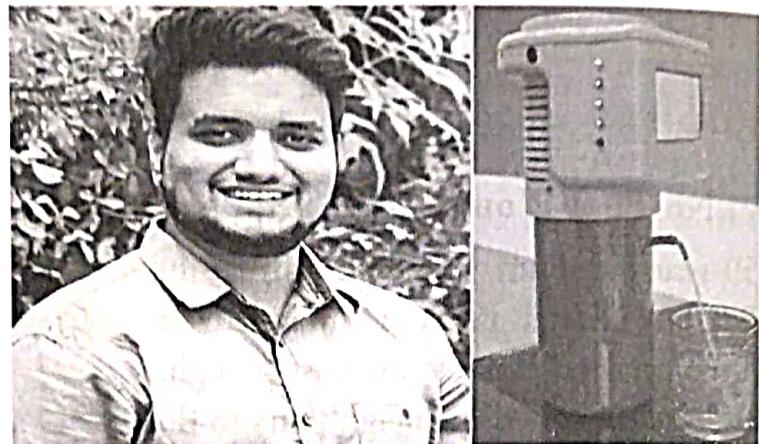
Developed by the Central Mechanical Engineering Research Institute (CSIR-CMERI), the Solar Power Tree generates the same amount of electricity as a conventional array (enough to light up five homes), but on a much smaller plot of land. With photovoltaic panels placed at different levels on branches made of steel, 'solar trees' could dramatically reduce the amount of land needed to develop solar parks. Solar power trees are also capable of harnessing 10–15 per cent more power as compared to ground-mounted solar arrays.



The tree charges a battery backup system that can provide two hours of light after sunset on a full charge. The solar tree is also self-cleaning, with a built-in water sprinkler to clear any debris that would interfere with efficiency.

## 9. DewDrop Water-from-Air Condenser

Jawwad Patel, a 22-year-old engineering student from Hyderabad, has designed a 3D-printed apparatus which can 'create' water from air. He is the first person from Asia to do so. The water apparatus produces pure drinkable water with the help of a computerised sensor interface with a UV filter. In an hour, the device can extract nearly 1.8 litres of water from the air. Called 'Dewdrop', this device uses the moisture in the air to create water. This is not Patel's first attempt at creating a novel device. He has previously created a smart helmet, which will not let you drive if you are drunk. He has also been nominated for the National Youth Award 2015–16 and the Dr APJ Abdul Kalam Excellence Award 2016.



## 10. Unique Waste Disposal Bins

Ganga Narayan Ghosh, an 87-year-old mechanical engineer, has designed innovative waste disposal bins to tackle the problem of waste management in India in an organised way. He visited 192 cities in India and 80 other cities in six continents to study other systems and finally designed three unique bins—one for homes, another for housing complexes and schools and the largest one for markets and entire localities. Every bin is covered, which prevents birds and animals from grabbing the waste content inside. Each bin is elevated so the bottom does not get submerged in water and is not corroded. The third and perhaps most unique feature is that the bottom portion of every bin is sloping. The slope creates an 'angle of slide' that helps in emptying waste once the front hatch is opened. The garbage automatically comes out of the opening due to the effect of gravity. Specially designed handcarts or regular



open-top trucks can be strategically placed in front of the bins to collect waste. This is a huge relief for garbage handlers as they hardly have to touch the waste matter. Even the top surface of each bin has a slope so that rain water cannot accumulate and corrode it. People also cannot leave bags of trash on it.

Source: <https://www.thebetterindia.com/80252/best-transformative-social-inventions-innovations-india/>

This article originally appeared in 'The Better India', written by Sanchari Pal.

The Better India is the world's largest solutions-based media platform that harnesses the power of the internet to transform every individual into a change maker. By reaching millions of people through its stories, campaigns and social messages, The Better India creates an eco-system of positivity and inspiration, helping people become part of the solution rather than being part of the problem. Through Karnival.com, The Better India expands its vision by offering ethically sourced, hand-made and eco-friendly products fit for every home.

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### Choose the answer that best completes the following statements:

1. In order to produce potable water from any water source the SuryaGen Solar Water Purifier uses the processes of
  - a. sedimentation and decantation
  - b. filtration
  - c. evaporation and condensation
2. What makes EnviGreen edible bags environment friendly is that
  - a. they are easily degradable
  - b. they are economical
  - c. they can carry heavy loads
3. The hydrophilic nano-coating of the fibres used in self-repairing roads helps
  - a. prevent waterlogging in areas that receive heavy rainfall
  - b. solve the water crisis in dry areas
  - c. heal cracks in the road by closing them before they grow larger
4. The Ulta Chaata Harvester facilitates both rainwater harvesting and
  - a. the generation of renewable energy
  - b. efficient waste management
  - c. reduced plastic use
5. Arun Cherian of Rise Legs thought of using cane to make prosthetic legs because
  - a. colour and texture

- b. pliability and strength  
c. easy availability in India
6. The Low-Cost Wind Turbine developed by Avant Garde Innovations can generate enough electricity for
- an entire hospital for a lifetime
  - an entire house for a lifetime
  - a car for a lifetime
7. The No-Fuel Plough developed by Ram Prasad is an environment-friendly method of farming because
- it is cost-effective
  - it does not require any kind of fuel
  - it can be built easily
8. One advantage that Solar Power Trees offer over ground-mounted solar arrays is that
- they are capable of harnessing more power
  - they take less time to generate power
  - they are more cost-effective
9. Jawwad Patel, the founder of the 'Dewdrop' water-from-air condenser, also developed
- a smart helmet
  - a smart wind-turbine
  - a smart water purifier
10. The most unique feature of the waste-disposal bins developed by Ganga Narayan Ghosh is that
- they are elevated to prevent corrosion through contact with water
  - the top surface of each bin has a slope so people cannot leave garbage on it
  - the bottom portion of the bin is sloping to allow easy collection of waste

## TASK 6: LISTENING

 Read the questions given below. Now listen to the passage on the app. Answer the questions as you listen.

Choose the answer that best completes the following statements:

- India's ranking in the Global Innovation Index for the years 2013–2015 has
  - gradually risen

- b. kept falling
  - c. remained consistent
2. India's game-changing inventions did not become 'innovations' because
- a. they were not marketed properly
  - b. they were not original inventions
  - c. they were not disruptive enough
3. One of the breakthrough technologies that the Simputer had incorporated even before the arrival of the smartphone was
- a. the GPS system
  - b. the accelerometer
  - c. virtual reality
4. The narrator says that knowledge is of primary importance in order to meet the twin objectives of
- a. growth with equity
  - b. growth with sustainability
  - c. digitisation and technologisation
5. One of the skills that recruiters will be looking out for in future is
- a. information memorisation
  - b. interpersonal skills
  - c. dependence on artificial intelligence

#### SECTION 4

Read the text provided in the following URL: <https://www.hitechnectar.com/blogs/future-technology-inventions-2050/#MedicalNanobots>

**Write down briefly what these inventions would do and how they would change things.**

- AI enabled robots

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2. Seamless IoT in home and business

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3. Space tourism

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4. Self-driving cars

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5. New sources of energy

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6. Drone ecosystem

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## 7. Virtual Reality

## 8. Medical advancement with AI and nanobots

### TASK 7: GRAMMAR

Read the following sentences from the above passages:

- As the population of the Earth **continues** to grow, living space also **shrinks**, not only for human beings but also for the animals and plants we **rely** on.
- Larger, more useful robots **are springing** up too.
- There **are** already plenty of touch-capable projector-like devices that can beam usable screens onto your skin, clothing or other surfaces.
- The future **is** all 3D printing in many fields.
- A quick glance in the mirror each morning **gives** you a visual cue on how you **are** **feeling** and looking to the outside world.
- Li-Fi **uses** light to transmit data rather than Wi-Fi's radio waves.

7. Tiny microscopic Nanobots **are scanning** and monitoring our insides to hunt out health problems.
8. Streaming films and music **is** perfectly normal nowadays.

The words in bold help us identify the time in which these events take place. The words in bold denote the present tense—simple present and present continuous.

## Present Tense

### Simple Present Tense

Verbs are action words that denote what happens in a sentence, as done by the subject. Verbs in simple present tense help in indicating that the action happens now (*The train is late.*), or can indicate a universal truth that never changes: *The sun sets in the west.*

### Present Continuous Tense

The present continuous tense is used to describe an action that is taking place at the time of speaking.

*Anu is building a 3-D model of a robot.*

*Prem is texting his friend about the special class tomorrow.*

**Fill in the following blanks using the simple present or present continuous forms of the verbs given in the brackets.**

1. Plastics ..... (be) one of the biggest challenges the world **is** .... (face) right now.
2. Many industries ..... (use) bioplastics made from corn which ..... (break) into polylactic acid.
3. Mushroom roots ..... (offer) excellent packaging material when mixed with other agricultural waste.
4. Bagasse ..... (come) as a by-product of sugarcane processing which ..... (transform) into packaging material used in many industries.
5. Seaweed water bubbles ..... (be) another innovation used for packing drinking water.
6. Scientists around the world ..... (develop) plastic alternatives out of the most unlikely things—one of these **is** chitosan, which is made from prawn and crab shells, which ..... (be) usually a waste product.

7. Wood pulp cellophane ..... (wrap) chocolates and other confectionery like cellophane.
8. Soap industries ..... (use) palm leaves from the areca palm to create the oyster-like cases. As the leaves fall (fall) naturally from the areca palm, they are collected and moulded into the desired shape.
9. Milk processing industries ..... (employ) casein, a protein that occurs in milk to create milk bottles.
10. It is ..... (surprise) to learn that paper can also be made from stone—especially from calcium carbonate.

### **TASK 8: LISTENING TO FILL A FORM**

#### **Availing a bank loan for your start up**

All innovations and start-ups that you have read about so far require funding. Many begin small but later they apply for funding through a bank to expand their businesses.

Now listen to a conversation on the app between a bank personnel and an entrepreneur who wants funds to establish a new company. Listen carefully and fill in the required details in the form given below.

#### **Allez Bank LOAN APPLICATION FORM FOR SMALL BUSINESSES**

For Office Use Only: Register No: .....

Date of Application: .....

Amount Requested: ..... (In words: .....)

Applicant's Name: (in CAPITAL LETTERS)

Email address: .....

Permanent Address: .....

Date of Birth: ..... Phone Number: .....

Name of the Company: .....

Type of Business: .....

Business Details: .....

### **Partners**

1. Name: ..... Percentage of Ownership: .....

2. Name: ..... Percentage of Ownership: .....

3. Name: ..... Percentage of Ownership: .....

### **FOLLOW-UP**

#### ***Speaking***

**Work with a partner. Ask him/her five questions about hobbies and study habits. Note down the information.**

Name:

Hobbies:

Study habits:

**Now introduce him/her to the rest of the class using simple present tense.**

This is .....

He/she likes .....

#### ***Vocabulary***

**One of the common ways in which new words are formed in science and technology is by combining various words. For example**

bio + medical/medicine = biomedical, biomedicine

bio + diversity = biodiversity

bio + materials = biomaterials

**Identify six such words from the reading passages given in Sections 1 and 3 and write them down in the space given below.**



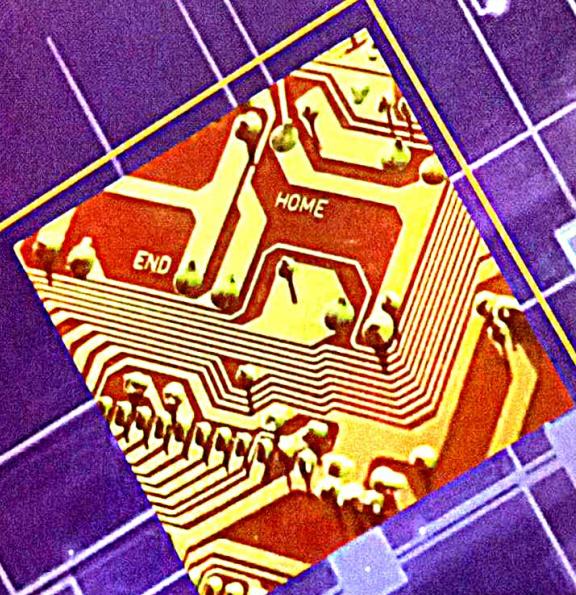
Orient BlackSwan

# English for Engineers and Technologists

Volume 1

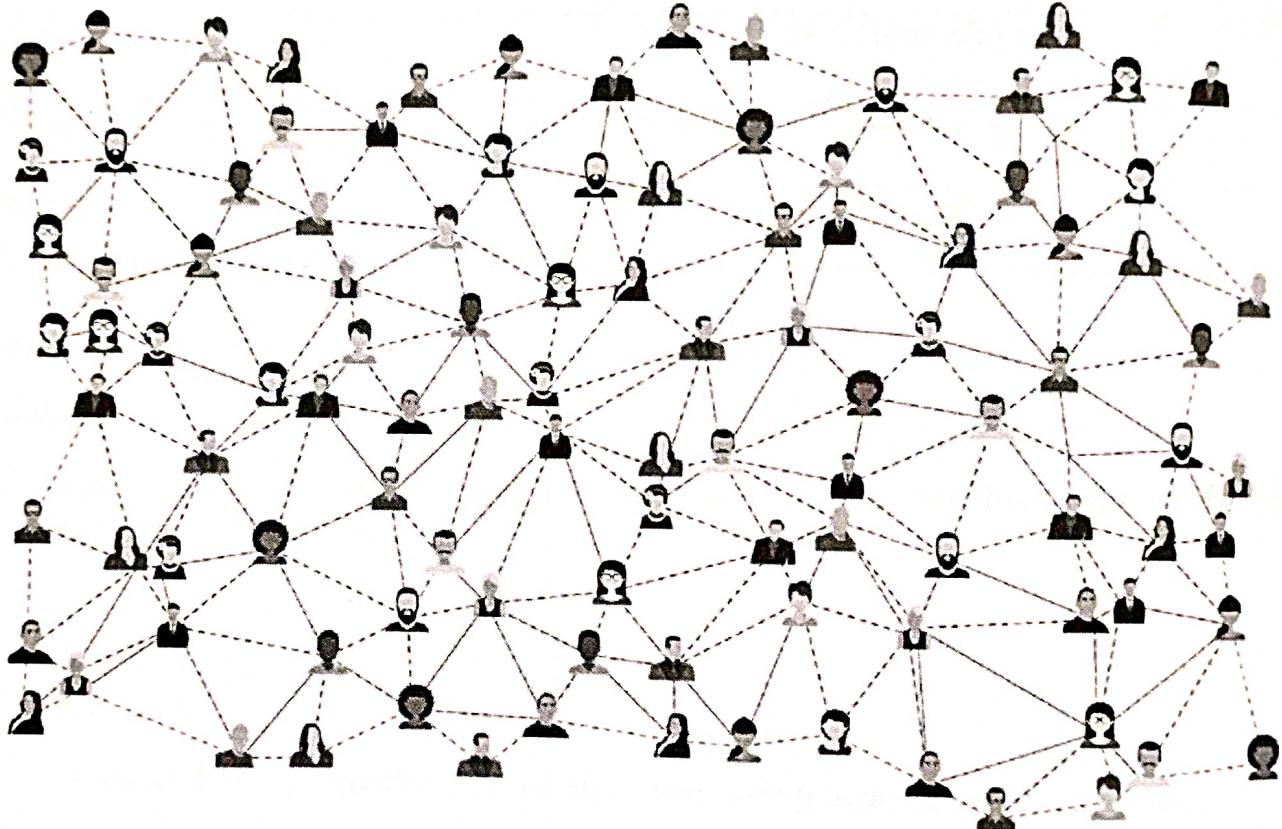
*Third Edition*

Department of English, Anna University



# Communication

Listening	Speaking	Reading	Writing	Grammar and Vocabulary
Conversation (asking for directions, framing questions)	Short conversation (social conversation—asking for directions, making enquiries), role play	Reading a print interview	Checklist, dialogue writing	Simple past, question formation ( <i>Wh</i> -questions, Yes/No questions, tag questions); stress shift



## PREPARATORY

1. Write down ten words related to communication, presentation and conversation.

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Describe to your partner the context in which these words are used.

2. Form groups of six. Each group should choose one of the topics given below. Express your views freely: everyone should take turns to listen and speak!

- Oral communication is preferable to written communication in social contexts.
- In order to make effective presentations one should know both the content and the language to express it.
- Communication is more than just words.
- Different cultures communicate in different ways.

Make a note of your group's arguments. Now write these out in five complete sentences.

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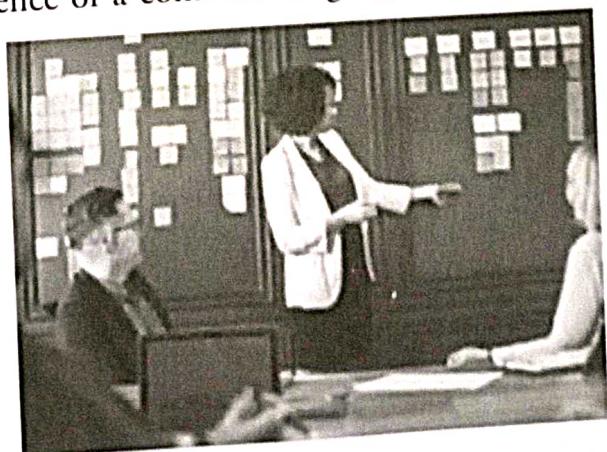
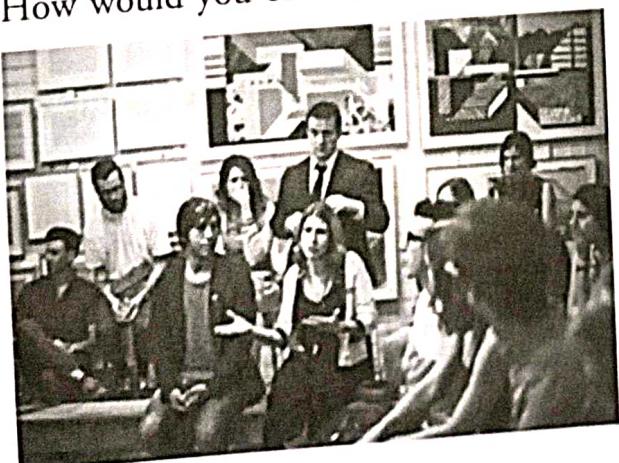
## SECTION 1

### TASK 1: LISTENING

#### *Pre-listening*

Brainstorm the following questions in groups.

1. Do you think the way we communicate is as important as what we communicate?
2. Is all communication culturally determined? Give some examples in support of your answer.
3. Is verbal communication different from non-verbal communication?
4. How would you communicate in the absence of a common language?



## Listening

- Now play the audio on the app. Listen to it once and read the questions given below. Listen to the audio again and write your answers in words or phrases from the audio.
  - The two kinds of cultures the speaker mentions are ..... and .....
  - In ..... culture, yes means yes, and no means no.
  - If you are from a ..... culture, when someone says 'no' without using the word 'no', you .....
  - Apart from the words, communication is also about paying attention to the .....
  - According to the speaker, culture is ..... and is ..... to the point of .....

## Post-listening

When you are in a new place, one of the first things you may need to do is to ask for directions.

- Now play the audio on the app. Listen to it once and write down the phrases used when asking for directions and giving directions.

**Asking for directions**

**Giving directions**

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- Now play the audio on the app, with clips of people asking for and giving directions in real life.

Note down the alternatives the coordinator points out regarding the following preposition used:

turn left: a. b.

go right: a. b.

keep going: a.

c.

## TASK 2: SPEAKING

One of the primary uses of communication is to help us get things done with someone's assistance. These could be:

- asking for directions
- making enquiries
- making polite conversation

Work with a partner or in small groups. Enact the following dialogues:

### *Dialogue 1*

*(Suman is new to the city and wants to make friends.)*

**Suman:** Hello! I'm new to this city. Can you help me find a stationery shop?

**Raji:** Hello Suman. I can help you. What're you looking for?

**Suman:** I want to buy some microtip pens and some sketch pens. Oh, and some large, ruled notebooks.

**Raji:** You can buy those at the store in the campus. They're cheaper here than in the city.

**Suman:** I also need a pen drive.

**Raji:** Then you'll need to go to a shop in Indira Nagar.

**Suman:** Thanks, Raji. I'll ask you for directions before I go!

### *Dialogue 2*

*(Arjun wants to study for an exam; Abdul wants to explore the city)*

**Abdul:** Let's go to the science museum, Arjun!

**Arjun:** Why don't you go with Mani? I have to study for the Maths exam.

**Abdul:** Come on, Arjun. It'll only take a couple of hours, and it's right across the road.

**Arjun:** I really must study: I haven't gone through the textbook at all since I was sick last week.

**Abdul:** Do come. It'll do you good to get away from the room. I'll explain the concepts and help you revise.

**Arjun:** Oh, well! I'll come then!

**Abdul:** Great, let's go!

### *Dialogue 3*

*(Khaleel wants to ask for application forms for participating in a competition)*

**Khaleel:** Good morning. I would like to participate in the robotics competition being organised at Technova 2019 next month.

