



UNICUS  
OLYMPIADS

#UnicusIsUnique

## Sample Paper



**Class 10**

## Unicus Science Olympiad (USO)

Time: 60 minutes

Pattern and Marking Scheme			
Section	Total Questions	Marks per Question	Total Marks
Classic Section	40	1	40
Scholar Section	10	2	20
Grand Total	50		60

## Classic Section (Each Question is 1 Mark)

1. In which of the following groups would you place a plant, which produces spores, has vascular tissues and bear seeds without fruits?

a. Bryophyta  
c. Pteridophyte

b. Angiosperm  
d. Gymnosperm

---

2. Consider the following statements:

1. Every multicellular organism has come from a single cell.
2. Amoeba, bacteria and paramecium are unicellular.
3. Vacuoles provide turgidity and rigidity to the cell.

Which of the statement(s) given above is/are correct?

a. Only 2  
c. Only 2 and 3

b. Only 1 and 2  
d. 1, 2 and 3

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3. Maize plant possesses which of the following morphological features?

- i. Trimerous flowers
- ii. Leaves with parallel venation
- iii. Solid branched stem
- iv. Isobilateral leaves

a. i, ii only  
c. i, ii, iv

b. ii, iv only  
d. ii, iii, iv

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4. The value of acceleration due to gravity on the Earth at a distance of 29,000 km from the surface is  $0.3 \text{ m s}^{-2}$ . The value of acceleration due to gravity at the same height on a planet whose mass is  $66.70 \times 10^{22} \text{ kg}$  and diameter is 8700 km is \_\_\_\_\_  $\text{m s}^{-2}$ , (Take  $G = 6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$ )

a. 0.05  
c. 0.06

b. 0.04  
d. 0.09

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5. Which of the following statements is incorrect?

- a. White revolution is meant for increase in milk production.
  - b. Blue revolution is meant for increase in fish production.
  - c. Silver revolution is meant for fruit production.
  - d. Increasing food production without compromising with environmental quality is called as sustainable agriculture.
-

6. Choose the correct option and complete the following sentence:  
Two waves of sinusoidal waveforms have the same wavelengths and different amplitude.  
These two waves will have \_\_\_\_\_.

- a. same pitch and different intensity                      b. same quality and different intensity  
c. different quality and different intensity              d. same quality and different pitch
- 

7. Match the following:

	Column I		Column II
A.	Adipose tissue	i.	Chondrocytes
B.	Bone	ii.	Blood
C.	Cartilage	iii.	Fat cell
D.	Platelets	iv.	Osteocyte

- a. A - iii, B - iv, C - i, D - ii                      b. A - iv, B - i, C - ii, D - ii  
c. A - iii, B - iv, C - ii, D - i                      d. A - iv, B - ii, C - iii, D - i
- 

8. Why does the Moon seem to change shape from week to week?

- a. Clouds block the part of the moon.  
b. The moon moves through Earth's shadow.  
c. The moon is lit in different ways.  
d. Different amounts of the dark-coloured side of the moon face Earth.
- 

9. Which among the following is not the characteristic of a manure?

- a. Manure is not readily soluble in water, thus it is absorbed by plants slowly.  
b. Manure is not nutrient specific. It only removes the general deficiency of soil.  
c. These are rich in humus but not in inorganic nutrients.  
d. These are inorganic salts made by humans.
- 

10. Which of the following statements are correct?

1. During fertilisation, the nuclei of the sperm and the egg fuse to form a single nucleus.
2. Fertilisation takes place in two different ways; internal and external.
3. Internal fertilisation mostly takes place in water.
4. In higher organisms like humans and dogs, fertilisation can take place both internally and externally.
5. In both external and internal fertilisation, fertilisation takes place outside the body of the female.

