

# Words from Robotics

AMPLIFICATION, ARTICULATE, AUTONOMOUS, COLLIMATING, COMPLIANT, DIFFERENTIAL, DIELECTRIC, GYROSCOPE, MAGNETOMETER, MODULATION, OSCILLATOR, PIEZOELECTRIC, PERMEABILITY, PROGRAMMABLE, PROTOCOL, PROXIMITY, REFLECTANCE, RESONANT, SPECIFICATION, TELEMETRY, TORQUE.

## Avocabo Wordlist 26



### Exercise 26-1 Fill-in-the-blanks

Choose the best list word to complete each of the following sentences:  
(21 marks)

1. Sallie Shockley of Norman, Oklahoma, has just finished passing through the \_\_\_\_\_ at 3:40 p.m. and had turned to wait for a friend when she saw a small, wiry man with bushy hair walk around the metal detector and head into the building. Chestnut turned towards the man and said, "Sir, I'm sorry but you need to..."

2. Turkey's political and military establishment is deeply concerned about the possibility that the Kurdish groups which currently control northern Iraq might use the war to try and establish an \_\_\_\_\_ state. - BBC News

3. Kimble added another project the department may take on, making curbs at intersections \_\_\_\_\_ with standards set in the Americans with Disabilities Act.

4. "Each of these processors is \_\_\_\_\_, and each is aimed at a specific application. They offer a good mix of performance and low cost," said Mello. - Yahoo News

5. THE new EU beef carcass dressing \_\_\_\_\_ cannot be used by Northern Ireland's factories for day-to-day commercial work - even though Northern Ireland Meat Exporters' Association (NIMEA) members had hoped they would soon be able to, the National Beef Association reported.

6. Professor Leif Salford and colleagues showed that mobile phone radiation could increase the \_\_\_\_\_ of albumin through the blood-brain barrier. The team sought to determine whether such leakage of albumin into the brain could lead to neuronal damage.

7. This instrument converts the electric charge from the \_\_\_\_\_ sensors into a voltage, allowing accurate measurement of the mechanical quantities of pressure, force and acceleration.

8. Cabinet has approved the Southern African Development Community (SADC) \_\_\_\_\_ on fisheries, demonstrating South Africa's commitment to regional co-operation and economic integration, government announced. - Business Day

9. Dr. Hamdi has determined that water surplus, the \_\_\_\_\_ between supply and demand, was 103 bcm in 1990 but declined to 84.2 bcm in 2000.

10. In a computer, a specialized \_\_\_\_\_, called the clock, serves as a sort of pacemaker for the microprocessor. The clock frequency (or clock speed) is usually specified in megahertz (MHz), and is an important factor in determining the rate at which a computer can perform instructions. - whatis.com

11. 'If you have a broken voice, you can't get a decent job,' they assert. "For this, looking after just those 2.5 cm of your vocal chords, life-long, is important for the three octaves of voice \_\_\_\_\_ while talking, singing, laughing and emoting," explains Abitbol.

12. British scientists say they have produced the “blackest ever” surface developed so far. NPL says its ultra-black coatings represent the blackest, lowest \_\_\_\_\_ surfaces developed so far. - *BBC News*

13. The shuttle Columbia’s fuselage remained essentially intact for at least a half minute after the commander’s final transmission, according to sources familiar with an ongoing analysis of the last 32 seconds of \_\_\_\_\_ from the doomed spacecraft. - *SpaceFlightNow*

14. In vain we classical-music lovers protest that the whole tradition of opera is about training voices not to need \_\_\_\_\_ — in vain, that is, in the face of a Rodolfo like Ram un Vargas, whose voice, produced with carefulness rather than passion, diminished at the top to a sound tight, hard and small. - *New York Times*.

15. A bill introduced Monday in the Oregon Senate seeks to define the Segway, the \_\_\_\_\_ - balanced vehicle, in the state transportation code and permit it on sidewalks, bike paths and the sides of streets posted 25 mph or less. Thanks to aggressive lobbying by Segway, 33 states have passed similar laws.

