

## I SIMULAZIONE IN INGLESE

### General Knowledge and Logical Reasoning

1. "All women with fair hair have blue eyes" Denying this statement means asserting firmly that:
  - A. All women with dark hair have blue eyes
  - B. At least one woman with fair hair hasn't got blue eyes
  - C. No blond woman has blue eyes
  - D. No woman with dark hair has blue eyes
  - E. At least one woman with dark hair hasn't got blue eyes
  
2. Oakley is west of Carson, which is west of Newton. Earith is east of Carson and west of Wembourne. Wembourne must be east of:
  - A Carson, but not necessarily east of Oakley or Newton;
  - B Newton, but not necessarily east of Carson or Oakley;
  - C Carson and Oakley, but not necessarily east of Newton;
  - D Oakley and Newton, but not necessarily east of Carson;
  - E Carson, Oakley and Newton.
  
3. A taxi company's fares consist of a flat rate for picking up a passenger plus a rate for each kilometre travelled. It costs John £4 to go to the station, a distance of 5 km and £3.20 to go to the town centre, a distance of 3 km. How much would it cost him to go to the supermarket, a distance of 6 km?
  - A £4.40
  - B £5.40
  - C £6.40
  - D £7.40
  - E £7.90
  
4. Which of the following statements is false?
  - A. There are odd numbers which are not multiples of 9
  - B. There are odd numbers which are multiples of 9
  - C. Among the multiples of 9 there are all the odd numbers
  - D. The multiples of 9 are not all odd numbers
  - E. Among the odd numbers there are not all the multiples of 9
  
5. Every branchiopod is a crustacean and every crustacean is an arthropod. No insect is a crustacean. Which two of the following statements must be true?
  - 1 Every branchiopod is an arthropod.
  - 2 No insect is an arthropod.
  - 3 No branchiopod is an insect.
  - 4 Some crustaceans are insects.
  - A 1 and 2
  - B 1 and 3
  - C 2 and 4

**D** 3 and 4

**E** only 1

**6.** The speed limit on motorways in the UK should be raised from 70mph to 80 mph. The majority of drivers consistently break the current speed limit - and without penalty, as the police are unable to enforce the speed limit in all cases. There is no evidence to suggest that driving at 80 mph is more dangerous than driving at 70 mph. If the speed limit were raised, the police could devote more time to dealing with other crimes.

Which **one** of the following, if true, most weakens the above argument?

**A** Many drivers choose to drive at below 70mph.

**B** Modern cars are capable of speeds far in excess of 80mph.

**C** Driving at 80mph uses more fuel than driving at 70mph.

**D** With a speed limit of 80mph, more drivers would drive between 80 and 90mph.

**E** Driving at 80mph increases the wear of the car

**7.** "There are no restaurants without air conditioning"

If the above mentioned statement is false, which of the following is necessarily true:

**A.** There is at least a restaurant without air conditioning

**B.** Some restaurants have a air conditioning

**C.** All restaurants have a air conditioning

**D.** All restaurants are without a air conditioning

**E.** No restaurant has a air conditioning

**8.** A government study suggested that courses in adult education should be subsidised because they contribute to the economy, raise skills and improve job opportunities. However where an adult education course is purely for leisure there is no case for subsidy. Therefore subsidies for courses which are purely for leisure should be abandoned.

Which **one** of the following is an underlying assumption of the above argument?

**A** Unemployment figures are showing an upward trend.

**B** Large numbers of adults will attend these courses.

**C** There are enough teachers for the courses which would be subsidised.

**D** Adults attending these courses will be able to upgrade their jobs if they pass the examinations.

**E** Courses which are purely for leisure cannot be economically useful.

**9.** Look at this series: 7, 11, 9, 13, 11, 15, ... What number should come next?

**A.** 7

**B.** 13

**C.** 12

**D.** 14

**E.** 11

**10.** A man is 2 m tall. He treads bare-foot on a drawing pin. Nervous impulses travel from his foot to his brain via fast and slow nerve paths. In the fast paths the impulse velocity is 200 metres per second, in the slow paths it is 50 m/s. What is the time gap in milliseconds between the arrival of the two sets of impulses at the brain?

- A 10
- B 20
- C 30
- D 40
- E 50

11. Which corporation decided that Santa Claus would have worn a red coat?

- A. Coca Cola
- B. Walt Disney
- C. Nestlè
- D. Apple
- E. Google

### Biology

12. In a DNA sample, the percentage of adenine present was 44%. What is the percentage of guanine in the sample?

- A 22%
- B 27%
- C 6%
- D 44%
- E 54%

13. The cytoskeleton is:

- A. A microscopic single-celled organism, including bacteria and cyanobacteria; does not have a nucleus with a membrane or other specialized organelles; considered to have evolved before Eukaryotes.
- B. A network of microtubules, microfilaments, and intermediate filaments that branch throughout the cytoplasm and serve a variety of mechanical and transport functions.
- C. A system of membranes that is found in a cell's cytoplasm and that assists in the production, processing, and transport of proteins and in the production of lipids
- D...., idea that all living things are composed of cells, cells are the basic units of structure and function in living things, and new cells are produced from existing cells
- E. None of the above

14. Water to cross membranes by facilitated diffusion which is faster than simple diffusion.

Water channel proteins are called..