- a. Only 1                      b. Only 3  
c. Both 1 and 2              d. 1, 2 and 5
-

11. If the water pressure gauge shows the pressure at the ground floor to be 270 k Pa, water would rise to a height of 3x metre in the pipes of a building. Find the value of x:

- a. 3  
c. 9
- b. 27  
d. 2
- 

12. Why do we use paper or kerosene oil to start fire in wood or coal?

- a. To reach the ignition temperature of wood or coal by burning of paper or kerosene.  
b. To supply more oxygen through kerosene.  
c. To give blue flame to the wood or coal.  
d. For spreading the fire.
- 

13. Study the table carefully to choose the correct conclusions:

Parts of a cell	Cell X	Cell Y	Cell Z
Cell wall	Yes	No	Yes
Chloroplast	No	No	Yes
Nucleus	Yes	Yes	Yes

- a. Cell 'X' is able to make its own food.  
b. Cell 'Y' can be found in the stem of a plant.  
c. Cell 'Z' is able to provide oxygen to the surroundings.  
d. Both X and Z
- 

14. Diagrams X and Y below show reproduction occurring in a yeast cell and in a human being respectively. Which statements about the two methods of reproduction is/are correct?

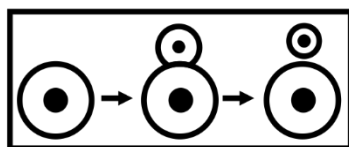


Diagram X

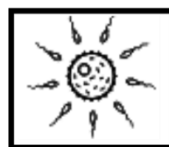


Diagram Y

- a. In diagram X, a single parent is involved but in diagram Y, both parents are involved.  
b. In diagram X, the parent cell and the daughter cell have identical characteristics.  
c. External fertilization occurs in diagram X but internal fertilization occurs in diagram Y.  
d. Both a and b
- 

15. Fill in the blanks:

\_\_\_X\_\_\_ is a thread or filament from which \_\_\_Y\_\_\_ is made. If prepared from plants and animals, it is known as \_\_\_Z\_\_\_ fibres whereas when prepared by humans it is known as \_\_\_W\_\_\_ fibres. Synthetic fibres are nylon, rayon polyester, acrylic etc. Identify X, Y, Z and W:

- a. X-Fibre, Y-cloth, Z-natural fibre, W-synthetic  
b. X-Wool, Y-cloth, Z-natural fibre, W-synthetic  
c. X-Wool, Y-fibre, Z-natural fibre, W-synthetic  
d. X-Wool, Y-fibre, Z-synthetic fibre, W-natural
-

16. Did you ever notice mould growing on a bread? Which of the following factors you may think, have favoured the growth?

- a. Bread captured moisture from air
  - b. Fungal spores from air landed on bread.
  - c. Bread was baked at 80°C.
  - d. Both a and b
- 

17. Which of the following statement is incorrect?

- a. Sound travels faster in summer than in winter.
  - b. Sound travels in a straight line.
  - c. Sound travels faster in vacuum than in air.
  - d. Sound travels in the form of longitudinal mechanical waves.
- 

18. In the given question, an assertion and a reason are given. Choose the correct option:

**Assertion:** Current can produce or speed up chemical change, this ability of current is called the chemical effect of electric current.

**Reason:** Solution of cane sugar allows electric current to pass through.

- a. Both assertion and reason are correct and reason is the correct explanation of the assertion.
  - b. Both assertion and reason are correct, but reason is not the correct explanation of the assertion.
  - c. Assertion is correct, but reason is incorrect.
  - d. Assertion is incorrect, but reason is correct.
- 

19. If one metallic sphere A is positively charged whereas another identical metallic sphere B of the exact same mass as of A is given an equal amount of negative charge, then \_\_\_\_\_.

- a. mass of A and mass of B still remain equal
  - b. mass of A increases
  - c. mass of B decreases
  - d. mass of B increases
- 

20. Consider the following features of gas and identify that gas:

- I. This gas is commonly known LPG.
- II. This gas is commonly used as domestic fuel
- III. A strong-smelling substance called ethyl mercaptan is added to detect the leakage of this gas.