**Lady:** That's good to hear. Here is the application form. You need to fill it in and return it to me.

**Khaleel:** What is the last date for submitting the applications?

**Lady:** It's the tenth of this month. That's day after tomorrow.

**Khaleel:** And how much is the fee? Can I pay it online?

**Lady:** The fee is Rs 200. You can pay it online to the Technova/Robotics account. The account details are given in the form. After you make the payment, fill in the transaction details in the form.

**Khaleel:** Great. I'll make the payment today and hand in the application tomorrow.

**Lady:** All the best!

### *Dialogue 4*

*(Suman wants to ask Raji the way to the stationery shop)*

**Raji:** Suman, you wanted to go to the stationery shop, didn't you? I'm afraid I can't come with you today but I can give you directions.

**Suman:** Thanks, Raji. I know you're busy today. I'm sure I will be able to find my way there if you give me directions.

**Raji:** You can take the bus. When you step out of the college campus, cross the road and take the bus number 23F. Get off at Indira Nagar Water Tank. It'll be the third stop after you get on.

**Suman:** Okay.

**Raji:** After you get off, continue walking in the direction you came from, and turn right at the first crossing.

**Suman:** Okay.

**Raji:** There will be a juice shop at the corner called Sip Fine. The shop next to it is Kamaal Stationery. You can buy pen drives there.

**Suman:** That seems fairly simple. I'm sure I'll have no trouble finding it. Thanks a lot! I think my mother's colleague stays somewhere there. I may visit her as well, while I'm there.

**Raji:** Great. Have a nice time!

### Dialogue 5

(Vishal meets Raja outside the gate of his house)

**Vishal:** Hello. Are you looking for someone?

**Raja:** I've just moved into the house next door and was exploring the street.

**Vishal:** Welcome to the neighbourhood. Let me know if you need any help.

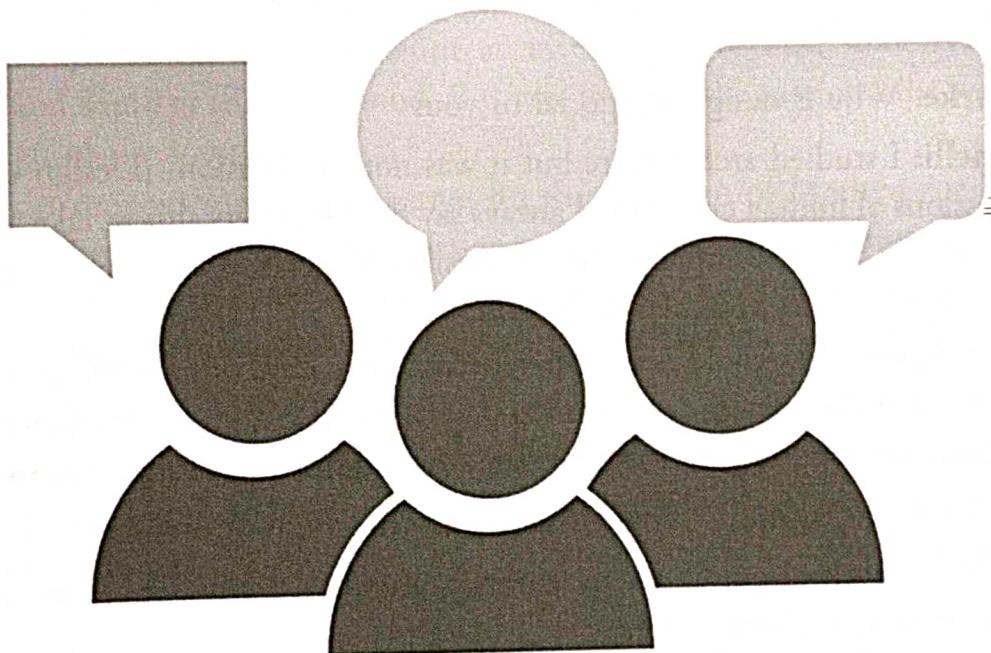
**Raja:** Sure. I am at work till six. Till what time is that department store open in the evening?

**Vishal:** Till about 8.30 pm. It's closed on Tuesday, though.

**Raja:** Thanks, I'll keep that in mind.

**Vishal:** See you, bye.

Note that since this is spoken communication, in the above dialogues **contractions** such as *I'll*, *I've*, *it'll*, *can't* are used.



Now work with a partner and exchange a short dialogue on the following topics. Exchange roles so both of you can play each speaker. Take a minute to prepare but do not write down and read out a dialogue.

- Hari asks Karen where the library is.
- Amma asks Muthu to buy some vegetables.
- Arsha asks a passerby for directions to the cinema.
- Ramani welcomes Anshu to the office and introduces her to everybody.
- Jacob offers to help Karan with his bags.

**SECTION 2****TASK 3: READING*****Pre-reading***

Discuss the following with a partner:

1. What do you understand by the term ‘design’?
2. List three words you associate with the word ‘design’.
3. Is there a relationship between ‘design’ and ‘development’?

Read the following interview.

In this edited Q and A with Professor Anthony Burke, Head of the School of Architecture at the University of Technology Sydney, Paola Antonelli, a senior curator at the Museum of Modern Art (MoMA), explains why design is much more than just pretty objects and Scandinavian furniture.

**Anthony Burke:** Why is design so special to you?

**Paola Antonelli:** I studied architecture but it was not my mission. [Design is] one of the highest expressions of human creativity. I always say that designers almost take a Hippocratic oath. An artist can *choose* whether to be responsible towards other human beings or not, but instead a designer *has* to be, by definition.

Without designers, life would not happen because any kind of scientific or technological innovation gets filtered by design and becomes part of our life. Without designers, we couldn’t use microwaves, we couldn’t use the internet, we couldn’t use so many innovations.

**Burke:** But most people think design is nice furniture from Scandinavia.

**Antonelli:** They think about it as an embellishment. ... My job is to make people understand that it is so much more.

**Burke:** Design has had a bit of a renaissance, almost; it’s come back into people’s lives in a broad way. Why do you think that has happened recently?

**Antonelli:** In the United States, where I have been living for the past 20 years, design has been kind of neglected or misconstrued as decoration or as an embellishment for a really long time.

Lately, it’s been reconsidered and I have to say, it’s mostly because of [the late Apple CEO] Steve Jobs. The funny thing is that that’s a blessing and a curse at the same time. It’s a blessing because Apple indeed did a lot to elevate the threshold of popular acceptance of design quality so people have started demanding more. ... Also, it concentrates the

attention again on objects; [whereas] it's so important to make people understand that interfaces, the ATM machine, and the interface of your phone, visualisation design, that they're such important parts of our time.

**Burke:** Normally we think of design within the creative arts and architecture but I think business now is interested, economists are talking about design, research and development departments of big companies now have design thinking units. Why is that?

**Antonelli:** Design thinking is not design. Design thinking is to design what the scientific method is to science. It's the *steps* without the knowledge and the years of training. And design thinking is a real danger because many companies think they're doing design and they're not. . . .

It's impossible to define what *is* design. You know, it's like trying to define what art is. It's everything that we make, if you wish. And some of it is good, and some of it is bad.

**Burke:** You have spoken in the past about interaction design. Can you tell us about that?

**Antonelli:** Interaction design is the design of the behaviour between a person and a machine. I always use the ATM machine as an example, because some ATM machines are disasters and some of them are good. But you can feel the care and the work that goes into the design of the interface. . . .

I decided to start acquiring videogames for the Museum of Modern Art because they really focus on this idea of interaction design and on behaviours. So they almost are pure because there is no function. In some cases, they can be educational, but in most cases it's just about exciting a certain kind of behaviour in you that is about letting go.

**Burke:** What else are you working on at the moment?

**Antonelli:** For the collection, we have been acquiring videogames and certain crucial icons. Two years ago we acquired the @ sign, and about a month ago, we acquired the Google pin, you know from the Google maps. And we're acquiring more and more typefaces and fonts.

. . . One of the goals [of our research and development] is to really make sure that museums make sense in the future. Especially museums like MoMA that are completely private. We don't receive any money from the government so we have to be self-sustaining; we have to keep ourselves relevant.

**Burke:** With this turn to interaction design and those more electronic forms of design, what happens to the more traditional forms of design like Scandinavian furniture?

**Antonelli:** You really are touching a sore spot. . . . I think we have become a little wary about objects. We demand more from objects. We are also conscious of the fact that there's too much stuff on Earth, so it better be really worthwhile. I think it is healthy because the fewer objects the better, in a way.

There's also a whole universe in the fifth dimension online that is for designers to explore. ... But I am pretty sure that, in the future, we will have more and more virtual environments that will also have their own objects. Designers can work on those. This will also be an economy. There's going to be this whole life we have online that is tied to the physical world but is also autonomous.

**Burke:** What's your current favourite piece of design?

**Antonelli:** Well, there's a new variation of the handicapped sign, the wheelchair sign, that I love that we just acquired into the collection.

The old one had the static person in the wheelchair waiting to be pushed. The new one, it's almost like the Paralympics, they are jolted forward, they don't need anybody, it's going. I like that. It made me excited.

I think it's our job as curators to present great checklists of fabulous objects.

When we can have them physically or digitally and preserve them, it behoves us to do so. In the case of the @ sign, it's in the ether but it's still part of my job to indicate it as an example of great design. So we just put it on the wall.

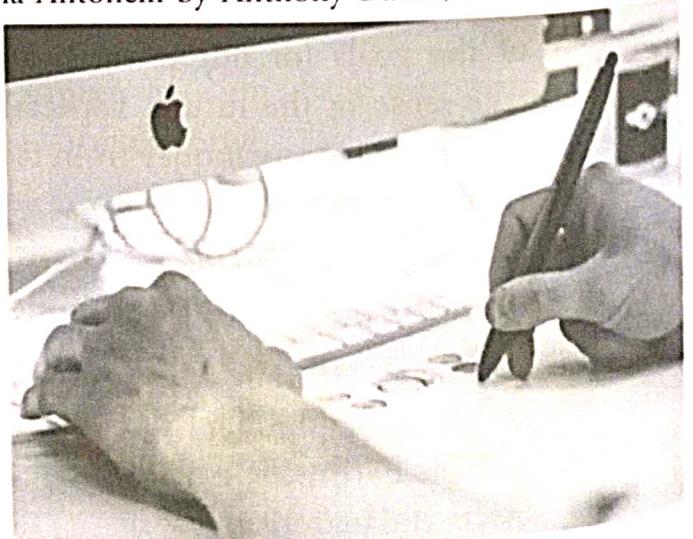
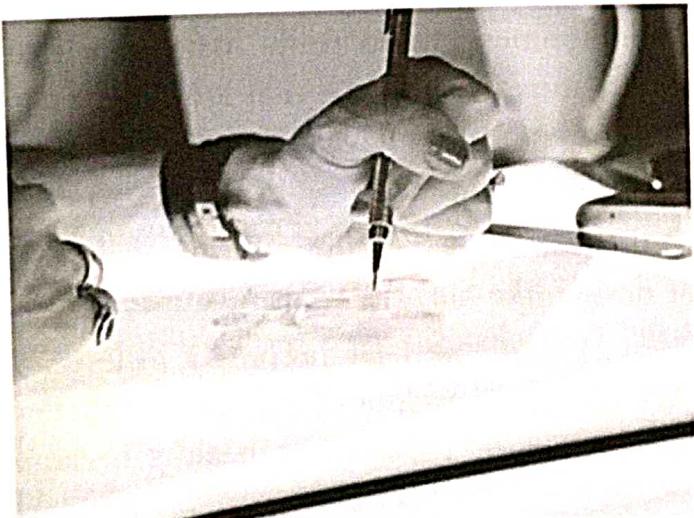
We chose American Typewriter as the font because that's the font that Ray Tomlinson used in 1971 when he was working for the agency that was commissioned by the US government to design email.

He found the symbol that was used by accountants that had existed since the Middle Ages. He did some research, he understood that this symbol meant "in relationship with". He adopted it to collapse all the lines of code that connected the person to the machine, in the email address.

Artefacts in the digital realm are alive. You can't put them in a cage.

*Source: <https://theconversation.com/paola-antonelli-interview-design-has-been-misconstrued-as-decoration-21148>*

Interview of Paola Antonelli by Anthony Burke, The Conversation



Now answer the following questions.

1. Why are designers important?

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2. What has design been interpreted as? What is the author's response to this?

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3. According to Antonelli, when designing something what should the focus be on?

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4. What is the difference between design thinking and design?

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5. What is the history and legacy of the symbol '@'?

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#### TASK 4: GRAMMAR

##### Simple past tense

Look at the following sentences from the passage you just read.

I studied architecture.

We acquired the @ symbol.

He did some research.

We chose the American Typewriter font.

They describe things that happened in the past. In these sentences, the verbs are used in the past tense. This is done in two ways:

Regular verbs: In regular verbs the form of the verb is changed by adding -d/-ed.

For example: *studied, acquired*

Irregular verbs: In irregular verbs the form of the verb is changed by modifying the root word itself.

For example: *did, chose*

### **Read the following description by Anne Toomey of research conducted in Bolivia.**

Between 2012 and 2015, we carried out interviews and workshops with people living and working in the region, including park guards, indigenous community members and other researchers. We also surveyed scientists who had worked in the area during the previous 10 years. Our goal was to better understand whether they considered their research to have implications for conservation and ecological management, and how and with whom they shared the results of their work.

Eighty-three percent of researchers queried told us their work had implications for management at community, regional and national levels rather than at the international level. For example, knowing the approximate populations of local primate species can be important for communities who rely on the animals for food and ecotourism.

But the scale of relevance didn't necessarily dictate how researchers actually disseminated the results of their work. Rather, we found that the strongest predictor of how and with whom a researcher shared their work was whether they were based at a foreign or national institution. Foreign-based researchers had extremely low levels of local, regional or even national dissemination. However, they were more likely than national researchers to publish their findings in the international literature.

### ***Ongoing scientific colonialism?***

This disparity raises concerns about whether foreign-led research in tropical nations such as Bolivia is perpetuating colonial-era legacies of scientific extractivism.

Along with its South American neighbors, Bolivia was subject to centuries of European explorations, during which collectors gathered interesting specimens of flora and fauna to ship back to the country financing the expedition. As late as the 1990s, more than 90 percent of 37,000 zoological specimens from Bolivia were in collections beyond its borders. The expatriation of biological samples has become increasingly restricted under a national political climate of "decolonization."

But many locals in the Madidi region still expressed to us perceptions that "research is only for the researcher" and "researchers leave nothing behind." In interviews and

workshops, they lamented opportunities missed because they didn't know about the results of research conducted on their lands. For example, when the park staff learned about previous research done on mercury levels in the Tuichi river that runs through the park, they talked about the importance of sharing this information with local communities for whom fish is a main source of protein.

Our results suggest that foreign researchers should be wary of a modern form of scientific colonialism—conducting fieldwork in a far-off land and then taking their data and knowledge home with them.

Our study also revealed that in some cases, the question of whether or not research had been disseminated was a matter of perspective. Park offices, indigenous council headquarters and government institutions all held dusty libraries full of articles and books that were in many cases the final products of scientific studies. But very few people had actually read these reports, in part because many were written in English. Also, people in the Madidi region are more accustomed to obtaining knowledge orally rather than through written texts. So finding new ways to communicate across cultural and language barriers is key.

Source: <https://theconversation.com/redefining-impact-so-research-can-help-real-people-right-away-even-before-becoming-a-journal-article-94219>

Anne Toomey, The Conversation

1. Underline the verbs that are in the simple past tense.
  2. Write your own sentences using the underlined verbs.

### 3. Fill in the blanks with the correct form of the verb provided in the brackets.

- In the past, indigenous communities ..... (depend) on local biodiversity for survival.
- Last week, the team ..... (address) issues of viability when the interviewers ..... (ask) them about it.
- The amount of discards ..... (collect) poses the question of what to do with it.
- This technique ..... (is) ineffective so we had to abandon it.
- It is ..... (estimate) that the majority of ocean plastic is particles less than 1 mm in size ..... (suspend) in the water column, with yet more plastic sinking to the ocean floor.

## SECTION 3

### TASK 5: WRITING

**In the interview in Task 3 note how questions are asked and answered in a formal interview.**

Now look at an excerpt from the interview.

**Burke:** You have spoken in the past about interaction design. Can you tell us about that?

**Antonelli:** Interaction design is the **design of the behaviour between a person and a machine**. I always use the **ATM machine** as an example, because some ATM machines are disasters and some of them are good. But you can feel the care and the work that goes into the **design of the interface**...

I decided to start **acquiring videogames** for the Museum of Modern Art because they really **focus on this idea of interaction design and on behaviours**. So they almost are **pure** because there is **no function**. In some cases, they can be **educational**, but in most cases it's just about **exciting a certain kind of behaviour** in you that is **about letting go**.

If you were listening to the interview and had to make notes, you would have noted down the phrases marked in bold, since these would help you capture the gist of what was being spoken.

### ***Exercise***

Write dialogues for the following situations. Write down some of the main ideas you would like to include, before you write down the dialogue. The first one provides you with some hints.

1. Your teacher would like you to prepare a project to include in the annual competition. You are discussing with him/her possible ideas to help you identify the topic of the project.

#### ***Notes***

*Possible areas:* mining, robotics, coding, ...

*Questions:* When is it to be ready? Who is the audience? How many people? What format? Should I prepare a model or demonstrate a sample?

*You:* Did you wish to see me, Ma'am?

*Teacher:* Yes, I wanted to discuss ...

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2. You would like to apply to the bank for a loan for further studies. You meet the manager at the bank to discuss what information/documents they need for the application.

#### ***Notes***

*Possible areas of study:*

*Questions:*

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- .....  
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3. You would like to take some additional courses to gain extra credits. You meet the Dean to discuss what courses you could take up, and the respective requirements, and how this could impact your schedule.

**Notes**

*Possible courses:*

*Questions:*

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## TASK 6: VOCABULARY

### Stress shift

Read out aloud the following words.

photograph

photography

photographic

Did you notice that the primary stress on the syllables shifts as the inflection changes. Now read the words stressing the syllable immediately after the stress mark ('').

**Write down six sets of words that show stress shift.**

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**Read the following passage and identify five three- or four-syllable words. Write down inflected forms of the word indicating stress shift.**

The underlying problem of underemployment is even more worrying. Throughout the 2000s, the number of young people in agriculture in India decreased, as you would expect in a modernising economy. But in the 2010s, the number increased. Most are unable to run viable farms and are effectively stuck in an occupation they may have hoped to escape.

The problem of unemployment and underemployment is a cluster crisis with three components.

First, it reflects the inability of the state to develop a form of economic growth that creates jobs. Jobless growth has become a hallmark of India's experience of economic liberalisation since the early 1990s.

Second, youth unemployment and underemployment results from a crisis in tertiary education. There are some excellent universities and colleges in India. But they are rare. The state universities and their affiliated colleges are starved of funds.

Third, the wider environment is inimical to enterprise in many parts of India. In many northern states of India in particular, problems in obtaining institutional credit; poor quality policing; an atrophied local and regional legal system; weak road infrastructure; and poor public health care provision militate against youth starting businesses that employ others and reflect their ambitions and talents.

*Source: <https://theconversation.com/why-australia-should-engage-with-the-unemployment-crisis-affecting-indian-youth-113034>*

Craig Jeffrey, The Conversation

**Word**

**Inflection 1**

**Inflection 2**

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.....  
.....