16. Paul S. Fischbeck, a professor at Carnegie Mellon University who warned in 1990 about the debris problem, said today that part of the trouble was NASA’s efforts over the years to increase payloads. To achieve that goal, Professor Fischbeck said, scientists had trimmed tons of weight from the external fuel tank, and that often meant modifying its design. “It’s not as rigid now,” he said. “So on liftoff, it can bend and \_\_\_\_\_ , and that makes it harder to keep the foam on.”

17. Building THINK’s “World Cultural Center” would provide the city with a(n) \_\_\_\_\_ structure, fragile-looking but deceptively strong, rising high without hulking or blocking out the sun. The new twins would enshrine the memory of the old ones, softening their angles and replacing their vertical striations with an intricate honeycomb of trusses, beams and joists. - *New York News Today*

18. However, said Morrison, because of the nature of Tech life, an overwhelming number of students apply to live on campus: “Students live on campus because of the \_\_\_\_\_ , the convenience, the ethernet

connection, etc. So we don’t need to induce people; we’re at a point where we’re actually turning people away.”

19. \_\_\_\_\_ a telescope is lining up its optical components (lenses, mirrors, prisms, eyepieces) in their proper positions. This should be accurately done, or else the image quality will suffer.

20. A(n) \_\_\_\_\_ material is a substance that is a poor conductor of electricity, but an efficient supporter of electrostatic fields. This property is useful in capacitors, especially at radio frequencies. Such materials are also used in the construction of radio-frequency transmission lines.

21. “They are very, very slick and very \_\_\_\_\_ . They speak very quickly and use visual aids very effectively. The material shown [via overhead projector or video] goes up and down real quickly” to keep seminar attendees off balance.

### **Exercise 26-2 Synonyms**

*From the three choices, circle the one that is closest in meaning to the list word in the context shown. (20 marks)*

#### 1. AMPLIFICATION

a) elaboration b) formation c) elation

#### 2. ARTICULATE

a) eloquent b) particulate c) speech

#### 3. AUTONOMOUS

a) alcoholics b) anonymous c) independent

#### 4. COLLIMATING

a) parallel b) perpendicular c) *multilateral*

#### 5. COMPLIANT

a) pliant b) spiritless c) defiant

#### 6. DIFFERENTIAL

a) equal b) rotation c) derivative

#### 7. DIELECTRIC

a) ceramic b) insulator c) panoramic

#### 8. GYROSCOPE

a) rotating mechanism b) stabilizer c) axis

9. MAGNETOMETER

- a) thermometer b) gaussmeter c) alkalimeter

10. MODULATION

- a) transition b) carrier c) plantation

11. OSCILLATOR

- a) heterodynes b) generator c) piezoelectricity

12. PERMEABILITY

- a) perviousness b) incomprehensibility c) quality

13. PROGRAMMABLE

- a) can be sequenced b) broadcast c) developable

14. PROTOCOL

- a) courtesy b) instrument c) Midi

15. PROXIMITY

- a) openness b) generosity c) propinquity

16. REFLECTANCE

- a) radiant energy b) reflectivity c) calcite

17. RESONANT

- a) reverberative b) sensational c) concealment

18. SPECIFICATION

- a) temptation b) compensation c) stipulation

19. TELEMETRY

- a) elementary b) remote automatic measurement c) sentry

20. TORQUE

- a) torsion b) extortion c) proportion

**Exercise 26-3 Antonyms**

Provide an antonym for each of the following words (5 x 1 marks)