- a. Ethane
  - b. Butane
  - c. Propene
  - d. Butene
-

21. In the given question, an assertion and a reason are given. Choose the correct option:

**Assertion:** Fertilisers provide quick replenishment of plant nutrients in the soil and restore its fertility.

**Reason:** They are easily absorbed by the plants.

- a. Both assertion and reason are correct and the reason is the correct explanation of the assertion.
  - b. Both assertion and reason are correct, but the reason is not the correct explanation of the assertion.
  - c. The assertion is correct, but the reason is incorrect.
  - d. The assertion is incorrect, but the reason is correct.
- 

22. Match the following:

	Column I		Column II
A.	Endangered species	I.	Species that are likely to move into the endangered category
B.	Vulnerable species	II.	Species that have disappeared
C.	Extinct species	III.	Species that are on the verge of extinction
D.	Rare species	IV.	Species that are thinly distributed

- a. A-(iii), B-(ii), C-(i), D-(iv)
  - b. A-(ii), B-(i), C-(iii), D-(iv)
  - c. A-(i), B-(iii), C-(iv), D-(ii)
  - d. A-(iii), B-(i), C-(ii), D-(iv)
- 

23. Which one of the following pairs of compounds illustrates the law of multiple proportions?

- a.  $\text{H}_2\text{O}$ ,  $\text{Na}_2\text{O}$
  - b.  $\text{MgO}$ ,  $\text{Na}_2\text{O}$
  - c.  $\text{Na}_2\text{O}$ ,  $\text{BaO}$
  - d.  $\text{SnCl}_2$ ,  $\text{SnCl}_4$
- 

24. Choose the correct option and complete the following sentence:

Two spheres moving in opposite directions along a straight line can interchange their velocities on colliding with each other, if \_\_\_\_\_.

- a. the magnitudes of their velocities before collision are equal
  - b. their masses are equal
  - c. their momenta before collision are equal
  - d. their accelerations are equal
- 

25. Which of the following statements is correct, when a person walks on a rough surface?

- a. The frictional force exerted by the surface keeps him moving.
  - b. The force which the man exerts on the floor keeps him moving.
  - c. The reaction of the force which the man exerts on the floor keeps him moving.
  - d. None of these
-

26. A student conducts an experiment. Initially, he takes two connected glass bulbs one containing coloured gas other containing air. After some time, both bulbs contain coloured gas. When he tries to do the same with coloured water in one glass bulb and other containing colourless water result obtained was not same.

Which of the following could be the reason for the above observation?

- a. Rate of diffusion of gas molecules is much faster than Liquid.
  - b. Rate of diffusion of water molecules is more than gas molecules.
  - c. Intermolecular space between gas molecules is very less.
  - d. Colourless water will not get coloured because it has a high density in comparison to the gas.
- 

27. At the maximum height of a body thrown vertically up, \_\_\_\_\_.

- a. velocity is not zero but acceleration is zero
  - b. acceleration is not zero but velocity is zero
  - c. both acceleration and velocity are zero
  - d. both acceleration and velocity are not zero
- 

28. A body projected vertically up with a velocity of  $10 \text{ m s}^{-1}$  reaches a height of 20 m. If it is projected with a velocity of  $20 \text{ m s}^{-1}$ , then the maximum height reached by the body is:

- |         |         |
|---------|---------|
| a. 20 m | b. 10 m |
| c. 80 m | d. 40 m |
- 

29. A stone is dropped from certain height, which can reach the ground in 5 s. After 3 s of its fall, it is again allowed to fall. Then, the time taken by the stone to reach the ground for the remaining distance is:

- |        |        |
|--------|--------|
| a. 3 s | b. 4 s |
| c. 2 s | d. 5 s |
- 

30. State 'T' for true and 'F' for false and choose the correct option:

- I. An isotope of iodine is used for making a tincture of iodine, which is used as a medicine.
- II. Isobars because of the presence of the same number of nucleons have same chemical properties.
- III. Isotones are the species in which the difference between the total number of nucleons and the total number of protons is the same.
- IV. The atomic mass of chlorine is fractional because it exists in several isotopic forms.
- V. An isotope of cobalt (Co-60) is used to detect blood clot.
- VI. Isobars shares their electronic configuration, i.e. have same electronic configuration but isotopes do not.

- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| a. I-F, II-F, III-T, IV-T, V-F, VI-F | b. I-F, II-F, III-F, IV-T, V-T, VI-T |
| c. I-F, II-T, III-T, IV-F, V-T, VI-F | d. I-F, II-T, III-F, IV-T, V-F, VI-T |
-

**31.** Consider the following statements and choose the correct option:

Statement 1: If the earth suddenly stops rotating about its axis, then the value of acceleration due to gravity will become the same at all the places.