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## SECTION 4

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### TASK 7: GRAMMAR

#### **Wh– questions**

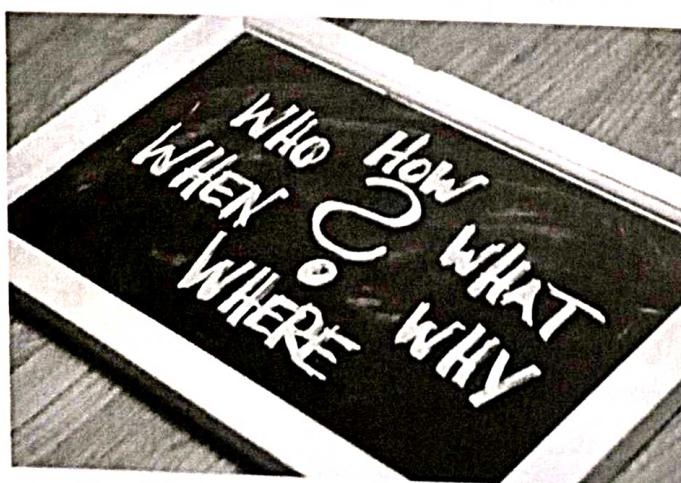
In the interview in Section 2, the interviewer asked the following questions.

- Why is design so special to you?
- Why do you think that has happened recently?
- Why is that?
- What else are you working on at the moment?
- What's your current favourite piece of design?

Some of the other questions you could ask when interviewing someone are:

- How did you become interested in the field?
- Who are the people who influenced you?
- When did you first realise...?
- Where were you educated?
- Which is the most memorable moment of your career?

The words *who*, *why*, *what*, *which*, *when*, *where* and *how* are *Wh–* question words.



1. Using **Wh-** words write the appropriate questions to the given answers.

- a. ....  
The main problems in Siapur village are lack of roads, electricity and healthcare.
  - b. ....  
I first visited the village in 2010.
  - c. ....  
You should contact the head of the panchayat to discuss the matter.
  - d. ....  
Ravi moved from the village to the city seeking employment opportunities.
  - e. ....  
He now lives in a rented flat.
  - f. ....  
Raja plans to resolve issues by working hard and persuading the community.
  - g. ....  
The eastern side of the river floods every year.

2. Work with a partner. Using different *Wh*- words ask each other five questions about your interests and ambitions. Write down the questions your partner asked you.

## Tag questions

In informal situations or in a conversation, we often use tags to move the conversation forward and to offer the other person a chance to express their views. Look at the following examples:

- You're from this city, aren't you?
- The weather is gloomy, isn't it?
- The problem won't be easily solved, will it?
- He isn't a teacher, is he?

When the (verb in the) main clause is positive, the question tag is negative (as in sentences a. and b.) and when the main clause is negative, the question tag is positive (as in sentences c. and d.).

### Fill in the blanks with the appropriate question tag.

- You can lift ten kilos, .....?
- This is the first time he succeeded, .....?
- He has two more chances to win the competition, .....?
- You can't drive a three-wheeler, .....?
- It doesn't look like India will win the World Cup, .....?

When responding to questions with tags, the answer can express agreement or disagreement.

*You feel really hot in Chennai in this weather, don't you?*

*Yes, I do. It was very cool in Yelagiri.*

*No, I don't. Madurai was even hotter.*

### 2. Write the appropriate question with a question tag to the answers given below.

- .....  
Yes, I did. I turned off the taps just before we left home.
- .....  
No, I haven't. This is my first visit to Gokarna.
- .....  
No, I couldn't. I was too busy to shop before I left for Hyderabad.
- .....  
Yes, it is. It takes more effort to write a letter than to send an SMS.
- .....  
Yes, he does. He now climbs three flights of stairs four times every day.

## TASK 8: WRITING

### *Writing a checklist*

Checklists can be written to serve various purposes, two of which are:

- to remember a list of things: such as, a shopping list, a to-do list
- to prepare an outline: such as, before writing an essay, before preparing a presentation

Look at the following examples.

#### *Things to do*

- Call Ramesh re rescheduling of classes
- Buy sketch pens for poster presentation
- Speak to Librarian re renewal of library cards
- Collect ID card from Admin Office
- Register for Volleyball team

#### *Mock presentation*

- Prepare slides
  - o Introduction (2 slides)
  - o Content of project (6 slides)
  - o Conclusion (2 slides)
  - o Prepare for possible questions
- Check infrastructure of room (seating, mikes)
- Check projector-laptop connection; check and play audio clips (speakers available?)
- Carry backup on pen drive, pointer
- Time the presentation (5 mins less than allotted time)



### ***Exercise***

**Write a checklist for each of the following.**

1. You have to go to the bank to ask about opening a savings bank account. Make a checklist of information you would like to ask for and the documents you are likely to need.

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2. You are going out of town for a few days and would like your room-mate to take care of a few things related to the room and to classes at the college.

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### **FOLLOW-UP**

1. Using *Wh-* words write the appropriate questions to the given answers. There may be more than one way of asking the question.

- a. ....  
Sher Singh reached here yesterday.

- b. ....  
He wanted to visit his mother.
  - c. ....  
It took him a day and a half to reach here.
  - d. ....  
His village is 30 km from the nearest railway station.
  - e. ....  
He boarded the train at Jhansi.

2. Match the questions in Column A with the tags provided in Column B.

A	B
a. We have had a busy day,	i. won't he?
b. You would like to sleep early,	ii. can't she?
c. He will fall if he runs so fast,	iii. haven't we?
d. She can take the exam next year,	iv. can she?
e. She can't join us for dinner tomorrow,	v. wouldn't you?

3. After the lesson, you would like to clarify certain topics with your teacher. Prepare a checklist of things you would like clarified.



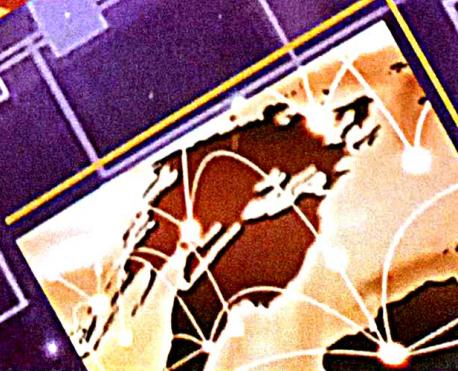
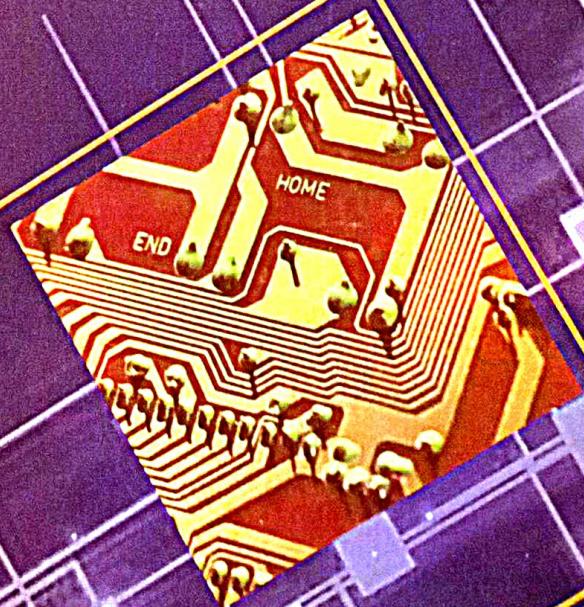
Orient BlackSwan

# English for Engineers and Technologists

Volume 1

*Third Edition*

Department of English, Anna University



# Space

Listening	Speaking	Reading	Writing	Grammar and Vocabulary
Listening to short speeches (gist of the speech, inferring the message, answering multiple choice questions)	Five-minute talks on given topic	Autobiography, biography	Formal letter—letter to the Dean, letter of complaint	Future tense, subject-verb agreement; collocation, fixed expressions

## PREPARATORY

Read some famous quotes related to space given below. Pick two that you like the most and discuss it with the person sitting on your left. You can also ask your partner if they know anything about the person who authored it.

- That's one small step for a man, one giant leap for mankind.

*Neil Armstrong*

- Look at the sky! We are not alone.

*A. P. J. Abdul Kalam*

- My mental boundaries expanded when I viewed the Earth against a black and uninviting vacuum. . .

*Rakesh Sharma*

- Hey sky, take off your hat, I'm on my way!

*Valentina Tereshkova*

- The Universe is under no obligation to make sense to you.

*Neil deGrasse Tyson*

- Mars is the only place in the solar system where it's possible for life to become multi-planetarian.

*Elon Musk*

- When you look at the stars and the galaxy, you feel that you are not just from any particular piece of land, but from the solar system.

*Kalpana Chawla*

- When I orbited the Earth in a spaceship, I saw for the first time how beautiful our planet is. Mankind, let us preserve and increase this beauty, and not destroy it!

*Yuri Gagarin*

9. All of a sudden, space isn't friendly. But we can't explore space if the requirement is that there be no casualties.

*Isaac Asimov*

10. In some strange way, any new fact or insight that I may have found has not seemed to me as a 'discovery' of mine, but rather something that had always been there and that I had chanced to pick up.

*S Chandrasekhar*

## SECTION 1

Read the following clues and guess the eminent personality. Fill in the blanks with the name you identified and the appropriate pronouns.

..... was born on 12 August 1919 in Ahmedabad, India. .... was an Indian physicist and industrialist who **initiated** space research and helped develop nuclear power in India. .... was born into a family of industrialists. .... attended Gujarat College, Ahmedabad, but later moved to the University of Cambridge, England, to complete his honours degree in natural sciences in 1940. World War II forced ..... to return to India to pursue research on **cosmic** rays under physicist Sir Chandrasekhara Venkata Raman at the Indian Institute of Science, Bangalore (Bengaluru). In 1945 ..... returned to Cambridge to **pursue** a doctorate and wrote a **thesis** titled 'Cosmic Ray Investigations in Tropical Latitudes,' in 1947. .... founded the Physical Research Laboratory in Ahmedabad on his return to India.

The range and breadth of .....'s interests were **remarkable**. After establishing the Indian National Committee for Space Research in 1962, which was later renamed the Indian Space Research Organisation (ISRO), ..... also set up the Thumba Equatorial Rocket Launching Station near Thiruvananthapuram in 1963. After the death of physicist Homi Bhabha in 1966, ..... was appointed chairman of the Atomic Energy Commission of India.

Dedicated to the use of all aspects of science and technology in general and to space applications in particular as 'levers of development,' ..... initiated programs to ensure education in **remote** villages through satellite communication and called for the development of satellite-based remote sensing of natural resources.

..... was awarded two of India's highest honours, the Padma Bhushan (1966) and the Padma Vibhushan (awarded **posthumously** in 1972). .....

**GUESS  
WHO?**



died on 30 December 1971, Kovalam, and is today better known as the Father of the Indian Space Program.

***Did you find out? Write your answer here. ....***

Now read the passage carefully again noticing its structure. The passage outlines the life and achievements of a person. This type or genre of writing is known as biography.

**Read biographies of the following well-known personalities and prepare short write-ups of about 100 words each.**





# Task 1: Reading Comprehension

**Answer the following questions related to the biography given in Section 1.**

- A. Write the meaning of the following words which are taken from the passage. Keep in mind the context and choose the correct option from the words given in brackets.

1. initiated – ..... (strengthened, started, completed)  
2. cosmic – ..... (earthly, dangerous, outer space)

3. pursue – ..... (gather, allow, follow)
4. thesis – ..... (research document, speech, puzzle)
5. latitude – ..... (boundary, territory, imaginary line)
6. remarkable – ..... (difficult, extraordinary, marking)
7. dedicate – ..... (devote, complain, agree)
8. lever – ..... (tool, platform, organ)
9. remote – ..... (control, distant, completed)
10. posthumously – ..... (after one's death, via-post, humanely)

**B. Answer the following in a word or phrase.**

1. The person discussed above has expertise in more than one field. Which two words explain this quality?
2. Where was the Physical Research Laboratory established?
3. Name the two highest honours received by the person.
4. What did the 'levers of development' focus on?
5. In your opinion, what are the key factors that helped the person achieve such success in his field?

## TASK 2: SPEAKING

Choose an eminent space scientist of your liking and prepare a brief biography, referring to various sources. Then speak about their life and achievements for five minutes in class. You can include details of their birthplace, education, career, achievements and awards.

You might be familiar with Mahatma Gandhi's autobiography *My Experiments with Truth* or APJ Abdul Kalam's *Wings of Fire*. How is an autobiography different from a biography? Follow this link to read a very interesting autobiography:  
<https://stolenemotions.wordpress.com/2011/05/18/autobiography-of-a-star/>

Now speak for 3 minutes about your favourite subject at school and how it inspired you to join the course you chose at college.

*You may want to jot down a few points before you start speaking.*

.....

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.....

.....



Why should you read autobiographies?

- Autobiographies are real life stories of people and serve to motivate us.
- They help us view their journey to success and may provide us with a role model.
- The tips and techniques to handle challenges could come in handy.
- Autobiographies help us gain perspective and understand what matters the most in life.

Here is a list of popular autobiographies. Read at least one of them and discuss what you thought about it in small groups.

*Wings of Fire* by A. P. J. Abdul Kalam

*I am Malala* by Malala Yousafzai and Christina Lamb

*I Know Why the Caged Bird Sings* by Maya Angelou

*Being Sachin* by Sachin Tendulkar

## SECTION 2

### TASK 3: LISTENING

#### *Pre-listening*

The world has seen many thought-leaders who have inspired people across the globe through their words. They have made seemingly impossible things possible. The following table presents a list of such influential leaders and the themes and key words from their famous speeches. Form groups of three to discuss and match the speaker to the correct key words and theme.

Speaker	Key words	Theme
Martin Luther King	<i>Stay hungry, stay foolish</i>	Compassion towards every human being
Mother Teresa	<i>I have a dream...</i>	challenges and aspirations of the world's largest democracy
Swami Vivekananda	<i>Long years ago we made a tryst with destiny...</i>	Advice to graduating students

Speaker	Key words	Theme
Jawaharlal Nehru	<i>Love begins at home</i>	interfaith harmony and tolerance
Steve Jobs	<i>Brothers and sisters of America...</i>	how society and race relations could be transformed

## Listening

### Step 1



Listen to the speech 'We choose to go to the moon and to the planets beyond' by John F Kennedy delivered at the Rice University in 1962.

<https://er.jsc.nasa.gov/seh/ricetalk.htm>

### Step 2

Read the questions given below carefully.

### Step 3

Listen to the audio again and answer the questions given below.

- Pick the most appropriate option:

The main agenda underlying the speech is

- a. Kennedy's plan to build a space station
- b. Putting a man on the moon
- c. Persuading his audience to vote for him
- d. Asking his listeners to try space travel

- Is space exploration a highly competitive industry? Justify your answer with a phrase from the speech.

- The city where the speaker delivers his speech is known for its ..... (courage/knowledge/progress)

- Kennedy is proud that his nation was pioneering ..... (industrial revolution/modern invention/both)

- The speaker takes a vow that space should be filled with the ..... (flag of conquest/banner of freedom/rays of truth)

- Space exploration, according to the speaker, is in its ..... stage. (advanced/infant/mature)

- The dangers that space posed are for ..... (Americans/everyone/Indians)

- Space and related industries are generating new demands in ..... (technology/investment/industry)

### *Post-listening*

Work in groups of six. Collect news articles about recent developments in space research by various organisations and by university and college students. Share your findings with your class as a group.

### TASK 4: WRITING

#### *Pre-writing*

Satish Dhawan Space Centre in Sriharikota is one of the two rocket launch centres in India. This state of the art facility is maintained by Indian Space Research Organisation (ISRO) and is the main base for India's space flight programs. The space station is open to visitors but the facility tour is limited to assembly buildings, launch pads, launch pedestals, mission control and launch control centres (MCC and LCC), and the space museum.

Watch this video of ISRO Sriharikota Space Port of India Tours advertisement:  
[https://www.youtube.com/watch?v=XvZt\\_n3\\_QA0](https://www.youtube.com/watch?v=XvZt_n3_QA0)

Imagine you want to visit this Space Centre. Here is the format of a letter seeking permission for a visit that you need to write using your college letterhead.

To  
 The Head, Public Outreach and Space Museum,  
 Satish Dhawan Space Centre, SHAR  
 Sriharikota 524124

Date:

Dear Sir/Madam,

Subject: Permission to visit Space Museum and facilities at SHAR  
 <College Name> located at <Address, City> would like to visit the Space Museum and the other facilities at Satish Dhawan Space Centre as part of an educational tour. I believe that visiting a facility like SHAR would inspire them to explore science and the prospects of a career in space.

A group of fifty students of Anna University would like to visit on <Date>. If this date is not feasible, please suggest an alternative date in the same week.

Your cooperation in this regard is solicited.

With regards,

<Principal Name>

<College>

Imagine you are the Dean of a college. Here are three sample permission-seeking letters. Work in pairs and read the letters carefully. Select one letter which is likely to get a positive response. Give reasons for denying permission to the other letters.

### *Sample A*

From

Rahul Pramod, Class Representative  
I year, Electrical Engineering Dept.  
College of Engineering  
Chennai

To

The Dean  
College of Engineering  
Chennai

Respected Sir

Our class of 57 students are planning to visit SDSC as educational tour. Please give us permission.

Thanking you,

Yours truly  
Rahul Pramod

### *Sample B*

Date: 4th February 2019

From

Rahul Pramod,  
Class Representative  
I year, Electrical Engineering Dept.  
College of Engineering  
Chennai

To

The Dean  
College of Engineering  
Chennai

4 February 2019

Respected Sir

Sub: Requesting permission to visit Satish Dhawan Space Centre.

Our class of 57 students would like to visit the Space Museum and the other facilities at Satish Dhawan Space Centre as part of an educational tour in the first week of March. I believe that visiting a facility such as this would inspire us to explore the world of space research and also learn of the career opportunities it offers. On making an enquiry at the Space Centre, we were asked to mail the permission letter to your office.

Our class teacher Dr Udhay has agreed to accompany us once we submit letters of consent from our parents. We assure you that we will make this a purposeful tour and behave responsibly at the Space Centre. I request you to grant us permission to undertake this trip.

Thanking you,

Yours truly

Rahul Pramod

### Sample C

Date: 4th February 2019

From

Rahul Pramod,  
I year, Electrical Engineering Dept.  
College of Engineering  
Chennai

To

The Dean  
Chennai

Dear Sir

We are going to Satish Dhawan Space Centre on 5th March. We will ask Udhay sir to accompany us. I hope he comes. He has been, of late, very strict with us. However, we can persuade him. If you say OK we will ask our dads also. We need money for this trip anyway.

If you can't give us permission now, let us know when we should go later. But it will be nice if you say yes. Please think about it. Our students will be happy also.

Yours truly

Rahul Pramod

**Which letter did you select? Why? According to you, what components make a permission letter effective?**

Read the following tips for writing an effective permission letter.

- Mention the date, name and address of the writer at the beginning of the letter (top left corner).
- It is also important to mention the receiver's name and address.
- Greet the recipient respectfully.
- Write the subject—the purpose of writing the letter.
- The first paragraph should contain all the important details such as the event, venue, purpose, time, etc.
- The second paragraph should contain additional details supporting the idea and explaining why the permission is important.
- The concluding paragraph of the letter should request the receiver of the letter to render a positive response.
- While ending the letter, thank the recipient and give your regards.
- The tone should be formal and the letter of appropriate length—neither too short nor too long.

### **Writing**

1. Now write a letter to the Dean of your college seeking permission to organise a blood donation camp as part of NSS activities. Provide details regarding the date, number of student volunteers involved, purpose of the camp, the staff-in-charge and other necessary information.
2. You plan to start a new yoga club in your college. Write a letter to your Principal seeking permission for the same. Provide details of the inauguration of the club, events planned and the budget.
3. A scientist is visiting your city and you would like to organise a special lecture in your college. Write to the Principal or Dean of your college seeking permission to organise the lecture. Provide details of the venue, date, number of participants, topic of the lecture, etc.

## SECTION 3

### TASK 5: READING

#### *Pre-reading*

Read the following newspaper headlines:

NEW PLANET DISCOVERED BY NASA SPACE PROBE COULD BE A  
‘WATER WORLD’ BUT PROBABLY DOESN’T SUPPORT LIFE

ASTRONOMERS HAVE FOUND THE MOST DISTANT DWARF PLANET  
IN THE SOLAR SYSTEM TO DATE

FIFTEEN NEW PLANETS DISCOVERED, INCLUDING POTENTIALLY  
HABITABLE ‘SUPER-EARTH’

Work in pairs and discuss how you would react to the above news articles. What specific information would you want to know about these new discoveries? Discuss and write at least three questions that you have.