- A. hypotonic
- B. vacuole
- C. aquaporin
- D. osmosis
- E. None of the above

15. Movement of molecules from an area of higher concentration to an area of lower concentration is called

- A. osmosis
- B. active transport
- C. diffusion
- D. passive transport
- E. None of these answers is correct

16. Inherited traits are

- A. the process in which an egg cell and a sperm cell join to form a new organism
- B. cannot be passed on genetically such as where to hide or bending to the wind
- C. must come from a parent or other ancestor such as the ability for a skunk to spray
- D. distinctive characteristics or behavior patterns determined by genetics
- E. None of the above

17. sexual reproduction is

- A. type of reproduction in which male and female cells combine to form offspring with genetic material from both
- B. must come from a parent or other ancestor such as the ability for a skunk to spray
- C. the process in which an egg cell and a sperm cell join to form a new organism
- D. cannot be passed on genetically such as where to hide or bending to the wind
- E. None of the above

18. Process by which organisms maintain a relatively stable internal environment; A tendency to maintain a balanced or constant internal state; the regulation of any aspect of body chemistry, such as blood glucose, around a particular level

- A. hypertonic
- B. osmosis
- C. hypotonic
- D. homeostasis
- E. All of the above

19. Which of the features below may be present in prokaryotic cells, but not in eukaryotic animal cells?

- 1 mitochondria
  - 2 capsule
  - 3 DNA and RNA
  - 4 cytoplasm containing ribosomes
- A 1 and 4 only
  - B 1 and 2 only
  - C 1, 2 and 3 only
  - D 2 only

**E** none

20. Which of the components of DNA listed below are found on the inside of a DNA double helix?

**1** Pentose sugar

**2** Phosphate

**3** Purine bases

**4** Pyrimidine bases

**A** 1 and 2 only

**B** 3 and 4 only

**C** 1, 2 and 3 only

**D** 2, 3 and 4 only

**E** 1, 2, 3 and 4

### Chemistry

21. Fluorine has a lower electronegativity than \_\_\_\_\_

A. oxygen

B. chlorine

C. lithium

D. iodine

E. None of these answers is correct

22. Electronegativity refers to

A. the degree of negative charge on an electron

B. the energy required to remove an electron from a gaseous atom in the ground state.

C. the ability of an atom to attract the electrons in a covalent bond toward itself

D. the energy change that occurs when an electron is accepted by a gaseous atom to form an anion

E. None of these answers is correct

23. The most electronegative elements are

A. found in the upper right corner of the periodic table

B. the alkali metals

C. the alkaline earth metals

D. the transition elements

E. None of these answers is correct

24. A polar covalent bond results from

A. a transfer of electrons to the atom of least electronegativity

B. an equal sharing of an electron pair between two atoms

C. the formation of oppositely charged ions

D. a ionic attraction

E. None of these answers is correct

25. The energy required to remove an electron from a gaseous atom in the ground state is called

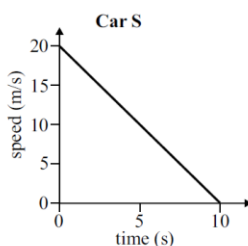
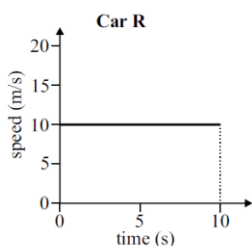
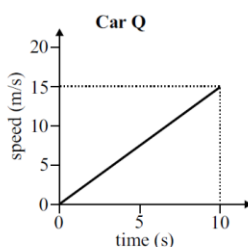
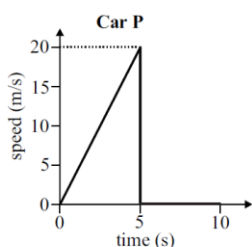
- A. ionization energy
- B. an ionic bond
- C. a nonpolar covalent bond
- D. electronegativity
- E. electron affinity

26. When sodium and chlorine react, chlorine removes sodium's valence electron and \_\_\_\_\_ forms between them.

- A. a covalent bond
- B. a non polar covalent bond
- C. an ionic bond
- D. a polar covalent bond
- E. coordinate bonding

### Physics and Mathematics

27. The graphs below show how the speeds of four different cars (P, Q, R and S) vary with time over a period of 10 seconds.

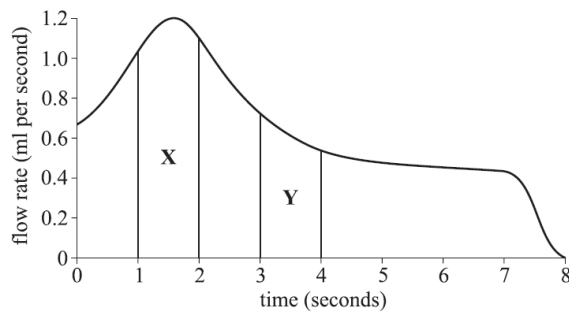


Which two cars travel the same distance in the 10 seconds?

- A** P and Q
- B** P and R
- C** Q and S
- D** R and S

E only P

28. The graph below shows how the flow rate in millilitres per second of fluid from a syringe into a patient's blood varies with time.



The area marked **X** on the graph is twice as large as the area marked **Y** on the graph. Which, if any, of the following statements must be true?

1. The rate of fluid flow after three seconds is half what it is after one second.
2. The average rate of fluid flow is twice as great between one and two seconds as it is between three and four seconds.
3. The flow rate increases twice as rapidly between one and two seconds as it does between three and four seconds.

- A** 1 only  
**B** 2 only  
**C** 3 only  
**D** All of them  
**E** None

29. Solve:  $(7+5i)-(2+3i)$

- A**  $12+8i$   
**B** 7  
**C**  $5-2i$   
**D**  $5+2i$

30. How many different integers,  $n$ , are there such that the difference between  $2\sqrt{n}$  and 7 is less than 1?

- A** 6  
**B** 2  
**C** 4

**D 0**  
**E 8**