Statement 2: A heavy body falls at a faster rate than a light body in a vacuum.

- a. Statement 1 is correct but statement 2 is incorrect.
  - b. Statement 1 is incorrect but statement 2 is correct.
  - c. Both the statements are correct.
  - d. Both the statements are incorrect.
- 

**32.** Study the following statements:

- 1. Neurons are considered as the longest cell of the body.
- 2. Neurons forms the structural and functional unit of the nervous system.
- 3. Nervous tissues are found in the brain, spinal cord and nerves.

Which of the statements given above are correct?

- a. 1 and 2 only
  - b. 2 and 3 only
  - c. 1 and 3 only
  - d. 1, 2 and 3
- 

**33.** Which of the following pairs of disease and the causative agent is correctly matched?

- a. Scabies - Entamoeba histolytic
  - b. Pneumonia -Sarcoptes Rom
  - c. Filarial - Wuchereria Bancroft
  - d. Tetanus - Haemophilus pertussis
- 

**34.** A car and a lorry both are moving with equal kinetic energies. If equal breaking force is applied on both, then before coming to rest:

- a. the car will cover a greater distance
  - b. lorry will cover a greater distance
  - c. both will cover the same distance
  - d. the distance covered by them will depend only on their respective velocities
- 

**35.** One day Susan's grandmother told her that, plants are very important for us and for our environment too. Thus, whenever we get time, we should try to plant new plants and nurture the old ones. She gave her a sapling of mango and told her to plant that sapling in the garden and also instruct her to give water to that sapling regularly. Susan obeyed her grandmother. While planting, Susan wondered how water and mineral from the soil reached throughout the whole plant. What would be your answer to Susan's question?

- a. Plants soak the water from their roots, from there the water reaches throughout the plant itself.
  - b. Plant's roots soak the water and xylem tissue conducts the transportation of water and mineral throughout the whole plant.
  - c. Xylem and phloem both help in the conduction of water throughout the plant body.
  - d. Phloem, stomata, xylem helps in water conduction in plants.
-

36. Match the following:

	Column I		Column II
A.	Antheridia	i.	Pteridophytes
B.	Archegonia	ii.	Bryophytes
C.	Rhizoids	iii.	Ferns
D.	Sporophylls	iv.	Female thallus
E.	Rhizome	v.	Male thallus

- a. A-v, B-iv, C-ii, D-i, E-iii  
c. A-ii, B-iii, C-iv, D-v, E-i

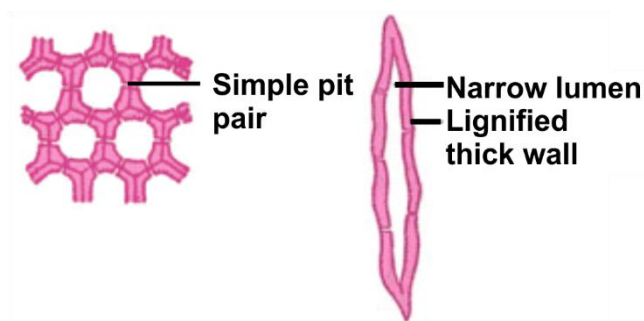
- b. A-iv, B-v, C-i, D-ii, B-iii  
d. A-v, B-iv, C-iii, D-i, E-ii

37. Read the following clues about the tissue 'X' shown below and identify 'X':

Clue 1: They are dead tissues.

Clue 2: Their cells are long with a narrow lumen. Their wall is thick due to lignin deposition.

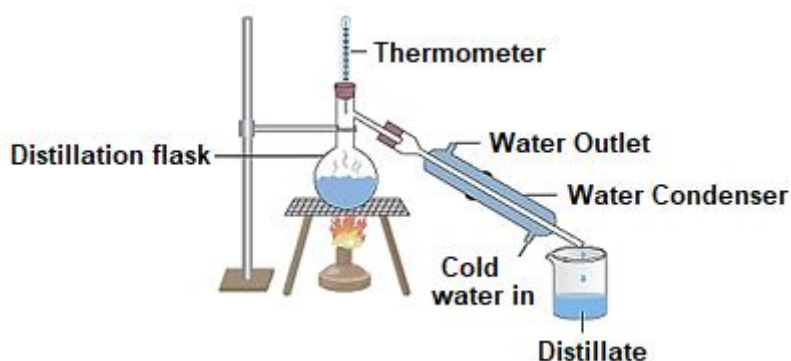
Clue 3: They provide mechanical support to the organs.