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#### *Reading*

Now read the following passage:

### In space, this is the age of reusability

Since the launch of Sputnik started the space age 60 years ago, most of the spacecraft that have been launched are Expendable Launch Vehicles (ELVs), which only fly once. After delivering their payload, they either come crashing back down to Earth, burn up in the atmosphere, or simply remain in orbit as ‘space junk’.

Every time a new payload needs to be sent into space, a new ELV has to be built, costing millions of dollars. Imagine how much an Uber would cost if the driver had to buy a new car for every trip!

It might seem that the obvious solution is to reuse rockets. The idea of Reusable Launch Vehicles (RLVs) isn't new, but reusing rockets has proven tricky in the past.

The first real attempt at making an RLV was NASA's Space Shuttle program.

The Space Shuttle fleet was meant to lower the cost of space transportation by being partially reusable. But rather than lowering costs, the program increased them. The complexity and risk of the Space Shuttle fleet made maintaining and operating them expensive. And when the 30-year program ended in 2011, it may have seemed like the argument for RLVs ended with it.

## Recovering and recycling

But proponents of RLVs were undeterred.

A few months after the final Space Shuttle flight, SpaceX, a start-up company founded by tech billionaire Elon Musk announced a plan to make its Falcon 9 rocket reusable. SpaceX began working on ways to recover and reuse the Falcon 9's booster stage, the largest, most expensive part of the rocket.

Two years later, the company began trying to recover used boosters by having them make controlled descents into the ocean after completing their missions. After some spectacular failures, SpaceX successfully recovered a booster for the first time in late 2015.

Over the next 15 months, SpaceX recovered more and more boosters, building up a stockpile of secondhand rockets. But it still hasn't reused any of them.

That changed in March 2017, when one of the recovered boosters was refurbished and used to launch a communications satellite. It wasn't the first time a rocket had been reused – that honour will always belong to the Space Shuttle program. But unlike the Space Shuttle, the reused Falcon 9 was cheaper.

For the first time in history, recycling rockets makes good business sense.

Even without being reused, the Falcon 9 was already much cheaper than similar medium-sized rockets ... And it will only get cheaper with more reuse flights.

How is SpaceX's competition reacting to these developments?

US rocket industry heavyweight United Launch Alliance (ULA), a joint venture between Boeing and Lockheed Martin, has published a plan for reusing rockets. But even after the successful SpaceX reuse flight in March, ULA CEO Tory Bruno remains sceptical about RLVs.

European rocket company Arianespace seems to be ignoring RLVs altogether.

## The quest

Even if the traditional players in the rocket industry continue to ignore RLVs, SpaceX will not remain alone in its quest for reusability.

Other billionaires aren't letting Musk have the industry to himself. Jeff Bezos, the world's second-richest man, owns Blue Origin, a rival rocket company. The company is finishing testing New Shepherd, a small suborbital rocket, and plans to start sending passengers into space in 2018.

Blue Origin is also working on New Glenn, a much larger reusable rocket that will be able to compete with SpaceX directly.

Richard Branson, founder of the Virgin Group, also wants to send tourists on suborbital flights. Branson has founded Virgin Galactic, which will fly passengers on SpaceShipTwo, a reusable spaceplane. At the same time, other groups from all over the world are setting out to prove that you don't need to be a billionaire to play the RLV game. In the UK, Reaction Engines are designing the Skylon reusable spaceplane with its innovative SABRE hybrid engine.

The Japan Aerospace Exploration Agency (JAXA) is researching a reusable sounding rocket. And the Indian Space Research Organisation is testing a reusable Space Shuttle-like spaceplane.

In Australia, the University of Queensland is developing SPARTAN, a small RLV that uses cutting-edge scramjet engines.

Time will tell which of these efforts are successful but it's clear that momentum for RLVs is building. RLVs bring with them the promise of low-cost space transportation, which could open up new worlds of opportunity in space.

The age of reusability has begun.

*Source:* <https://theconversation.com/in-space-this-is-the-age-of-reusability-77964>

Matthew Richardson and Michael Smart, The Conversation

### Answer the following questions in a phrase.

1. What are ELVs? .....
2. What happens to ELVs after they reach their destination? .....
3. How does Falcon 9 plan to cut costs? .....
4. Name some of the people who are investing in the business of space travel .....
5. What is the ISRO testing? .....

### Post-reading

Work in groups of four and discuss some of the things that commercial space travel will change. Use the future tense structure.

Space travel will .....

It will be possible for space travel to ..... for these reasons: .....

## TASK 6: GRAMMAR

### Future Tense

The future tense is used to indicate or discuss anything that will take place at a certain time in the future.

Read the following sentences noting the words in **bold** to understand how to use future tense in your writing.

Within the next few billion years, I **will grow** old, all my hydrogen **will turn** into helium and then the helium fusion **will occur**. Then all the helium **will start** to turn into other matter, oxygen, carbon, etc., and that **will be** the beginning of my end.

And from a red giant I **will** slowly **cool** and form dense, white dwarf stars.

The growth of our science and education **will be enriched** by new knowledge of the universe and environment.

We have vowed that we **shall not see** space filled with weapons of mass destruction but with instruments of knowledge and understanding.

The Space Centre tour **will be** a good opportunity to visit launch pads, launch pedestals, mission control and launch control centres.

**Now fill in the following blanks with appropriate forms of the verbs given in brackets:**

- Right now, no one can predict when the Sun ..... (emit) a massive stream of particles and radiation at us. Yet our civilisation is highly dependent on a network of technologies that supply communication, transportation, navigation, and other modern services; these in turn ..... (affect) by the Sun's outbursts.
- By obtaining vital information in advance, scientists ..... (deliver) timely warnings to satellite operators and power grid owners, as well as ..... (notify) airline services.
- Nothing so drastic ..... (happen) to Earth, although the rise in greenhouse gases is troubling.
- Earth ..... (exist), along with the other inner planets, for another five billion years. After that Earth's oceans ..... (boil) away, and the planet ..... (transform) into a lifeless cinder.
- No matter what work people do on the Moon in the future, they ..... (have) to contend with a much harsher and more different environment than the one we currently live and work in, here on Earth.

6. Future Mars explorers ..... (have) to wear space suits to help keep them warm and pressurised and supply oxygen to breathe.
7. Astronomers like to make graphs to help them understand how a star ..... (evolve) over time.
8. Its existence can tell astronomers if the universe ..... (keep) expanding, stay static, or perhaps even shrink.
9. It ..... (exist) for another five billion years, until the Sun dies.
10. Our galaxy ..... (enter) into a multi-billion-year-long dance with the Andromeda Galaxy, an event that ..... (merge) the two into one large elliptical galaxy looking nothing like the spirals that combined to build it.

### Subject–Verb Agreement

Read the following sentences that are taken from the above passage ‘In space, this is the age of reuseability’. A few words have been changed in these sentences. Underline the change and write the correct form.

1. Since the launch of Sputnik started the space age 60 years ago, most of the spacecraft that has been launched are Expendable Launch Vehicles (ELVs).
2. US rocket industry heavyweight United Launch Alliance (ULA), a joint venture between Boeing and Lockheed Martin, have published a plan for reusing rockets.
3. Other billionaires aren’t letting Musk has the industry to himself.
4. Blue Origin are also working on New Glenn, a much larger reusable rocket that will be able to compete with Space X directly.
5. Richard Branson, founder of the Virgin Group, also want to send tourists on suborbital flights.
6. The Japan Aerospace Exploration Agency (JAXA) are researching a reusable sounding rocket.

Did you notice any differences? The verbs in the given sentences do not seem to be correct. The subject and the verb do not agree.

Now rewrite the sentences correctly by referring to the passage above.

1. ....
2. ....
3. ....

4. ....
5. ....
6. ....

The subject of the sentence is the main noun in the sentence and the doer of the <sup>act</sup> mentioned. Singular verbs are those that usually end in 's'—for example, *is, has, was, does, finishes*, etc. Examples of plural verbs include *are, were, have, do, play, finished*, etc.

Here are a few useful tips to keep in mind while constructing sentences.

#### **Tip 1**

Use singular verbs for singular subjects and plural verbs for plural subjects.

Singular: The solar system is surrounded by clouds of ice sheets.

Plural: All major planets have natural satellites called moons.

#### **Tip 2**

Use a plural verb when the subject is composed of two or more nouns or pronouns connected by *and*.

Jupiter's four largest moons are Io, Europa, Ganymede and Callisto, and they're often referred to as the Galileans, honouring their discoverer, astronomer Galileo Galilei.

#### **Tip 3**

Use a singular verb when a singular subject is used or two singular subjects are used, and are connected by *or/nor*.

Weathering or erosion changes the surface of a planet.

#### **Tip 4**

When a phrase is placed between the subject and the verb, don't be misled by it. The subject still controls the verb.

The planet Saturn, which is surrounded by several rings, is actually a giant ball of gas.

#### **Tip 5**

Use singular verbs with words such as *each, each one, either, neither, everyone, everybody, anybody, anyone, nobody, somebody, someone, and no one*.

Each gas giant planet has a set of rings.

Either oxygen or water is essential for a planet to be habitable.

Neither Mercury nor Venus has moons.

Use singular verbs with nouns such as *civics, mathematics, dollars, rupees, measles and news*.

News from NASA about the discovery of new planets is interesting.

**Tip 6**

Collective nouns such as *group*, *team*, *committee*, *class* and *family* denote more than one person but are considered singular and therefore take a singular verb.

A constellation of stars has been identified by astronomers.

**Tip 7**

The verb has to suit the main subject when expressions such as *with*, *together with*, *including*, *accompanied by*, *in addition to*, or *as well as* are used. If the subject is singular, the verb is also singular and vice versa.

Saturn accompanied by a retinue of 62 moons is spectacular.

Now fill in the blanks with the correct form of the verb from the options given in brackets.

1. Titan ..... (undergo/undergoes) seasonal weather changes, and periodic rains and winds ..... (create/creates) dunes, flowing rivers, and small seas and lakes.
2. In addition to the Earth-based exploration of Saturn, four spacecraft ..... (has/have) visited the planet.
3. Venus, like Mercury, Earth, and Mars, ..... (is/are) made primarily of silicate rocks and metallic elements.
4. Beneath the mantle of the earth ..... (is/are) the core, which ..... (is/are) divided into two parts: the inner and outer core.
5. Many of Uranus's moons ..... (orbit/orbits) in the same plane as its ring system, which ..... (was/were) only discovered in 1977.
6. The telescope's long-term mission ..... (is/are) to provide frequent monitoring of activity in the Uranian atmosphere and ..... (track/tracks) seasonal changes.
7. There ..... (is/are) a vast collection of icy objects at the outer limits of our solar system called the Oort Cloud.
8. Comets ..... (has/have) been called 'dirty snowballs' and ..... (is/are) thought to be a mixture of ice and rock and dust particles.
9. Each of the meteor showers ..... (is/are) caused by Earth moving through a stream of comet debris.
10. The rarest types of meteorites found on Earth ..... (comes/come) from Mars.

## TASK 7: READING

The following passage traces how the trajectory of the exploration of the moon gradually changed after 1969. Read the passage given below and answer the questions that follow.

### The Real Story of Apollo 17... and Why Humans Never Went Back to the Moon

On December 11, 1972, Apollo 17 touched down on the Moon. This was not only a final Moon landing, but the last time humans left low Earth orbit. So, it's important to remember the reason for going to the Moon—and why this endeavour was later given up. The primary scientific objectives included 'geological surveying and sampling of materials and surface features; deploying and activating surface experiments; and conducting in-flight experiments and photographic tasks during lunar orbit and transearth coast.'

In the aftermath of World War II, the United States and Soviet Union became embroiled in a competitive arms race that saw significant military gains on both sides, eventually culminating in the development of rockets capable of striking enemy territory across the world. The next step for arms superiority jumped from the atmosphere to low Earth orbit to the Moon, the ultimate high ground. As this happened, each country capitalised on the advances in rocket technology to experiment with human spaceflight missions. The Soviet Union succeeded in putting Yuri Gagarin into space in 1961, just a couple of years after launching the first satellite into orbit.

Closely followed by the United States, space became an incredibly public demonstration of military and technological might. The development of space travel didn't occur in a political vacuum: for the United States, the drive to develop rockets and vehicles which could travel higher and faster than their Soviet counterparts grew alongside increasing US/USSR tensions. This shift in national priorities following the oil crises in 1973 deeply impacted the willpower of policymakers to implement new exploratory missions to the Moon and beyond. Optimistic dreams of reaching Mars had long since perished, and as NASA focused on the Space Shuttle, the physical infrastructure which supported lunar missions vanished. No longer were Saturn V rockets manufactured, and unused rockets were turned into museum displays. The entire technical and manufacturing apparatus, which had supported both military and civilian operations, had likewise begun to wind down. The Strategic Arms Limitation Talks (SALT) and its successors began to freeze the number of missiles which could be deployed by both the United States and Soviet Union in 1972, and each country largely began to step down their operations. The urgency which fuelled the Cold War

arms race had begun to cool, and along with it, the support for much of the efforts required to send people into space and to the Moon.

The reasons for visiting the Moon, and potentially other planets and bodies in the solar system, are numerous: they could be the greatest scientific endeavours of human existence, allowing further understanding of the creation of the Earth and the solar system and the greater world around it. . . Such missions contribute to the character of the nation, demonstrating the importance of science and technology to civilisation, which will ultimately help humans to process and address the issues of greatest concern: the health of our planet.

*Source:* <https://io9.gizmodo.com/the-real-story-of-apollo-17-and-why-we-never-went-ba-1670503448>

Andrew Liptak, Gizmodo

**The main idea of the passage is to demonstrate how space programmes had agendas of proving the national might of certain countries. Are these ideas different from those presented in Kennedy's speech 'We choose to go to the moon'? Write at least three sentences highlighting the differences.**

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## TASK 8: VOCABULARY

Look at the following sets of words.

*last:* last words, last thing, last person

*uncover:* uncover evidence, uncover a secret, uncover a plot

*physical:* physical appearance, physical fitness, physical condition, physical health

*scientific:* scientific discovery, scientific outlook, scientific interest, scientific knowledge

*step:* step down, step forward, step aside

You may have noticed that these pairs of words usually feature together. These are called **collocations**.

Collocations are natural word-partners made using words which would sound incomplete or incorrect when used with other words in a sentence. For example,

express train *not* quick train

high temperature *not* tall temperature

**1. Find the word in Column A that collocates with the word in Column B:**

*Hint: All word pairs are from this unit.*

A	B
moon	territory
scientific	impact
manufacturing	down
enemy	landing
solar	time
deep	objectives
wind	apparatus
last	system

**2. Choose the appropriate word to fill in the blanks in the following sentences.**

- Star Clusters are (scientifically/technologically) ..... interesting because all their stars formed around the same time and generally have similar characteristics.
- There are only three galaxies that can be seen with the ..... (bare/naked) eye from Earth.
- The merging of galaxies will ..... (highly/radically) change the course of the galactic path.
- Astronauts are transported to space-stations in order to perform a specific ..... (work/task).
- Astronomy as a science has changed from 'lone geniuses at the telescope' to large, multi-national ..... (collaborations/combinations) of people who work together for many years toward a ..... (same/common) scientific goal.
- Today astronomy isn't limited to ..... (official/professional) observers and big telescopes.

- g. The type of telescope you buy will depend on which ..... (celestial/terrestrial) objects you want to view.
- h. On Earth, doctors use infrared as a diagnostic ..... (device/tool), and most of us are aware of infrared-sensitive night-vision binoculars and cameras.
- i. The Spitzer Space Telescope was the first to directly ..... (find/detect) light from two exoplanets orbiting distant stars.
- j. One of the ..... (well/best) known current X-ray observatories is called Chandra, after the Indian astrophysicist Subrahmanyan Chandrasekhar.

Now consider the following expressions from the same passage:

the primary scientific objectives  
 culmination of a massive program  
 following the successes of  
 in the aftermath of  
 significant ... gains  
 on both sides  
 across the world

These expressions are called **fixed expressions**.

Fixed expressions can be used to frame sentences where a particular meaning has to be expressed. They include collocations, idioms and other stock phrases which are also called **lexical chunks**.

Fixed expressions are of the following types:

One word: *well, sorry, please, kudos, basically, essentially*

Two words: *great idea, that's it, well done, of course,*

Three or more words: *Is this true?/Pleased to meet you/I'm sad to hear that/over the next few years/a matter of time*

**3. Here is a list of commonly used fixed expressions. Which ones have you come across? Underline them. Work with a partner to understand the meaning of these and frame sentences using them.**

have no doubt

no chance of

come as no surprise

have no choice

highly regarded

there is no point in

no matter how

keep an eye on

as far as I know

be under the impression

turn out to be

will result in

make it clear that

contrary to popular belief

keep in touch

short on time  
a great deal of  
have something in mind

it is not worth  
stand a chance of  
by the time

never occurred to me  
make up your mind  
under no circumstances

4. Identify and underline the fixed expressions in the following sentences. The first two have been done for you.

1. Over the next few centuries, people worked to improve the telescope, replacing metal mirrors with larger (and heavier) ground and polished glass ones.
2. Volcanism has played a role in shaping Mercury, Venus, Mars, and many of the icy worlds in the outer solar system.
3. With the advent of electricity and automation, people began using motors to guide their telescopes through long observations.
4. It's only a matter of time before we find a Sun-like star and its orbiting world with traces of water in its atmosphere.
5. In fact, the Greek philosopher Aristotle flatly ruled out the idea of life on other worlds, and his Earth-centred cosmology held sway for more than 1,200 years.
6. Under the right conditions, microbial compounds combined and eventually gave birth to the first primitive forms of life.
7. How organisms live in such alien conditions could give us clues as to how life might exist in oceans on other worlds.
8. The volcanoes on Earth essentially belch lava and clouds of poisonous gases.
9. There is a fine line between belief and scepticism about extra-terrestrial life forms.
10. Mike Brown is a highly regarded professor of planetary science at the California Institute of Technology (CalTech).

11. Science-fiction writers have a lot of fun with Einstein's theory of special relativity.
12. From our point of view here on Earth, space and time are locked and can't change.

## SECTION 4

### TASK 9: WRITING

#### An alien's perspective on human life

What would aliens think about the way we live if they came to earth to observe humans? The advanced technology humans have developed might fascinate them, the craze of social media and reality TV shows would amuse/confuse them, but what negative traits of humans do you think they would find fault with or complain about?

Think of any three such traits and write them in the blanks given below.

....., ....., .....

Here's an imaginary journey into this 'alien' world.

#### An alien's account of overuse of mobile phones by teenagers

It is a strange sight indeed. Humans are supposed to have evolved remarkably in communication and mastered the art of interpersonal relationships, but of late, all I could witness is young men and women glued to the small devices in their hands. Their eyes are magnetically attracted to it and they refuse to look up even while crossing the road. I happened to help a boy one day from falling into a pit. It looks like we can conquer the entire human race while they remain stuck to their phones!

#### An alien's account of violation of traffic rules in India

The traffic congestion in India is unbelievable. As humans use roads mostly to move from one place to another, the roads in Delhi, Mumbai, Kolkata and Chennai are overcrowded. Though there are traffic signals and officers to regulate traffic, nobody seems to bother. The honking goes overboard sometimes and there is too much pollution as well.

#### An alien's account of poor customer service

The other day, when I decided to buy a television, I entered a shop. The salesperson did not acknowledge my presence even with a smile. When I asked about the best television set in the market, I was shown an overpriced one that looked ugly. When I enquired about its features, I was simply given a manual to read and find out. When I wanted to know whether the television came with a warranty, I was completely ignored and I received no answer at all.

1. Discuss with your partner and think of three other issues you think aliens would complain about if they came to earth. Remember to use future tense in your sentences. Make sure the sentences show concord (that is, the subject agrees with the verb).

As an alien you may like to write a letter of complaint regarding these problems.

## Writing a letter of complaint

## *Format*

- The date, writer's address followed by the recipient's address are all similar to the permission-seeking letter as these are both formal letters.
  - It is also important to include details of the product, service or problem accurately.
  - Follow a logical sequence.
  - Suggest expected measures that would solve the problem.
  - Close the letter with references to enclosures of bills, telephone numbers, etc.
  - Emails also follow the same format, except the address and date are pre-installed.

### *Useful expressions in writing a complaint letter*

- I am writing to complain about...
  - I wish to express my dissatisfaction with...
  - ...to resolve the matter I would appreciate if...
  - ...does not function
  - ...immediate replacement
  - ...matter of concern
  - ...affected by...