1. ARTICULATE \_\_\_\_\_

2. COMPLIANT \_\_\_\_\_

3. DIELECTRIC \_\_\_\_\_

4. MODULATION \_\_\_\_\_

5. PERMEABILITY \_\_\_\_\_

**Exercise 26-4 Etymologies (4 x 1 marks)**

1. Which word comes from the Greek meaning " sheets of a papyrus glued together"?

\_\_\_\_\_

2. Which word comes from the Greek meaning " to assign, hold, sway"?

\_\_\_\_\_

3. Which word comes from the Latin meaning "to divide into joints"?

\_\_\_\_\_

4. Which word is an alternation of an Latin word meaning "to aim"?

\_\_\_\_\_

**Exercise 26-5 Making connections**

In a few sentences, describe the relationship between each pair of words. Use a good dictionary to clarify unclear words. (8 x 2 marks)

1. AMPLIFICATION      TRANSISTOR

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. DIFFERENTIAL      ARBITRAGER

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. GYROSCOPE      FLIGHT INDICATOR

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. MODULATION      KLYSTRON

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. PROXIMITY            CHEEK BY JOWL

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6. RESONANT            CLANGOUR

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7. SPECIFICATION        NOMINAL

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8. TORQUE                RAYLEIGH DISK

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**What is the definition of a 'robot'?**

“A reprogrammable, multifunctional manipulator designed to move material, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks”

**Where did the word 'robot' come from?**

The word 'robot' was coined by the Czech playwright Karel Capek (pronounced “chop’ek”) from the Czech word for forced labor or serf. Capek was reportedly several times a candidate for the Nobel prize for his works and very influential and prolific as a writer and playwright. Mercifully, he died before the Gestapo got to him for his anti-Nazi sympathies in 1938. The use of the word **Robot** was introduced into his play R.U.R. (*Rossum’s Universal Robots*) which opened in Prague in January 1921. The play was an enormous success and productions soon opened throughout Europe and the US. R.U.R.’s theme, in part, was the dehumanization of man in a technological civilization. You may find it surprising that the robots were not mechanical in nature but were created through chemical means. In fact, in an essay written in 1935, Capek strongly fought that this idea was at all possible and, writing in the third person, said:

“It is with horror, frankly, that he rejects all responsibility for the idea that metal contraptions could ever replace human beings, and that by means of wires they could awaken something like life, love, or rebellion. He would deem this dark prospect to be either an overestimation of machines, or a grave offence against life.” [*The Author of Robots Defends Himself*- Karl Capek, Lidove noviny, June 9, 1935, translation: Bean Comrada]

**When did robots, as we know them today, come into existence?**

The first industrial modern robots were the Unimates developed by George Devol and Joe Engelberger in the late 50’s and early 60’s. The first patents were by Devol for parts transfer machines. Engelberger formed Unimation and was the first to market robots. As a result, Engelberger has been called the ‘father of robotics.’ Modern industrial arms have increased in capability and performance through controller and language development, improved mechanisms, sensing, and drive systems. In the early to mid 80’s the robot industry grew very fast primarily due to large investments by the automotive industry. The quick leap into the factory of the future turned into a plunge when the integration and economic viability of these efforts proved disastrous. The robot industry has only recently recovered to mid-80’s revenue levels. In the meantime there has been an enormous shakeout in the robot industry. In the US, for example, only one US company, Adept, remains in the production industrial robot arm business. Most of the rest went under, consolidated, or were sold to European and Japanese companies.

In the research community the first automata were probably Grey Walter’s machina (1940’s) and the John’s Hopkins beast. Teleoperated or remote controlled devices had been built even earlier with at least the first radio controlled vehicles built by Nikola Tesla in the 1890’s. Tesla is better known as the inventor of the induction motor, AC power transmission, and numerous other electrical devices. Tesla had also envisioned smart mechanisms that were as capable as humans. An excellent biography of Tesla is Margaret Cheney’s *Tesla, Man Out of Time*, Published by Prentice-Hall, c1981.

SRI’s Shakey navigated highly structured indoor environments in the late 60’s and Moravec’s Stanford Cart was the first to attempt natural outdoor scenes in the late 70’s. From that time there has been a proliferation of work in autonomous driving machines that cruise at highway speeds and navigate outdoor terrains in commercial applications.