- a. Parenchyma  
c. Collenchyma

- b. Sclerenchyma  
d. Phloem

38. While using the given apparatus, what must be kept in mind?



- a. The mixture in the distillation flask must contain a solid.  
b. The temperature difference between the boiling points of components of the mixture must be less than 25°C.  
c. The temperature difference between the boiling points of components of the mixture must be more than 25°C.  
d. All of these

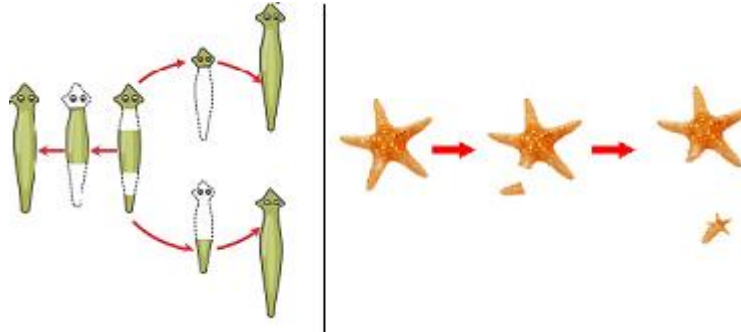
39. Read the following clues about the mode of reproduction 'X' shown below and identify 'X':

**Clue 1:** A part of an organism which is detached, forms a new individual.

**Clue 2:** A starfish which is cut into two regrows into two individuals.

**Clue 3:** A planaria (a flatworm) cut into two parts will grow into two new individuals.

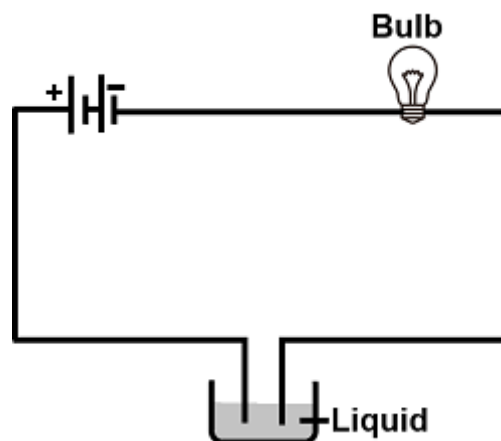
**Clue 4:** A lizard which has lost its tail can grow a new tail.



- a. Binary fission
- c. Regeneration

- b. Budding
- d. Grafting

40. The given figure shows a set-up for testing the conduction of electricity in different liquids. Pick out the group of liquids for which the bulb will not glow:



- a. Milk, Lemon juice, Tap water, Liquid soap
- b. Vinegar, Tap water, Rainwater, Lemon juice
- c. Honey, Kerosene, Vegetable oil, Distilled water
- d. Rainwater, Salt solution, Vinegar, Milk

### Scholar Section (Each Question is 2 Marks)

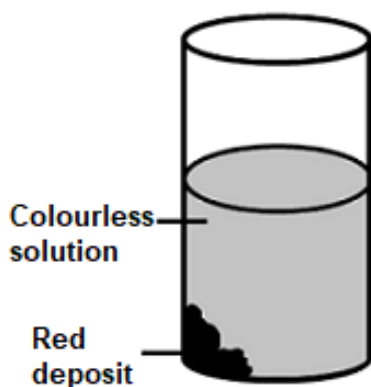
41. Consider the following statements and choose the correct option:

1. Weight of a body is greater at the poles than at the equator.
2. Weight of a body decreases, with an increase in height from the surface of the Earth.
3. Weight of a body increases when a body is moved from the null point towards Moon.