- ...authorities concerned
- ...the issue is...
- customer care personnel
- ...gravity of the issue
- request a refund...
- expect prompt action
- request you to take immediate action...
- Please let me know when...
- I look forward to...

### Writing a formal letter

#### Sample 1

Harish bought a water-heater from Sharp Electronics. After installation, he found that it did not function as expected because the temperature control was faulty. He decides to write a complaint letter to the head office asking for a refund. Fill in the blanks using clues from the phrases given above.

45/2, Nehru Circle Colony  
Grand Trunk Road  
Bengaluru – 09

11 September, 2019

Customer Services Manager  
Sharp Electronics Company  
GD Road  
Bengaluru – 50

Dear Sir or Madam

Subject: Faulty Quickheat Geyser (Model No. 2279)

I wish to express my ..... with the above-mentioned water-heater, which I purchased from Sharp Electronics Company, GD Road outlet, on 10th August, 2019. When I installed it and used it for the first time, the temperature control in the digital panel was .....; it was not possible to set it to any temperature apart from the highest.

When I attempted to return the water-heater to the store, the cashier said that the store was unable to replace it or offer me a ..... but advised me that it could be

sent away for repair. As I need a water-heater for everyday use, and the ..... gave me no idea about how long it would take to repair, this option was unsatisfactory. As the water-heater clearly does not function as it should and therefore does not comply with the legal standards of product quality, I am writing to you to ask for a full refund of the retail price (Rs 9,500). I have enclosed a copy of the bill and warranty card as received from your sales outlet.

I ..... to hearing from you within the next two weeks.

Yours truly,

Harish Kumar

### *Sample 2*

*Leela was planning to travel with her family and had booked a hotel in Ooty based on website's recommendation. However, she was hugely disappointed with their service. She decided to write an email complaining about her unsatisfactory experience.*

From: leela.joseph@email.com

To: customercare@heritagehotels.com

Dear Sir/Madam,

I am writing to you following a recent visit to the Heritage Hotels in Ooty, Tamil Nadu. I would like to express my extreme disappointment with the service I received.

Although the staff was generally polite and helpful, they seemed to lack basic etiquette of hospitality. None of the people at the reception desk could offer any advice to me on planning a sight-seeing trip. I suggest that you send your employees on suitable training courses.

Another cause for complaint was that the swimming pool was closed. I understand that repairs and maintenance need to be carried out. However, when I called for information the day before my visit, the receptionist did not mention that the pool was closed. My two sons were extremely disappointed. If I had known, I would have stayed at a different hotel.

Finally, room service personnel were shabbily dressed and the price of the food available, in my opinion, was very expensive.

I hope you will take these points into consideration.

Yours faithfully,

Leela Joseph

Using the correct structure and appropriate phrases, write letters of complaint for the situations given below.

1. You have recently bought a pair of running shoes from an online service. It carried a brand logo and was expensive. However, on the very second day of using it, the sole came off and you found it was a fake. Write an email to the shopkeeper's address on the bill asking for a refund.
2. The Municipal Corporation in your locality had dug the roads to replace water pipes last month. However, the water pipes were not replaced, nor were the pits closed. This poses a danger to everyone in the locality. Write to the Collector's Office as the personnel from the Municipal office haven't heeded your complaints.
3. Following the recent rains, the drains in your area have overflowed and have mixed with the drinking water facility. Complain to the town panchayat head, highlighting the problems faced due to this and suggest measures to address the issue immediately.

## TASK 10: SPEAKING

Read the following passage.

The Anna University Satellite, or ANUSAT was an Indian student research microsatellite designed, developed and integrated at Aerospace Engineering, Madras Institute of Technology (MIT), Chromepet, Anna University. Students and faculties of Madras Institute of Technology and College of Engineering, Guindy, were involved in the design of ANUSAT. The director of the ANUSAT was Dr P. V. Ramakrishna, professor at College of Engineering, Guindy. It carries an amateur radio and technology demonstration experiments. It was successfully launched aboard a PSLV-CA designated PSLV-C12, along with RISAT-2, from the Second Launch Pad at the Satish Dhawan Space Centre. The launch was carried out at 01:15 GMT (06:45 IST) on 20 April 2009. The satellite's development was sponsored by the Indian Space Research Organisation (ISRO), who were also responsible for launch services. ANUSAT was a cube with 23-inch (580 mm) long sides, and a mass of 38 kilograms (84 lb). It carried an amateur radio store and forward communications system, and also conducted technological research. This satellite was spin stabilised and the spin axis is pointed normal towards the sun. The satellite was integrated and tested at MICSAT, at MIT Chromepet.

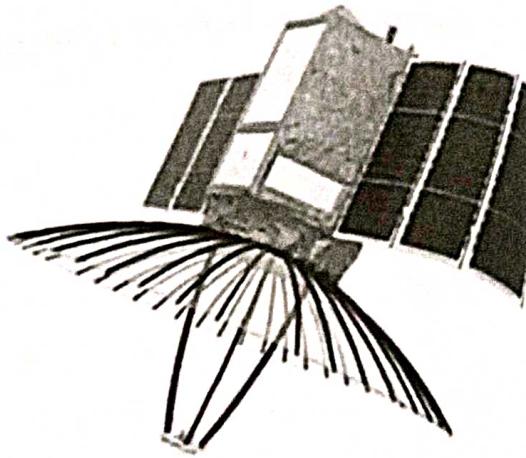
Source: Adapted from <https://en.wikipedia.org/wiki/ANUSAT>

Imagine you are a student of the 2005–2009 batch involved in the above project. Explain the features and the launch of ANUSAT as planned. Use future tense to explain important features.

*For example:*

The Anna University Satellite, or ANUSAT will be a research microsatellite designed by Indian students. The Department of Aerospace Engineering at the Madras Inst of Technology will develop and integrate the satellite...

Add more sentences using this pattern from the passage above.



Fast forward to the current year!

Form groups of eight. Brainstorm for ten minutes and come up with ideas to design a new satellite. *What will be the key features of this satellite? What will it mainly be used for? What will you name it?* Two persons from each group will then make a 4-minute presentation to the class and answer questions (1 minute) (total presentation time = 5 minutes).

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## FOLLOW-UP

1. Underline the fixed expressions in the following sentences. Write another sentence using the expression.
  - a. The teacher asked her to step forward to receive the prize.  
.....
  - b. There was a world of difference between the performance of the two products.  
.....
  - c. We were asked to fall in line by our manager after we protested.  
.....

- d. 'I can assure you that you will be provided all support for completing the project,' the teacher reassured us.
- .....

- e. Because of wear and tear, the machine stopped working before the warranty on it expired.
- .....

2. Write five sentences describing your plans for the semester break, using words such as *will*, *will probably*, *might*, etc. to indicate future tense.

- a. ....
- b. ....
- c. ....
- d. ....
- e. ....

3. You want to participate in a play but will have to miss classes on two days. Write a letter to the Head of Department requesting permission to do so.

# Cyber World

Listening	Speaking	Reading	Writing	Grammar and Vocabulary
TED talks (listening to a TED talk, filling in blanks, taking notes)	Small group discussions, making recommendations	Problem-solution articles (newspaper articles)	Formal letter, recommendations, letter to the editor, making notes	Modals, phrasal verbs; connectives, cause and effect sentences

## PREPARATORY

Write down twelve words related to the internet, gaming and social media.

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Describe to your partner the context in which these words are used.

### Breaking News

Look at the following headlines.

NEW E-SKIN INNOVATION GIVES ROBOTS AND PROSTHETICS  
AN EXCEPTIONAL SENSE OF TOUCH

AI BEATS PROFESSIONALS IN SIX-PLAYER POKER

ROBOT-ANTS THAT CAN JUMP, COMMUNICATE WITH EACH OTHER  
AND WORK TOGETHER

DEEP LEARNING ALGORITHM SOLVES RUBIK'S CUBE FASTER THAN ANY HUMAN

SIMPLE 'SMART' GLASS REVEALS THE FUTURE OF ARTIFICIAL VISION

3D-PRINTED PROSTHETIC HAND CAN GUESS HOW YOU PLAY ROCK,  
PAPER, SCISSORS

WANT TO BOOST CREATIVITY? TRY PLAYING MINECRAFT

USING ARTIFICIAL INTELLIGENCE TO BETTER PREDICT SEVERE WEATHER  
 SOCIAL ROBOTS CAN BENEFIT HOSPITALISED CHILDREN  
 ARE YOUR DIGITAL FOOTPRINTS TRACED BY YOUR EMPLOYER?

**Form groups of six. Each group should choose one of the news items given above. Discuss**

- a. your own understanding about these.
- b. how you think these will impact society.
- c. whether these will have short-term or long-term implications.

**Make a note of your group's conclusions and questions, and any points that they could ask the class to help clarify. Present these as a group to the class.**

## SECTION 1

### TASK 1: LISTENING

#### *Pre-listening*

**Brainstorm the following questions in groups.**

1. Have you heard about hackers? Can you remember any hackers from movies you've watched or books you've read?
2. Have you followed any news stories about hacking?
3. According to you, is hacking good or bad? Is it always a crime to hack computers?
4. Can you give some examples of popular websites that have used personal information for commercial reasons, in recent times?
5. Have you (or someone you know) been victims of hacking, or lost their personal or financial data through hacking? What impact did that have on you?

#### *Listening*



**Now listen to the audio on the app and answer the questions that follow.**

1. Listen to the audio again and fill in the blanks in the following passages based on what you just heard in the audio excerpt.
  - a. Four years ago, a security ..... , or, as most people would call it, a ..... , found a way to literally make ATMs throw money at him. His name was Barnaby Jack, and this technique was later called 'jackpotting' in his honour. I'm here today because I think we actually ..... hackers. Barnaby Jack could have easily turned into a career ..... or James Bond ..... with his knowledge, but he chose to show the world

his research instead. He believed that sometimes you have to demo a threat to ..... a solution.

We are often terrified and fascinated by the power hackers now have. They ..... us. But the choices they make have ..... that influence us all. So, I am here today because I think we need hackers, and in fact, they just might be the immune system for the ..... age. Sometimes they make us sick, but they also find those hidden ..... in our world, and they make us fix it.

....

- b. I wanted to be a hacker myself, so I started spending a lot of time on hacker chat rooms and ..... forums. I remember one late night I found a bit of PHP code. I didn't really know what it did, but I copy-pasted it and used it anyway to get into a password-protected site like that. Open Sesame. It was a ..... trick, and I was just a script kiddie back then, but to me, that trick, it felt like this, like I had discovered limitless ..... at my fingertips. This is the ..... of power that hackers feel. It's geeks just like me discovering ..... they have access to ....., one that requires the ..... of their intellect, but thankfully no radioactive spiders.  
.....
- c. Making vulnerabilities known to the public is a ..... called full disclosure in the hacker community, and it is controversial, but it does make me think of how hackers have an evolving ..... on technologies we use every day.  
...
- d. Hackers can rally the masses from the keyboards to the streets, and it laid the foundations for dozens of future ..... against perceived injustices to their online and offline world. Since then, they've gone after many targets. They've uncovered ..... abuse. They've hacked popes and politicians, and I think their effect is larger than simple ..... of service attacks that take down ..... or even leak sensitive documents. I think that, like Robin Hood, they are in the ..... of redistribution, but what they are after isn't your money. It's not your documents. It's your ..... They grab the spotlight for causes they support, forcing us to take note, acting as a global ..... for issues that we are not as aware of but perhaps we should be. They have been called many names from ..... to terrorists, and I cannot justify their illegal means, but the ideas they fight for

are ones that matter to us all. The ..... is, hackers can do a lot more than break things. They can bring ..... together.

## TASK 2: SPEAKING



Follow the link below to read up on five of the most famous hackers in the world today.

<https://www.cbronline.com/list/top-5-ethical-hackers-white-hat>

1. Form groups of eight. Based on what you just read, each group should write three statements either in favour of or against hacking.
2. The group members should present supporting statements for their argument. Note down the points discussed. One person can present the group's arguments to the class.
3. Note down the arguments that you found the most convincing from all the presentations made in class, not only your own.

*In favour of hacking*

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*Against hacking*

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## SECTION 2

### TASK 3: WRITING

#### Taking notes while listening

Taking notes while listening to a lecture is a vital skill that you will have to develop as a student in higher education. Your lecturers may not provide detailed notes of everything they are teaching in class and so it is important to learn this skill. Moreover, taking notes while reading is quite easy, as you can flip the pages and note down what you want. But taking notes during a live lecture can be challenging if you are not prepared for it. Here are a few ideas that can help you in taking notes while listening.

#### *Prepare before listening to the lecture*

If you know the outline and the key topics that will be covered in the lecture, make a layout predicting what ideas are likely to be discussed. Your syllabus and sub-topics can be referred to in this regard. You can even write down what you already know about the topic and your questions, if any.

#### *As you listen*

You will have to listen, think and write notes simultaneously.

- note down the topic of the lecture and the date.
- use plenty of abbreviations; do not write in full sentences.
- differentiate between important and not so important information as you listen; learn to identify key points (using discourse markers).
- use numbers or bullet points while making notes.
- note down reasons, examples, important terminology and phrases.
- note the structure or organisation of the talk or lecture—whether it follows a theory–evidence, cause and effect, steps of a process, or comparison pattern. You can draw suitable mind maps if necessary.

#### *After listening*

Once the lecture is over, quickly run through your notes to cover any gaps in information. You can also rewrite, review or revise your notes immediately so that you don't find your own notes difficult to follow. Transferring it to a different compilation will also help you remember it well.



Now listen to the audio clip on the app by a person who talks about an innovative solution to counter the problem of cyber-bullying among children. A sample note-taking template is provided below.

<b>Pre-listening</b>	Note down whatever there to know about cyber-bullying Depression, stalking, extreme case-suicide, cyber security, mindset change
<b>Listening</b>	Indian parents, Speaker—American, Rebecca, 13, suicide, repeated cyber bullying, tortured, danger  App-ReThink, pause and change text, positive-trial, 93 percent did not post hurtful texts
<b>Post-listening</b>	Transfer your notes into meaningful sentences.  The speaker, Trisha Prabhu, is American but her parents are from India. When she was thirteen, she learnt about a girl named Rebecca who committed suicide because of repeated cyber bullying. The speaker wanted to find a solution to this and created an app called ReThink which checks on users about to post or send hurtful messages and asks them to rethink. The speaker also mentions that the app has a success rate of 93 per cent.

2. Listen to a talk on the app by the famous chess grandmaster Garry Kasparov and take notes. Use the template given below.

Pre-listening	
Listening	
Post-listening	

### SECTION 3

#### TASK 4: READING

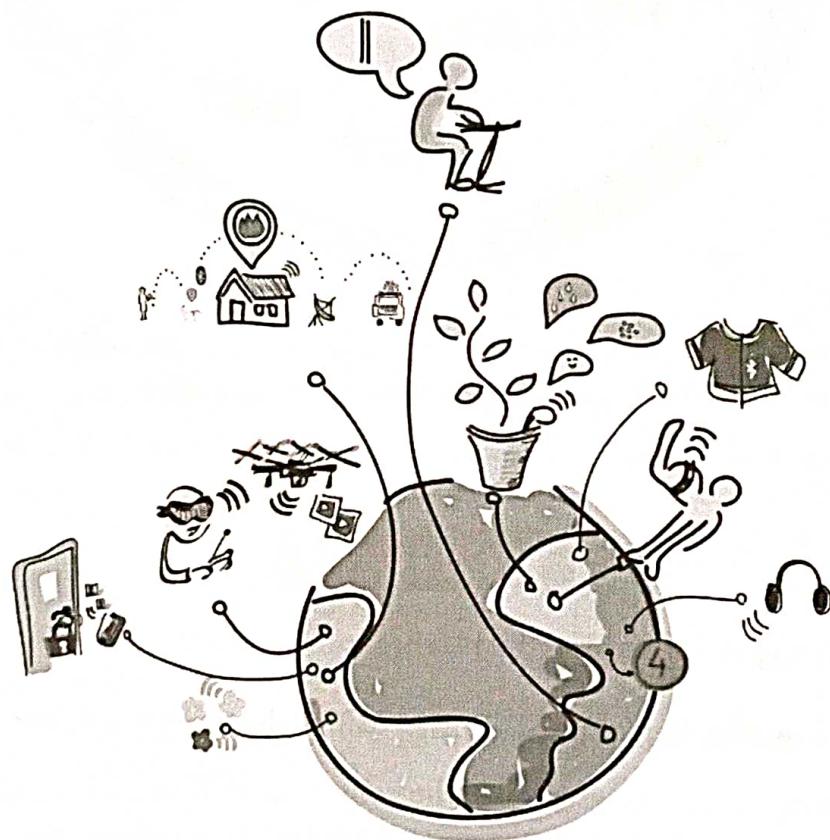
##### How the Internet of Things Will Change Our Lives

The Internet of Things (IoT) **might have** the power to change our world. And while we are starting to see its incredible impact, we are still very much at the beginning of the transformational journey. So, here's a look into the current state of affairs in the race to standardise IoT, along with what people are saying about it.

Soon every device you own—and nearly every object you **can imagine**—will be connected to the Internet. Whether it's through your phone, wearable tech or everyday household objects, the Internet of Things (IoT) **will connect** us in ways we can't even imagine yet.

Moreover, your thermostat, alarm system, smoke detector, doorbell and refrigerator **may already be** ‘networked’, but changes are starting to take root in our cities as well. Better management of energy, water, transportation and safety **can bring** people in closer touch with their surroundings and capturing our imaginations for urban bliss—a fully integrated, smart, sustainable city. Last but not least, we’re seeing dramatic increases in activity and innovation on the factory front, where the potential for cyber-physical systems to improve productivity in the production process is vast.

As you **can imagine**, life in ten years **would look** materially different from how it looks in 2016 as the pace of technology change accelerates, thanks in large part to the coming boom of the Internet of Things. In some ways, IoT still feels like empty tech jargon. It’s hard to lump all these different, disparate things together and talk about them in a meaningful way. So, in an attempt to make sense of this emerging technology, let’s look at what **should form** the base to build an IoT future.



### *Paradigm shift in technology*

Technology consulting firm Gartner, Inc. projects that 6.4 billion connected things shall **be** in use worldwide this year, up 30 per cent from last year. And this number **may grow** by more than three times to nearly 21 billion by the year 2020.

Over half of major new business processes and systems **must incorporate** some element of IoT by 2020, assures Gartner. Therefore, the impact on consumers’ lives and corporate

business models is rapidly increasing as the cost of ‘instrumenting’ physical things with sensors and connecting them to other things—devices, systems and people—continues to drop.

Futurist and technologist Chuck Evanhoe, who has spoken extensively about IoT, explains the precipitation of devices connected to the Internet and each other: ‘IoT will be a tremendous enabler of better information in both the consumer and business environments. I believe that the impact of IoT will be across the board. Consequently, all of the systems that we don’t think about in our day-to-day life will be more effective in keeping humans productive so the impact won’t be in just one area.’

While flashy applications to consumer technologies understandably generate the most media buzz, there is more to IoT than merely everyday life situations and communications. Networked devices perhaps hold the most promise to cut costs and raise efficiency in production and manufacturing, offering not only to make their management more effective but the work itself smarter.

Evanhoe lists the multiple benefits: ‘From “Smart Appliances” to the “Smart Factory”, we **would have** better information, more control and insight into the everyday things that we need to function, both known and unknown. By unknown, I refer to things most people don’t think about until they become a problem, such as the power grid. By sensing the things in our world, systems **should be** better able to keep running without human intervention until something needs or **shall need**, for example, predictive maintenance, our intervention.’

### Welcome to Industry 4.0

Around the world, traditional manufacturing industry is also in the midst of a major change, marking the dawn of smart manufacturing or Industry 4.0. Every day, technologies based on IoT make factories smarter, safer and more environmentally sustainable. IoT connects the factory to a whole new range of smart manufacturing solutions, which run around the production. The dramatic improvements to production and cost reduction are projected to generate billions in revenue growth and productivity over the next decade. The transformation that it implies is huge.

IoT gives manufacturers the ability to track objects, to find out how consumers are using a certain product, and to determine which features are the prominent ones. This subsequently creates a better understanding of what adjustments should be made to the product(s) to help improve adoption and purchasing rates. Knowing what the users do with the product is something brands want to leverage and IoT makes that readily available.

Igor Demay, another expert on IoT in *Road vehicles*, explains: ‘IoT in the automotive industry appeared around the beginning of the 21st century, with navigation systems

changing dramatically the relationship between the driver and the vehicle. We are now in the second period with "mirror devices" such as mobile phones or portable navigation units known as nomadic devices, whose screens are used by car owners or drivers while driving their vehicles.'

That influence is only going to deepen as more connected cars come online and as consumers continue to demand more technology in their vehicles. 'The third step,' says Demay, 'will consist of all advanced driver-assistance systems and automated driving solutions.' So, while IoT solutions are part of the industry's future, the challenges that lie ahead are mountainous as the levels of sophistication continue to grow.

### *Biggest challenge*

As with any new technology, IoT **can be confusing** and intimidating, especially as debates swirl around standardisation. Currently, the biggest problem facing IoT is the lack of consistent standards. To understand how a lack of uniform standards **can complicate** product development and industry growth, consider connectivity issues. For example, if a company that develops smart clothing is different from a company that develops smart home technology, the chances of their products communicating are minimal. That's because different devices **will often use** different communications protocols, resulting in a lack of interoperability and an experience that's far from seamless for customers. However, if the two companies used the same standard for connectivity, interoperability **would be** much more likely.

Source: <https://www.iso.org/news/2016/09/Ref2112.html>

Elizabeth Gasiorowski-Denis, International Organization for Standardization

**Note the words in bold in the passage.**

**Are these regular verbs or do they perform another function?**

Such words in which a verb combines with words such as *can*, *could*, *may*, *might*, *will*, *would*, *shall*, *should*, *must* are called modals and they express several functions such as permission, ability, obligation, prohibition, lack of necessity, advice, possibility and probability.

**Examples:**

Modal Verb	Function	Example
Can	ability	Technicians can set this right.
	possibility	Procrastination can cause problems.

Modal Verb	Function	Example
could	possibility in the past	He could walk faster last year.
	polite permission	Could I add something, please?
must	strong obligation	You must wear your helmet while driving.
	logical conclusion	The roads must be durable because the quality of the concrete used is good.
might	lesser possibility	Tomorrow might be sunny.
may	possibility	— They may come here any time.
	permission	May I submit the assignment tomorrow?
should	obligation	I should return the book.
	advice	You should take up exercise.
need	obligation	I need to visit them immediately.

## TASK 5: GRAMMAR

### Modal verbs

Complete the following passage by filling in the blanks with appropriate modal verbs like *can*, *could*, *will*, *would*.

Online learning ..... no doubt widen the scope of education and transcend beyond classroom boundaries. India is witnessing a digital revolution with 500 million new users set to join the bandwagon of the internet revolution. There are at least 370 million internet users in India, pointing towards India's enormous potential as a huge market for e-learning and this ..... be good news for many. E-learning opens a cornucopia of resources to both students and teachers, the access to which they ..... not have had earlier, irrespective of their status and location. Statistics clearly show that e-learning ..... become a global trend, as more and more people start preferring it over traditional classrooms. The Internet boom has been a major catalyst for the growth of online learning and with more than 500 million new internet users, the boost for online learning ..... only better itself. E-learning is aggressively making inroads into the Indian education ecosystem and its impact is not limited to schools and institutes of higher education. The number of jobs involving routine skills—both physical and cognitive—..... shrink, and with increasing automation, newer opportunities ..... be created every day. Co-branded courses with corporate and educational institutes having live industry projects, real-time mentoring and peer

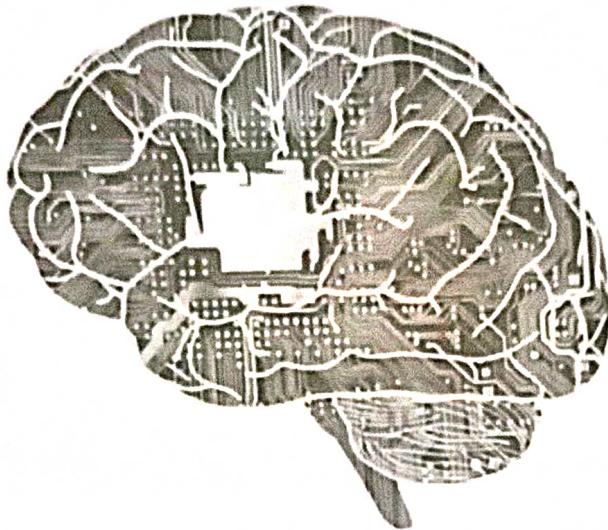
to peer interactions on an online platform, with an exposure to connect with anyone across the globe interested in a same skill set ..... be another main reason to help online learning score a brownie point over traditional learning which limits one to bricks and mortar, or to a particular location and city. E-learning ..... also focus on qualitative outcomes—it ..... not only aim at making people employable through industry-oriented skill up programmes but will also act as an effective tool to fill the demand-supply gap in the Indian industries. It is a revolution in the making.

**Now go back to the passage titled ‘How the “Internet of Things” Will Change Our Lives’ and identify words in it that connect ideas. Words like *and, so, consequently, moreover*, etc., that connect ideas are known as connectives. Underline these words. Look at the list given below to understand the purpose and correct usage of these words.**

Purpose	Connective Words
addition of ideas	and, also, besides, further, furthermore, too, moreover, in addition, then,
order or sequence	first, second, (etc.), finally, hence, next, then, from here on, to begin with, last of all, after, before, as soon as, in the end, gradually
results	as a result, hence, so, accordingly, as a consequence, consequently, thus, since, therefore, for this reason, because of this
purpose	to this end, for this purpose, with this in mind, for this reason(s)
space and place	above, behind, below, beyond, here, there, to the right (left), nearby, opposite, on the other side, in the background, directly ahead, along the wall, as you turn right, at the top, across the hall, at this point, adjacent to
another time	next, afterward, finally, later, last, lastly, at last, now, subsequently, then, when, soon, thereafter, after a short time, the next week (month, day, etc.), a minute later, in the meantime, meanwhile, on the following day, at length, ultimately, presently
to signal an example	for example, to illustrate, for instance, to be specific, such as, moreover, furthermore, just as important, similarly, in the same way
comparison	like, in the same manner (way), as so, similarly
contrast connectives	but, in contrast, conversely, however, still, nevertheless, nonetheless, yet, and yet, on the other hand, on the contrary, or, in spite of this, actually, in fact
to summarise or report	in summary, to sum up, to repeat, briefly, in short, finally, on the whole, therefore, as I have said, in conclusion, as you can see

## TASK 6: VOCABULARY

Use appropriate connectives to fill in the blanks in the following passage.



An interesting point is that the creators of Virternity were so concerned with ensuring public ownership ..... very few people even know or knew who exactly they were. Their reasoning was apparently to prevent governments and their agencies subsuming their interests with corporate and other less desirable aims. ..... being anonymous also has its advantages if a company wants to slide into the shadows, as appears to have been the case.

The biggest question is whether it is even possible for a human, or any living being for that matter, to be digitised in the first place. ..... lies the dichotomy of two different schools of thought.

### Philosophy versus mind uploading

Those who would align themselves with thinkers such as Gilles Deleuze and Henri Bergson believe there is a higher consciousness above the physical persona or body. Such philosophical thinking rests on the idea of duality—the mind and the body are not the same. ..... it would seem impossible to digitise a human. How can one put the essence of a human spirit into a computer, almost like a genie into a bottle?

....., several prominent scientists and neurosurgeons contend that the physical is all there is. If one can copy the brain of a human in digital form then the rest is easy. Copying the brain is not particularly simple, ..... Proposals include making thousands of micro-thin slices of a brain and copying the neural network revealed.

To do this, a machine would need to be constructed that can make these slices. ..... then a willing volunteer would need to be found. These would be physical slices from a brain preserved before death. That's the drawback. In fact, a startup, Nectome, has been proposing to do just that ..... preserve your brain until the day it can be digitised.

The person, or at least the contents of their brain, would ultimately be transferred to a computer, and ..... remain alive or perhaps be reborn. Experiments have been undertaken on scanning a mouse brain ..... the breakthrough of digitising the entirety of even a mouse brain has not happened.

*Source: <https://theconversation.com/the-digital-human-the-cyber-version-of-humanitys-quest-for-immortality-108081>*

David Evans Bailey, The Conversation

## SECTION 4

### TASK 7: READING



Read about online hoaxes at: <https://theconversation.com/dont-fall-for-it-a-parents-guide-to-protecting-your-kids-from-online-hoaxes-113179>

Notice how the article makes recommendations.

#### 1. How to read a problem-solution article

The above passage deals with an important problem in the present times. It has also proposed a few solutions.

The problems posed include:

- dangers of online hoaxes
- harm caused by viral ‘challenges’ on social media
- misleading information posted online to manipulate our thinking

Read the passage and find out what solutions have been proposed by the author for solving these problems. One solution is mentioned below.

a. Parents to investigate online hoaxes to determine the dangers involved, this can be done by conducting thorough searches on reputable news or fact-checking websites

b. ....

.....

.....

c. ....

.....

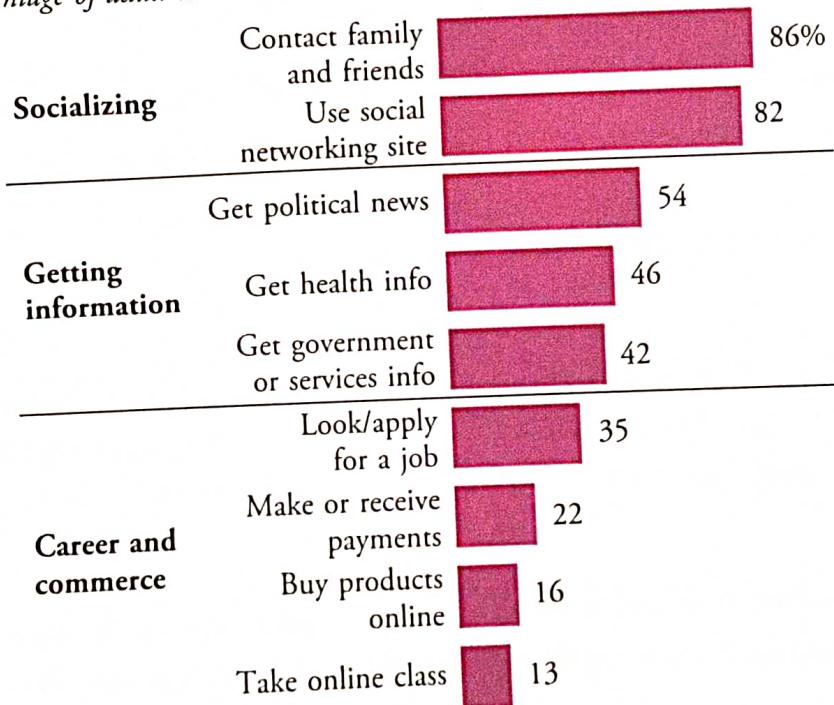
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2. Now look at the following bar chart.

### Online, Socializing and Getting Information Are Popular Activities in Emerging and Developing Nations

*Percentage of adult internet users who have used the internet to do the following things*



*Note:* Medians across 31 emerging and developing nations. Pakistan not included due to insufficient sample size.

*Source:* Spring 2014 Global Attitudes survey. Q71a-h&Q72.

1. Write a paragraph describing the preferences and habits of internet users based on the information given in the bar chart.

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2. Form groups of five and analyse the bar chart given above. Compare it with your own and your group members' browsing habits and find out if you use the internet for anything else. Discuss and write at least five sentences on your findings.

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5. ....  
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### Note-making

#### Steps involved:

- Read the passage carefully. Understand the gist or the topic sentence of the passage. The topic sentence need not always be the first sentence of the passage.
- Identify the supporting statements that validate the main idea of the passage.
- Break all these into key word-like simple structures and write in a bulleted form including the title.

Earlier in this unit, you learnt how to take notes while listening to a lecture or an audio file. Now you will learn to make notes on a passage while reading.

If you make notes on the above passage, it will include the following key ideas.

#### Topic: A Parent's Guide to Protecting Children from Online Hoaxes

Recent panic from parents over supposed online threats

- Several online threats turned out to be hoaxes
- Panic could have been avoided if parents had done simple checks

#### Momo challenge

- Ghoulish character named Momo said to use social media
- Encourages youngsters to perform dangerous tasks and cause self-harm
- Actually a manufactured myth designed to generate paranoia

#### Other online hoaxes

- Blue whale challenge linked to numerous teen deaths turned out to be fake
- TidePod challenge supposedly encouraging kids to be filmed while eating poisonous laundry detergent pods

#### About online hoaxes

- Designed to grab attention, create shock and panic
- Designers of hoaxes tap into parents' fears about children's security

- Hoaxes posted online because they can spread far and wide quickly
- Perpetrator's aim is to go viral
- More attention for hoax means more fame or profits for perpetrators

Measures by parents to protect children

- Investigate properly using reliable news or fact-checking websites
- Educate children about hoaxes—help them understand fake content online and why people start hoaxes
- Find alternative ways for children to view content to reduce exposure to hoax videos
- Be careful about sharing articles or information that perpetuate hoaxes
- Be alert and critical about content viewed or read online
- Report to social media platforms or local police in case of serious threats

**Now choose any two passages from Sections 1–3 in this unit and make notes on them.**

### ***Cause and effect***

The article above also deals with sentences that follow the cause and effect pattern. For example, the sentence 'These hoaxes are carefully designed to grab your attention and incite shock and panic, so you share the information with everyone you know.'

Cause: Hoaxes are carefully designed to grab your attention and incite shock and panic

Effect: You share the information with everyone you know

**Identify three more sentences from the passage that contain a cause and an effect.**

.....  
.....  
.....

Cause and effect expressions are words or phrases that help us in constructing sentences of this type. Some of these are:

*as, since, therefore, hence, as a result, for, because, consequently, due to, because of, as a result of*

Here are a few causes and effects. Combine the phrases with the cause and effect expressions given above and write out the sentences thus formed.

1. Overdependence on technology – lack of creativity

.....

2. Sitting for long hours before the computer – health issues

.....

3. Distraction caused by technology – poor concentration

.....

4. Notification lights and sounds – loss of focus

.....

5. Spending more time online – deficit of social skills

.....

**Brainstorm in small groups and discuss at least ten causes and effects related to social media and its overuse. The first one has been done for you.**

1. Posting too much personal information on social media sites can cause unwanted problems.

2. .....

3. .....

4. .....

5. .....

6. .....

7. .....

8. .....

9. .....

10. ....

**Answer the following questions:**

1. What are the main problems that are discussed in the above article and what are their causes?
2. What is the Momo challenge?
3. What are the solutions to the problems discussed in the article?

***Making recommendations***

In the passage on online hoaxes, notice that the author makes a few recommendations. Write down any three recommendations made in the passage.

.....  
.....  
.....

**Here are a few recommendations that you should follow in order to ensure your digital safety.**

1. Safe search options should be used when searching for any information on the internet.
2. A strong and unique password containing a combination of upper and lower case letters with numbers and special characters should be used.
3. Official email IDs should not be used for social media sites.
4. Free and unsecure Wi-fi networks should be avoided for banking transactions.
5. The same password should not be used for different sites.
6. Old accounts that are not used anymore should be deleted.
7. A trusted anti-virus system should be installed on the system.
8. Files must be scanned before opening or downloading.

Look at the sentence structure of the above recommendations. The object is given first followed by the action connected by the modal for advice or recommendation 'should'.

1. Add five more recommendations to the above list using the same format.
- .....  
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2. Write a set of four recommendations for each of the following:
1. Recommendations to be followed when working in a physics laboratory
  2. Recommendations to be followed while driving on a highway
  3. Recommendations to be followed while visiting a museum
  4. Recommendations to be followed for maintaining your vehicle

### TASK 8: WRITING

**Letter to the Editor on increasing incidence of cybercrime making a few recommendations**

S Chandran  
50 Block A  
Radiant Apartments  
17, Main Temple Street  
Madurai 625 002

4 August 2019

To  
The Editor  
The Hindu  
Anna Salai  
Chennai 600 002

Sir/Madam

*Subject: The issue of increasing cybercrime in recent times*

I am writing to express my deep concern over the problem of increasing cybercrime in recent times. Most of our daily activities now involve using digital devices that are connected to the internet ranging from booking a movie ticket to paying our bills.

It is not only quick but also convenient and can be done at a click from the comfort of our homes. As more and more technology is used even for simple transactions, hacking, banking frauds and false calls have become quite common. There is now a need to make our transactions completely foolproof.

My father made an online banking transaction and was shocked to find his account displayed a message saying it was hacked and is bankrupt. In that moment, he panicked and started calling everyone to find out how this could happen. We then went to the cybercrime department to find out what had happened. This incident was a bitter experience for my entire family.

Here are a few recommendations that we should all follow while making online transactions:

A high level of alertness should be maintained when making banking transactions.

Avoid asking another person to transact on one's behalf.

More safety filters should be provided in online transactions.

Cyber-security laws should be more stringent.

Punishment for breaking cyber-laws should be stringent.

Through the columns of your esteemed daily, I appeal to the concerned authorities to look into the matter and request people to be vigilant.

Thank you

Yours sincerely,

Chandran S

## Exercises

- Imagine your neighbour complains about his/her child refusing to leave the house in the evenings after school because he/she is engrossed playing with gadgets. Although it is now a common phenomenon, you feel it is unhealthy for children to spend hours online. Write a letter to the editor of a local newspaper highlighting the issue.
- Students use social media for various purposes. However, social media is a space where one's views should be expressed in a careful and inoffensive manner. Write a letter to the editor of a local newspaper on the issue offering suggestions.

## Phrasal verbs

**Read the following passage.**

Let's go back to 1969, when the first verb sent over the Internet was a phrasal verb: **log in**. To log in is to enter a code, key or password to gain access to the computer's

abilities. We have been logging in ever since then. Sometimes we say we have to **sign in** to a web page. Like now, we started a computer by **hooking up** wire cables and then powering it up or **turning it on**. Some computers took a long time to **boot up**, or get ready to run programs. Now, we do not have to wait as long. To install new applications on the computer, users run a **set up** program. Then we click on the icon, or image, for a program to run it. After opening a program, you choose commands from a menu. These menus are stored in a **pull down** or **drop down** bar near the top of the screen.

A click of the mouse—the hand-held device that guides the cursor around the computer screen—shows more commands on the bar. That bar is often called the navigation bar or nav bar. Another verb that describes the up-and-down movement on the screen is **scroll up** or **scroll down**. A wheel on the mouse allows you to scroll up or scroll down to read a web page. We can **click on** an arrow to move to the next screen, too.

Source: <https://learningenglish.voanews.com/a/phrasal-verbs-to-help-you-with-technology/3085650.html>  
Voice of America

The words in bold are called **phrasal verbs** and are a combination of a verb and a preposition.

### 1. Now read the following passages and underline the phrasal verbs.

#### ***Storage and other problems***

Installing upgrades can sometimes damage files. So, users should always back up their files. That is, copy files and folders to another location, like an external disk drive. A user who stores many large files will soon run out of room on the computer, so keeping files on an extra hard drive is a good idea. This phrasal verb became a noun, too (for example, Experts tell us, ‘Put your backups in a safe place’).

My parents used to print out their emails because they wanted to keep a permanent copy. The phrasal verb ‘print out’ is a separable phrasal verb, that means you can put a pronoun between the verb and preposition, as in ‘Let me print it out for you’.

Today, cyber-criminals have learned to enter computer systems or networks without permission. This is known as hacking into the network. Hacking can make computer systems go down, or stop working. A disaster could happen if the hacker wipes out or erases all the information on a computer system. That is another reason why you need to back up your system.

#### ***Annoying advertising***

Internet advertisements, or ads, pop up on the screen over a web page. This created a new noun from the phrasal verb, pop-up. People said they needed a tool to block those

annoying ads, so the ‘pop-up blocker’ was born. This feature is part of the browser software. Speaking of browsers, another phrasal verb that became a noun is plug-in. You know that you can plug a wire into the wall. Now, we add small programs to perform specific tasks in the computer, and call them plug-ins.

Companies often ask for your email address. They create a large list of users from their email addresses. When we sign up to use a website, we key in our name and email address. The organisation running an online service usually asks us to opt in, or choose to receive email messages. Usually those messages are asking us to buy products. There are so many of these emails now that many people try to filter out all messages from advertisers—otherwise known as spam.

### **Getting off the grid**

If you think that the Internet is full of too many advertisements, and your email is nothing but spam, just click on the menu to shut down and turn off your devices for the day. Get off what we call ‘the information superhighway’ and take a walk outside. Wait! There is one final phrasal verb to describe that: go offline.

*Source: <https://learningenglish.voanews.com/a/phrasal-verbs-to-help-you-with-technology/3085650.html>*

Voice of America

There are several other phrasal verbs that are integral to our day to day communication. A few examples have been provided in the table below.

	<b>Phrasal verb</b>	<b>Meaning</b>	<b>Sample sentence</b>
1.	mix up	to get confused	<i>I always mix up names and faces.</i>
2.	look down on	to judge, or to think less of someone	<i>When you look down on someone, you will fail to see the good in them.</i>
3.	set up	to arrange or organise	<i>He set up a meeting with the manager the very same day.</i>
4.	work out	exercising	<i>It is better to start working out while you are still young.</i>
5.	show off	to brag	<i>Varun couldn't help but show off his new mobile phone.</i>
6.	break down	to get extremely upset or stop functioning	<i>The woman broke down on hearing the bad news./ The bus broke down on the highway.</i>
7.	figure out	to understand	<i>Scientists have finally figured out the reason behind the mission failure.</i>

Phrasal verb	Meaning	Sample sentence
8. end up	eventually do something	If you work hard consistently you can end up in the national team.
9. give up	to quit or to stop trying	Unfortunately, he gave up during the last phase of the project and lost the advantage he had gained earlier.
10. get over	to overcome a problem or an illness	The teacher advised him to get over the failure and start afresh./He got over his cold after a week.
11. drop out	quitting a class	His friends advised him not to drop out in the final year.
12. clean up	make tidy	The boy was asked to clean up his room after the party.
13. calm down	to relax	It is better to calm down rather than panic when you are faced with a challenge.
14. hang out	spend time with	I prefer hanging out with my school friends any day.
15. hang on	to wait a short while	I was asked to hang on till they found my file.

2. Use the words in the box to complete the following sentences.

across      after      away      back      down      into      off      on      out      over      up

- The police located the bomb before it blew .....
- When I met my friend after a year, we went to a coffee shop to catch .....
- The father wanted to bring ..... his children well.
- I usually check the dictionary when I come ..... a new word.
- He preferred eating ..... when his friends visited.
- He was asked to turn the volume ..... as she was reading.
- The child finally calmed ..... when his parents bought the toy.
- I was asked to call ..... because they were busy in the morning.
- Our neighbours agreed to look ..... the pet for two days.
- My dad was looking ..... his keys in a hurry.

3. Find the meanings of the given phrasal verbs and frame suitable sentences.

act up: .....

get along: .....

give away: .....

step down: .....

make up: .....

ring back: .....

find out: .....

cut off: .....

carry out: .....

take over: .....

fall over: .....

give up: .....

hold up: .....

go off: .....

sort out: .....

## FOLLOW-UP

- Identify and underline the cause and effect expressions in the sentences given below.
  - Salim could not attend the music concert since he was unwell.
  - The bridge has collapsed due to heavy rains and floods in the area.
  - The results of the study are positive therefore we can go ahead with the testing.
  - Sumedha studied well for the examination and consequently stood first.
  - Neil has finished his assignment early so that he can attend the conference in the evening.
- The sentences in Column A all use connective words. Match the connectives in each sentence to its correct purpose provided in Column B.

A	B
a. On the whole it was an eventful day.	i. to signal order or sequence
b. We must discuss this issue at length tomorrow.	ii. to signal an example

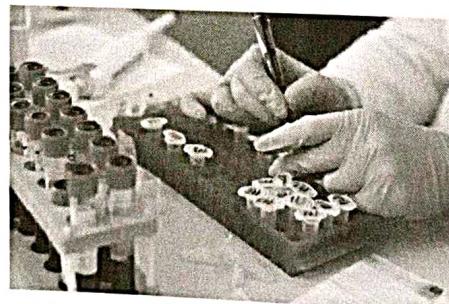
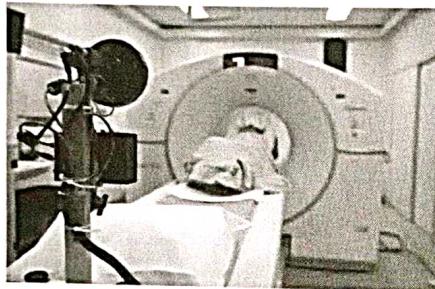
A	B
c. The waterfall is located beyond these hills.	iii. to summarise
d. The professor asked her students to be specific when answering questions.	iv. to signal time
e. According to this list, Isha will be presenting her paper next.	v. to signal place

3. The link given below provides a brief history of hacking. Read the article carefully and make notes on it listing the key ideas, using the template provided in the unit.  
<https://www.computerweekly.com/opinion/A-history-of-hacking-and-hackers>

# Medical Technologies

Listening	Speaking	Reading	Writing	Grammar and Vocabulary
Listening to technical passages/ reports, filling in blanks, providing brief descriptions	Conducting interviews, gist of reports and research	Advertisement—reading graphical material for comparison	Definitions, making comparisons and drawing contrasts, essay writing	Affixes, adjectives, degrees of comparison, connectives, discourse markers; compound words

The use of technology in the medical field is not new, but the way medical technology has advanced over the past few years has impacted healthcare tremendously.



## PREPARATORY

1. Discuss the following questions in small groups.
  - a. What is medical technology?
  - b. List a few terms associated with medical technology.
  - c. Briefly describe a few technology-driven changes you have noticed in the practice of medicine.
2. Search the Internet and find some information on the role of technology in the field of medicine.
3. Now watch the video clip ‘What is Medtech?’ on the app.



Listen to the clip again. Write down five examples of 'medtech' mentioned in the clip.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

4. The following words are related to the field of medical technology. Find the words in the grid.

ASSISTIVE  
THERAPY  
TECHNOLOGY

MEDICINE  
CONSULTANT  
ULTRASOUND

RADIOLOGIST  
MICROSCOPE

SPECIALIST  
SCANNER

T	R	Y	V	B	L	F	G	L	S	C	T	E	M	F
Z	A	Y	Q	C	N	W	F	I	G	E	D	P	P	I
J	D	I	D	Z	A	Y	Z	R	C	N	O	O	T	O
F	I	J	F	U	V	Q	H	H	U	D	L	C	T	K
L	O	L	G	T	V	V	N	O	R	Q	Q	S	H	S
I	L	D	A	E	N	O	S	K	W	M	D	O	E	M
Y	O	T	S	I	L	A	I	C	E	P	S	R	R	I
L	G	G	P	O	R	M	T	X	N	Z	X	C	A	P
U	I	O	G	T	K	S	E	L	S	V	M	I	P	N
U	S	Y	L	O	C	L	K	D	U	E	Q	M	Y	U
A	T	U	R	A	E	A	S	S	I	S	T	I	V	E
L	P	P	N	R	D	Z	D	I	U	C	N	Q	S	H
A	Q	N	V	Q	D	C	D	A	J	P	I	O	P	D
Z	E	D	A	Z	F	E	X	S	B	W	K	N	C	M
R	G	X	N	S	Z	Z	V	L	F	F	X	G	E	S

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**SECTION 1****TASK 1: READING*****Pre-reading***

Discuss the following questions with your partner.

1. What do you know about virtual reality?
2. Can virtual reality be used in the field of medicine?
3. Have you heard about robotic surgery? Describe it to your partner.
4. Name three computer-controlled medical devices.

**Five ways virtual reality is improving healthcare**

Virtual reality is much more than just a new form of entertainment, it is increasingly being used in a wide range of medical applications, from treatments to training. Here are a few of them.

**1. Pain management**

There is good scientific evidence that virtual reality (VR) can help relieve pain. The parts of the brain that are linked to pain—the somatosensory cortex and the insula—are less active when a patient is immersed in virtual reality. In some instances, it can even help people tolerate medical procedures that are usually very painful.

Other studies have shown that amputees can benefit from VR therapy. Amputees often feel severe pain in their missing limb, which can be hard to treat with conventional methods, and often doesn't respond well to strong painkillers like codeine and morphine. However, a technique called 'virtual mirror therapy', which involves putting on a VR headset and controlling a virtual version of the absent limb seems to help some patients cope better with this 'phantom pain'.

**2. Physical therapy**

VR can be used to track body movements, allowing patients to use the movements of their therapy exercises as interactions in a VR game. For example, they may need to lift an arm above their head in order to catch a virtual ball.

It's more fun doing exercises in virtual reality than it is in a gym, so people are more motivated to exercise. It can help in other ways too. For example, we found that for patients who are anxious about walking, we can control their virtual environment so that it looks as though they are moving much slower than they actually are. When we do this,

they naturally speed up their walking, but they don't realise they are doing it and so it isn't associated with pain or anxiety.

Studying how people perceive and interact with VR systems helps us design better rehabilitation applications.

### 3. Fears and phobias

If you have an irrational fear of something, you might think the last thing you need is to see it in virtual reality, however, this is one of most established forms of medical VR treatment. Phobias are often treated with something called graded-exposure therapy, where patients are slowly introduced to their fear by a therapist. Virtual reality is perfect for this as it can be adjusted precisely for the needs of each patient, and can be done in the doctor's office or even at home. This is being used to treat phobias such as fear of heights and fear of spiders, but also to help people recover from post-traumatic stress disorder (PTSD).

### 4. Cognitive rehabilitation

Patients with brain injury from trauma or illness, such as stroke, often struggle with the everyday tasks that we take for granted, such as shopping or making plans for the weekend. Recreating these tasks within virtual environments and allowing patients to practise them at increasing levels of complexity can speed up recovery and help patients regain a higher level of cognitive function.

Doctors can also use these same virtual environments as an assessment tool, observing patients carrying out a variety of real-world complex tasks and identifying areas of memory loss, reduced attention or difficulty with decision-making.

### 5. Training doctors and nurses

Virtual reality is, of course, not just for patients. It also offers benefits to healthcare professionals. Training doctors and nurses to carry out routine procedures is time consuming, and training generally needs to be delivered by a busy—and expensive—professional. But virtual reality is increasingly being used to learn anatomy, practise operations and teach infection control.

Being immersed in a realistic simulation of a procedure and practising the steps and techniques is far better training than watching a video, or even standing in a crowded room watching an expert. With low-cost VR equipment, controllable, repeatable scenarios and instant feedback, we have a powerful new teaching tool that reaches well beyond the classroom.

Source: <https://theconversation.com/five-ways-virtual-reality-is-improving-healthcare-79523>  
Wendy Powell, The Conversation

***Post-reading******Vocabulary***

1. Choose the contextual meaning of the word 'immerse' from the options given below.
  - a. dip in liquid
  - b. be deeply involved
  - c. a large quantity
2. Choose the meaning of the word 'simulation' from the options given below.
  - a. to encourage development of
  - b. imitation of a situation or process
  - c. doing two things at the same time
3. Identify the word that means 'treatment intended to relieve or heal a disorder'.
4. Identify the word that means 'an irrational fear of something'.
5. Identify the antonym of the word 'delayed' from the passage.

***Comprehension***

1. Name the parts of the brain that are linked to pain.
2. How does virtual reality help patients cope with 'phantom pain'?
3. What role does virtual reality play in physical therapy?
4. What is graded-exposure therapy?
5. How do doctors use virtual reality as an assessment tool?
6. What advantages does virtual reality offer to healthcare professionals?
7. Which of the following statements is correct according to the passage?
  - a. Virtual reality is used in assisting only amputees or people with phobias
  - b. Virtual reality is used in a wide range of medical applications, from treatments to training
8. How does virtual reality help in the training of doctors and nurses?
9. What do you think is the future of virtual reality, particularly in the field of medicine?

**TASK 2: VOCABULARY****Compound Words**

A compound word is a word made up of two or more words.

Compound words can be formed in three ways:

- a. Closed form: two words joined together to form one word, with no additional punctuation or space  
*toothpaste, makeup, keyboard*

- b. Hyphenated form: two or more words joined together with a hyphen  
*passer-by, son-in-law, go-between*
- c. Open form: two or more separate words, with a space between the words  
*post office, middle class, attorney general*

There are compound words in all classes: nouns, verbs, adjectives, adverbs and pronouns.

**1. Coin compound words related to the field of medicine by combining words in columns A and B.**

A	B
plastic	trial
allergic	diet
balanced	anaesthetic
heart	marrow
clinical	surgery
surgical	attack
general	intervention
bone	reaction

**2. Write down the expanded forms of the following nouns. The first two have been done for you.**

- |                        |                               |
|------------------------|-------------------------------|
| soil laboratory        | : laboratory for testing soil |
| noise pollution        | : pollution caused by noise   |
| climate change         | :                             |
| food crisis            | :                             |
| energy efficiency      | :                             |
| underground cable      | :                             |
| weather report         | :                             |
| media support          | :                             |
| environmental problems | :                             |
| robotic surgery        | :                             |

**3. Fill in the blanks with the appropriate compound nouns formed from the words given in the box below. Some of the words need to be used twice but in different combinations.**

window	reading	seat	street	day	phone	child	light
fishing	card	table	food	frames	work/working	boat	

- a. I worked at night for so long that when I finally started to do some ..... I found it difficult to do so.

- b. Rakesh: 'What type of credit card is that?'  
Chris: 'That's not a credit card. That's a ..... I use it once a week to call my mum back home in New Zealand.'
- c. I know that Monday is a holiday for everyone else, but for us it's a normal ..... We have to get this project finished by Wednesday!
- d. I want to put a ..... in the car as it keeps toddlers safe while you are driving.
- e. All the ..... in this house have to be repainted. Otherwise, they will rot over the winter and then we may not be able to open the windows in the spring.
- f. I only have coins on me and that's a ..... I will have to see if there is a public phone in that restaurant.
- g. A ..... sank off the Spanish coast last night. Both fishermen were saved by the coast guard.
- h. John was furious with the airline company. He sat on that plane for 14 hours and his ..... didn't work. He couldn't finish that novel he was reading.

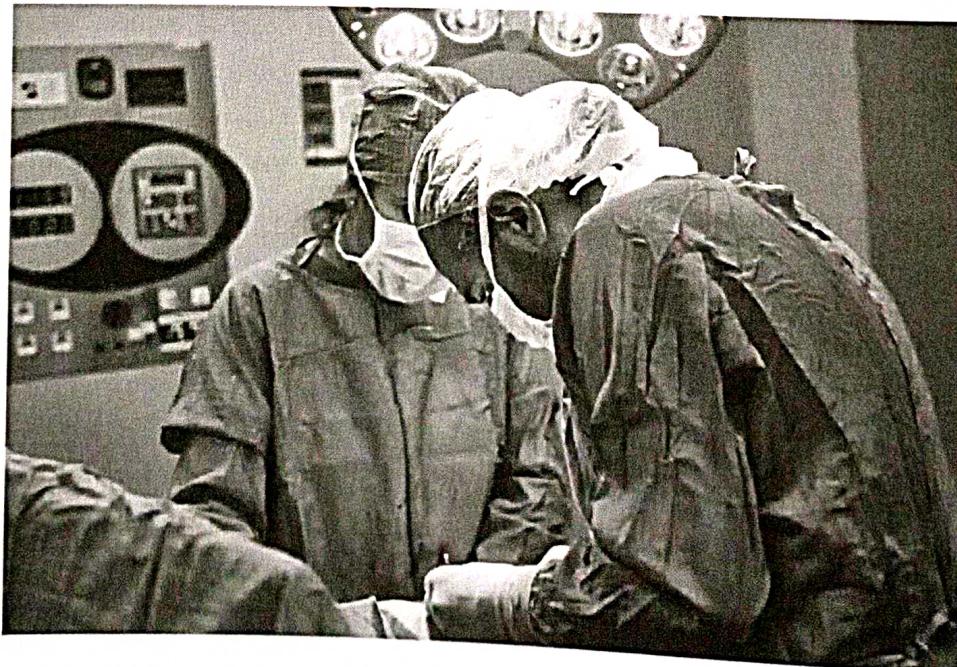
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## SECTION 2

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Robotic surgery, computer-assisted surgery and robotically assisted surgery are terms for technological developments that use robotic systems to aid in surgical procedures.

### TASK 3: SPEAKING



*Role play*

1. Read the following interview conducted by a student. She is interviewing a surgeon.

**Student:** Good morning, doctor. Welcome to the show. We hear about robotic surgery or computer-assisted surgery very often nowadays. Could you please tell us about it?

**Doctor:** Good morning to all viewers. I'm glad that I've got an opportunity to share my views on this programme. Computer-assisted surgery is an emerging technology in which the computer assists the surgeon in performing the surgery.

**Student:** Very interesting! Are there any advantages of using a computer for the surgery?

**Doctor:** Yes! This was developed to overcome the limitations of minimally invasive surgery and to enhance the capabilities of surgeons performing open surgery.

**Student:** How is the surgery performed?

**Doctor:** It's performed by two methods: either by using a telemanipulator or by computer control.

**Student:** What is a telemanipulator?

**Doctor:** It is a remote manipulator that allows us to perform normal movements while robotic arms carry out the actual surgery on the patient.

**Student:** Very interesting! How about the other system?

**Doctor:** In a computer-controlled system, the surgeon uses a computer to control the robotic arms and its end effectors.

**Student:** Could you please tell us the advantages of the computer-controlled system?

**Doctor:** Sure. One advantage of the computerised method is that the surgeon need not be present; he or she could be anywhere in the world and conduct remote surgery. Some major advantages of robotic surgery are precision, miniaturisation, smaller incisions, decreased blood loss, less pain and quicker healing time.

**Student:** Wonderful! Do you use conventional instruments in this method?

**Doctor:** Good question. No, the conventional steel instruments are replaced with modern ones which have feedback-controlled motions. These smart instruments reduce or eliminate the tissue trauma associated with open surgery.

**Student:** Where are these surgeries performed?

**Doctor:** In all parts of the body. Most surgeries are done using this method, especially cardio-thoracic surgery.

**Student:** So you mean to say that engineers are assisting doctors with this modern technology. Thank you, doctor, for sharing this information with our viewers.

2. Your uncle has to undergo robotic surgery and is apprehensive that the robot would perform the surgery and not the doctor. What advice would you give your uncle to reassure him? How would you clarify his doubts? Enact a role play with your partner. You may both want to note down points and questions. Do not read out from your notes. Take 10 minutes to rehearse.

#### TASK 4: LISTENING



Now play the audio clip on the app. Listen to the audio once. Listen again and fill in the blanks in the passage below.

#### How X-rays work

X-ray technology utilises ..... rays that can pass through certain body ..... and create imagery vital to diagnosis and treatment. The X-ray machine is composed of an X-ray tube that contains a pair of ..... or conductors, called a cathode and an anode. The cathode is a ..... that releases energy with the introduction of an ..... current, much like that of a light bulb. The cathode energy is released in the form of electrons. The anode, located on the opposite end of the X-ray tube, is a ..... made of tungsten, a material that attracts the electrons. When the electrons released from the cathode come in contact with the tungsten, they release ..... in the form of photons. These highly ..... photons are channelled through a ..... cylinder and a series of filters creating an X-ray beam. The X-ray beam is a high-energy beam that can be absorbed only by dense body tissues such as bone. During an X-ray, a ..... film is placed behind the patient and the patient is placed between the film and the X-ray machine. The X-ray machine then focuses the ..... at the specific area of the patient's body. As the X-ray energy passes through the patient's body, the photons of the beam reach the film and cause a ..... reaction. The areas where X-ray energy passes through the body become black while the areas where energy is absorbed by the ..... appear white. This process produces a ....., which is commonly referred to as an X-ray.

## *Post-listening*

You have just heard the description of an X-ray machine. Work with a partner and describe in 6–8 sentences how a mobile phone works.

## SECTION 3

## *Pre-reading*

**Pre-reading**

'The MRI was invented by Paul Lauterbur in 1971 at Stony Brook University, Long Island. The technique was then developed by Sir Peter Mansfield and the first MRI body scan of a human being was produced in 1977.'

Now read the following passage:

**Now read the following passage:**

Magnetic Resonance Imaging (MRI) is a non-invasive imaging technology that produces three-dimensional detailed anatomical images. It is often used for disease detection, diagnosis, and treatment monitoring. It is based on sophisticated technology that excites and detects the change in the direction of the rotational axis of protons found in the water that makes up living tissues.

MRIs employ powerful magnets which produce a strong magnetic field that forces protons in the body to align with that field. When a radiofrequency current is then

pulsed through the patient, the protons are stimulated, and spin out of equilibrium, straining against the pull of the magnetic field. When the radiofrequency field is turned off, the MRI sensors are able to detect the energy released as the protons realign with the magnetic field. The time it takes for the protons to realign with the magnetic field, as well as the amount of energy released, changes depending on the environment and the chemical nature of the molecules. Physicians are able to tell the difference between various types of tissues based on these magnetic properties.

To obtain an MRI image, a patient is placed inside a large magnet and must remain very still during the imaging process in order not to blur the image. Contrast agents (often containing the element Gadolinium) may be given to a patient intravenously before or during the MRI to increase the speed at which protons realign with the magnetic field. The faster the protons realign, the brighter the image.

MRI scanners are particularly well suited to image the non-bony parts or soft tissues of the body. They differ from computed tomography (CT), in that they do not use the damaging ionizing radiation of x-rays. The brain, spinal cord and nerves, as well as muscles, ligaments, and tendons are seen much more clearly with MRI than with regular x-rays and CT; for this reason MRI is often used to image knee and shoulder injuries.

In the brain, MRI can differentiate between white matter and grey matter and can also be used to diagnose aneurysms and tumors. Because MRI does not use x-rays or other radiation, it is the imaging modality of choice when frequent imaging is required for diagnosis or therapy, especially in the brain. However, MRI is more expensive than x-ray imaging or CT scanning.

Although MRI does not emit the ionizing radiation that is found in x-ray and CT imaging, it does employ a strong magnetic field. The magnetic field extends beyond the machine and exerts very powerful forces on objects of iron, some steels, and other magnetizable objects; it is strong enough to fling a wheelchair across the room. Patients should notify their physicians of any form of medical implants prior to an MRI scan.

*Source:* Adapted from <https://www.nibib.nih.gov/science-education/science-topics/magnetic-resonance-imaging-mri>  
 National Institute of Biomedical Imaging and Bioengineering

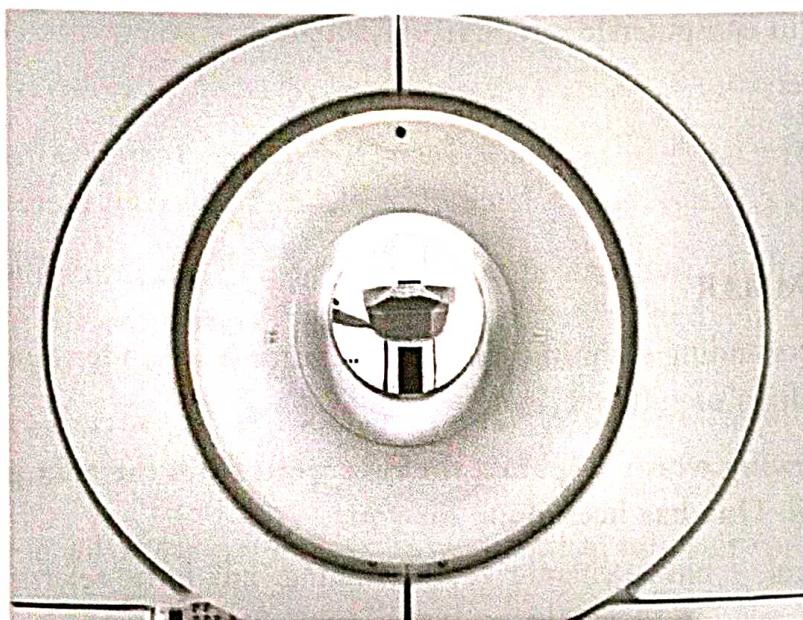
Note that the description follows a certain sequence:

- describing the object
- explaining how it works
- listing advantages and disadvantages

Now write a description in about 250 words of any of the following:

- a. an ultrasound machine
- b. a smartphone
- c. a gaming device such as X-Box or PlayStation

Before you write, make sure you read extensively about your chosen topic. Make notes as you read. Prepare a draft essay first. Then fill in the details. Finally edit it and prepare the final version.



## TASK 5: WRITING

### Definitions

Definitions of terms are the foundation of technical writing. A definition should be clear and easily understandable. A good definition has three parts:

- a. the term to be defined
- b. the class it belongs to
- c. its functions or uses.

Look at the following examples:

1. A microscope is an instrument which is used for producing a magnified image of a small object.
2. A glucometer is a device that is used to measure the glucose level.
3. A cadaver is a dead human body that is used as a source for anatomical study and dissection.

**Define the following words in one sentence.**

1. laboratory: .....
2. sphygmomanometer: .....
3. hammer: .....
4. hearing aid: .....
5. flowchart: .....
6. coolant: .....
7. compiler (in computers): .....
8. photocopier: .....
9. magnet: .....
10. pacemaker: .....

## **TASK 6: GRAMMAR**

One way of understanding scientific and medical terms is by understanding the meaning of the affixes (prefixes or suffixes) used.

**Look at the following words. Separate the root word from the affix and write out the parts of the word. One has been done for you.**

- a. biochemical = bio + chemic + al (meaning: adj form referring to an object's properties relating to *bio* (living things) and *chemic* (process of change in atoms/molecules))
- b. biomedicine = .....
- c. biotechnology = .....
- d. magnetic = .....
- e. scanner = .....
- f. electrical = .....

### **Prefixes**

A **prefix** is a group of letters placed at the **beginning** of a word to make a **new word**. Prefixes can be prefixes of number, negation, attitude, degree and location.

The following table shows you some examples of prefixes.

Prefixes	Examples
bi-	biennial, biannual
tri-	tricycle, triad

Prefixes	Examples
un-	unrepentant, unsavoury
co-	coexist, coincidence
pro-	pronoun, proactive
over-	overreact, overturn
sub-	subatomic, subordinate
trans-	transnational, transatlantic
pre-	premeditated, prepaid

### Suffixes

A **suffix** is a group of letters placed at the **end** of a word to make a **new** word. A suffix can make a new word in one of two ways:

- **inflectional** (grammatical): for example, changing singular to plural (dog → dogs), or changing present tense to past tense (walk → walked). In this case, the basic meaning of the word does not change.
- **derivational** (the new word has a new meaning, ‘derived’ from the original word): for example, teach → teacher or care → careful

The following table will show you how to derive adjectival forms of words using suffixes.

Suffixes	Examples
-able / -ible	readable, comprehensible
-al	functional, mathematical,
-ful	beautiful, helpful, harmful
-ic	artistic, terrific
-ive	intuitive, inventive
-less	sleeveless, hopeless
-ous	dangerous, adventurous
-ish	foolish, childish
-ly / -y	friendly, rainy

Fill in the blanks in the sentences below with the adjectival form of the word given in brackets.

1. He has a ..... (create) mind.
2. I wish I had ..... (magic) powers.

3. The little boy is ..... (allergy) to cats.
4. The party was much more ..... (enjoy) than I had expected.
5. That girl has a ..... (melody) voice.
6. Large meals overload the ..... (digest) system.
7. That's a really ..... (interest) novel. I'm sure you'll enjoy reading it.
8. Information must be stored so that it is secure from ..... (accident) deletion.

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## SECTION 4

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### TASK 7: READING

#### *Pre-reading*

Discuss the following in pairs. Note down your answers.

- What do you know about assistive technology?
- List a few assistive technology products.

Read the following passages.

#### Passage 1

Stephen Hawking was a brilliant physicist who published more than 230 scientific articles, papers, books, book chapters and children's books. He gave countless lectures and stretched humankind's understanding of the nature of our existence. Hawking was well-regarded by his scientific peers but also explained his thoughts in ways that make sense to everyone else. This is an unparalleled contribution for anyone, but especially for someone whose communication was severely limited by ALS, or amyotrophic lateral sclerosis.

At age 21, Hawking was given the standard two to five years to live after his ALS diagnosis. He beat the predictions. Hawking lived with the physical effects of this neurodegenerative disease for more than half a century.

Fortunately, Hawking lived in a time when researchers were rapidly developing electronic technology to assist people with physical limitations in achieving increased independence.

#### Passage 2

#### **Tech fills in for functional limitations**

So-called assistive technologies provide a means for people to move from place to place, to eat independently, to see and hear what they can't otherwise perceive. They include basic things like wheelchairs to help people move around, magnifiers that increase the size of text or images to make them easier to see, even non-electronic items like large-handled kitchen

utensils that are easier to hold; think about everyday things in your kitchen drawers such as can openers, spoons, spatulas and the like.

Assistive technologies range from the seemingly simple all the way to speech-generating devices (SGD) that provide a physical voice to those who don't have one. Stephen Hawking's SGD system combined relatively simple technology together in a unique and functional way. In his own words he described how he managed a tablet computer with an infrared switch that he controlled with cheek movements:

*[An open source program] provides a software keyboard on the screen. A cursor automatically scans across this keyboard by row or by column. I can select a character by moving my cheek to stop the cursor. My cheek movement is detected by an infrared switch that is mounted on my spectacles. This switch is my only interface with the computer. [The open source program] includes a word prediction algorithm ... so I usually only have to type the first couple of characters before I can select the whole word. When I have built up a sentence, I can send it to my speech synthesizer. ... I can also control the mouse in Windows. This allows me to operate my whole computer. I can check my email ... surf the internet ... or write lectures. My latest computer ... contains a webcam which I use with Skype.'*

### Passage 3

#### **Setting an example and normalizing SGDs**

Among his many accomplishments, one that might not be readily apparent was Hawking's role as a 'spokesmodel' for the use of assistive technologies. In a way, he was like a brand ambassador—a person who made the connection between consumers and products. He demonstrated throughout his adult life that technology was simply a tool that enabled him, and others like him, to fully participate and contribute to the world around him. Rather than one particular keyboard or software system, the 'product' that Hawking promoted was the concept that physical limitation cannot hamper the human mind.

Tech solutions, all of which are part of everyday 21st-century life, are used to overcome physical limitations imposed by functional disabilities. From complex solutions used by well-known people—such as the late Christopher Reeve's use of a high-tech wheelchair—to simpler ones like screen magnifiers on our computers and speech recognition 'voice commands' on our smartphones, technology makes some tasks easier. In a very public way, Hawking demonstrated that it is OK—maybe even somewhat cool—to use technology to enhance or enable communication, to move around, work, play and fully participate in family and professional activities.

Hawking and other high-profile users show the world that technology is not strange, nor does it diminish or magnify them as human beings. The technology they use allows others to look past disability and focus their attention on who they are, on them as people. And Hawking's fame raised the visibility of speech-generating technologies, helping them

seem more commonplace than weird for people all over the world—both those who might need SGDs and those who might encounter others using them to communicate.

Advances in technology that help us interact with the world around us are limited only by our imagination. We now take for granted that we can ask our smartphone questions, that it can guide us to our next appointment, monitor our heart rate, measure our steps, help us find and communicate with others, and on and on. Smart technologies are being incorporated into our kitchen appliances, shoes, vehicles and eyeglasses. These and the world of robotics stretch our thinking about ways in which technology can enhance human independence, regardless of physical, and sometimes cognitive, limitations.

How these advances will benefit people with disabilities remains to be seen. One thing is certain though. The use of assistive technologies in our everyday world diminishes the differences between people with different abilities.

*Source: <https://theconversation.com/stephen-hawking-as-accidental-ambassador-for-assistive-technologies-70627>*

Martin E. Blair, The Conversation

### ***Post-reading***

1. What are SGDs? What are they used for?
2. Briefly describe how Stephen Hawking's SGD works.
3. List the ways in which smartphones can help people with functional disabilities overcome their physical limitations.

### ***Exercise***

Imagine you are interviewing Stephen Hawking about the merits and the future of assistive technology. Work with a partner and prepare a list of questions you would like to ask. Refer to the above article as well as external sources for more information on assistive technology in order to frame your questions.

## **TASK 8: GRAMMAR**

### **Adjectives**

An adjective is a word that describes or modifies a noun or a pronoun.

**Example:** This is a safe painkiller, with no harmful side-effects.

**Choose the appropriate adjective from the box and fill in the blanks in the sentences below.**

preventive	incipient	regular	compatible	safe	lethal	sample	severe
------------	-----------	---------	------------	------	--------	--------	--------

1. The surgeons are trying to find a donor with a ..... blood group.

2. These fumes are ..... if inhaled.
3. In the past ten years, ..... measures have radically reduced levels of tooth decay in children.
4. A ..... outbreak of whooping cough occurred during the winter.
5. He was advised to make ..... visits to the dentist.

### Degrees of Comparison (adjectives/adverbs)

i. Pattern for one syllable or two syllables (addition of suffixes)	Comparative: adjective/adverb + er + than Superlative: the + adjective/adverb + est
ii. Pattern for more than two syllables	Comparative: more + adjective/adverb + than Superlative: the + most + adjective/adverb
iii. Irregular comparison	Example: good – better – best Little – less – least Much/many – more – most

Fill in the blanks with the appropriate degree of adjective/adverb:

1. Tablets are ..... (convenient) laptops.
2. *King Lear* is one of ..... (popular) tragedies of Shakespeare.
3. Many students think that Mathematics is ..... (difficult) other subjects.
4. This is ..... (interesting) book I have ever read.
5. Everybody says that Midhun is one of ..... (smart) students in the class.
6. James is as ..... (tall) as his brother.
7. Swimming is ..... (good) any other kind of exercise.
8. Some beans are as ..... (nutritious) as meat.

### Connectives

Connectives are words that connect or join two or more words, phrases, clauses or sentences.

*I played the guitar and my brother complained about the noise.  
Clement needed to colour his hair, so he went to the hair salon.  
He looks fit in spite of his age.*

Look at the following sentence from the reading passage titled 'Virtual Reality in Healthcare'. The connectives have been highlighted in bold.

*The ability to view the inside of the human body in Virtual Reality is **not only** useful for doctors, **but also** for patients.*

Now identify the other connectives in the same reading passage and write them down.

.....  
 .....  
 .....  
 .....  
 .....  
 .....  
 .....  
 .....

### Discourse Markers

Discourse markers are more commonly referred to as 'linking words' and 'linking phrases', or 'sentence connectors'. They may be described as the 'glue' that binds together a piece of writing, making the different parts of the text stick together.

#### *Examples of discourse markers/connectives*

- i. addition: and, also, as well as, moreover, etc.
- ii. sequence: first(ly), next, then, subsequently, etc.
- iii. illustration: for example, such as, illustrated by, as shown by, etc.
- iv. cause and effect: because, since, as, consequently, etc.
- v. similarity: similarly, likewise, like, in the same way, etc.
- vi. contrast: whereas, unlike, otherwise, on the other hand, etc.

Fill in the blanks in the following sentences choosing the suitable discourse marker/connective given in brackets.

1. .... (As far as/Whereas/Regarding) your question about our mobile rates, I have attached a document where you can see all our rate plans.
2. .... (Obviously/Regarding/Basically) the most qualified candidates always get the best jobs.

3. The north of that country is industrialised and rich ..... (furthermore/whereas/on the whole) the south is quite poor, with an economy based on agriculture.
  4. ..... (Incidentally/Basically/Obviously), our objective is to improve productivity and product quality at the same time.
  5. We'd better find a quick solution to this crisis, ..... (after all/in fact/otherwise) our customers will start to lose faith in us.
  6. I got up at 7 o'clock yesterday and took a cold shower, ..... (then/later/meanwhile) I had breakfast and left for work.
  7. The tomato is not, ..... (by contrast/strictly speaking/likewise), a vegetable even though it is commonly considered as one.
  8. The flood victims are short of food. ..... (Similarly/In addition/For instance), they urgently need medical supplies.

## TASK 9: WRITING



## **Advertisements**

**Advertisements** Advertising is one of the oldest forms of public announcement and is an important part of an organisation's growth plans. '*Advertising is any paid form of non-personal presentation of ideas, goods and services by an identified sponsor*' (American Marketing Association).

To **advertise** means to **inform**: the flow of information about a product or service from the seller to the buyer. However, advertising does not end with the flow of information alone. It goes further to **influence and persuade people to take a desired action** – like placing an order to buy a product.

Advertisements target specific audiences. Their use of language and images should be matched to their purpose and audience; otherwise the advertisement will lack impact and effectiveness. Advertisements should first grab **attention**, hold the readers' **interest**, make them **desire** the product and prompt the audience to take **action** (AIDA).

There are different kinds of advertisements; they use different media. However all of them can be made more powerful by careful use of some or all of the following elements:

- a. **Colour:** While four-colour advertisements may seem more attractive, it is possible to grab the audience's attention by using black and white alone. Its use depends on the creativity of the person creating the advertisement.
- b. **Language:** Advertisements should use language economically. The more words they use the less likely that the audience will read through the whole message.  
The advertisement should use headlines that have a 'punch' and convey the basic message.
- c. **Images:** Effective use of a visual can add significant meaning to the advertisement. 'A picture is worth a thousand words' is true for advertising.
- d. **Idea/analogy:** The basic idea or analogy (comparison) used in the advertisement should reflect the values of the product for which the advertisement is made.
- e. **Humour:** A touch of humour always makes an advertisement more effective and memorable.
- f. **Music:** In audiovisual advertisements music can be used to set the tone and convey a mood; together with words and analogies it can make a powerful impact.
- g. **Activity:** Action or movement can be conveyed both through print and television advertisements.

*Source: Orient Blackswan*

### **Exercises**

1. Collect samples of advertisements illustrating the above. Share them with the class, explaining in 30 seconds why they appealed to you.
2. You have created a new product. Prepare a print advertisement (A4 size) using the principles listed above.

## Comparison and Contrast

When we compare and contrast people, things or ideas, we can clearly show similarities and differences by joining ideas or information with appropriate linking words or expressions. Refer to the interview at the beginning of this unit.

The following words or short phrases are used to **compare** two items or ideas:

- like
- likewise
- same as
- as well as
- also
- too
- likewise

Here is a short paragraph using some of these expressions:

You'll find that time, **like** money, is a limited resource. You can't buy everything you want, **likewise**, you don't have enough time to do everything you want to do. Our time is the **same as** our money: it's limited. **Also**, time is a resource when work needs to be done.

The following words or short phrases are used to **contrast** two items or ideas:

- unlike
- in contrast to
- as opposed to
- different from
- whereas

Here is a short paragraph using some of these expressions:

**Unlike** time or money, desire is an unlimited resource. Think about it: **In contrast to** money which can run out, your desire for new experiences and ideas will never end. **Whereas** there is never enough time to do everything you want, your desire will always come up with something new and exciting.

## Essays (Compare and Contrast)

Given below are the basic elements and structure of an essay that seeks to compare and contrast two subjects.

*Paragraph 1: Introduction*

- General topic sentence: catch the reader's attention
- Thesis statement
- Brief background information about the two subjects

*Paragraph 2: Body*

- Topic sentence: Introduce the first similarity or difference
- Examples: To show the similarity or difference
- Explanation: Make the comparison clear (use the appropriate transition words)
- Concluding sentence: Restate the idea discussed

*Paragraph 3: Body*

- Topic sentence: Introduce the second similarity or difference
- Examples: To show the similarity or difference
- Explanation: Make the comparison clear (use the appropriate transition words)
- Concluding sentence: Restate the idea discussed

*Paragraph 4: Body*

- Topic sentence: Introduce the third similarity or difference
- Examples: To show the similarity or difference
- Explanation: Make the comparison clear (use the appropriate transition words)
- Concluding sentence: Restate the idea discussed

*Paragraph 5: Conclusion*

- Re-state thesis statement
- Briefly summarise the three features that you are comparing and contrasting
- Final thought/closing statement



**Go through the following websites.**

<https://mifimaging.com/2016/03/25/ct-scan-vs-mri/>

<https://avacaremedical.com/blog/manual-wheelchairs-vs-transport-chairs.html>

<https://www.writoscope.com/reading/ebooks-vs-printed-books-reasons-better/>

**Now write an essay in not more than 300 words on one of the following topics:**

- Compare and contrast CT scanner and MRI scanner
- Compare and contrast self-propelled wheelchair and manual wheelchair
- Compare and contrast printed books and e-books

## FOLLOW-UP

1. Write down five words that use five different prefixes.

.....  
.....  
.....  
.....  
.....

2. Write down five words that use five different suffixes.

.....  
.....  
.....  
.....  
.....

3. Write brief definitions of the following words used in relation to medical technology.

biomaterials: .....

biometrics: .....

assistive device: .....

X-ray machine: .....

# **Image Attributions**

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