- a. Only statement 1 is correct
- c. Only statement 3 is correct

- b. Only statement 2 is correct
- d. All the statements are correct

42. When few granules of sample X are added to a solution of copper sulphate, the change observed are shown in the figure. Identify sample X and red deposit:



- |           |           |
|-----------|-----------|
| a. Fe, Zn | b. Zn, Cu |
| c. Cu, Zn | d. Fe, Cu |

- 
43. Assume that life has existed on the surface of the moon, without changing its present acceleration due to gravity i.e., one sixth that on the surface of the earth. If 5 kg weight of sugar is purchased on the Earth and the Moon, how many cups of tea can be made out of it on the Earth and the Moon respectively?  
Note: From 100 g of sugar 10 cups of tea can be made on the earth. ( $g = 10 \text{ m s}^{-2}$ )

- |              |              |
|--------------|--------------|
| a. 1000 cups | b. 5000 cups |
| c. 3000 Cups | d. 2000 cups |

- 
44. Two plane mirrors A and B are inclined at angle  $\theta$  ( $< 90^\circ$ ) to each other. A light ray parallel to mirror B is incident on mirror A and it becomes parallel to mirror A after reflection from mirror B. Find the value of angle  $\theta$ :

- |               |               |
|---------------|---------------|
| a. $60^\circ$ | b. $90^\circ$ |
| c. $50^\circ$ | d. $40^\circ$ |

- 
45. A body travels at a speed of  $10 \text{ m s}^{-1}$  for a time interval 't' and next at a speed of  $40 \text{ m s}^{-1}$  for the next time interval 't'. Find the average speed for the total journey.

- |                          |                          |
|--------------------------|--------------------------|
| a. $40 \text{ m s}^{-2}$ | b. $20 \text{ m s}^{-2}$ |
| c. $5 \text{ m s}^{-2}$  | d. $25 \text{ m s}^{-2}$ |

- 
46. Two ice blocks of 10 g each are placed in 2 L of distilled water at 273 K. One of the ice blocks is made up of seawater and the other one is made up of distilled water. What will you observe if the ambient temperature is also 273 K?

- a. After some time, the ice block made of seawater will disappear and the other one will remain intact.
- b. After some time, both the ice block will disappear.
- c. After some time, both the ice block will remain intact.
- d. After some time, the ice block made of distilled water will disappear and the other one will remain intact.

47. Identify the odd one among the following:

1. Bacteria, Insect, Earthworm, Hydra
2. Polythene, Egg membrane, Cell membrane, Onion peel
3. Nucleus, Chromosomes, Genes, Lysosomes
4. Cellulose, Hemicellulose, Suberin, Protein

- a. 1 - Bacteria; 2 - Polythene; 3 - Lysosomes; 4 - Proteins
- b. 1 - Bacteria; 2 - Cell membrane; 3 - Lysosomes; 4 - Cellulose
- c. 1 - Earthworm; 2 - Polythene; 3 - Nucleus; 4 - Proteins
- d. 1 - Hydra; 2 - Onion peel; 3 - Lysosomes; 4 - Proteins

48. A negative ion of an atom of element X has 18 electrons and 16 protons. Calculate the number of neutrons, if the mass number is 2 units more than double the number of protons:

- a. 16
- b. 18
- c. 17
- d. 15

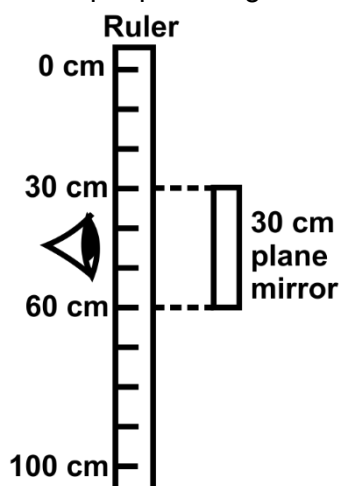
49. The table given below gives the properties of four substances (P, Q, R and S):

Substance	P	Q	R	S
Melting point (°C)	-101	0	44	113
Boiling point (°C)	-34	100	280	445
Colour	Yellow-green	Colourless	White	Yellow

Which substance is a gas at room temperature (25°C)?

- a. P
- b. Q
- c. R
- d. S

50. A man drills a tiny hole at the 40 cm mark of a metre long ruler. He places a 30 cm long plane mirror in front of the ruler as shown. What are the minimum and maximum readings he can read from the image of the ruler if he peeps through the tiny hole looking into the plane mirror?



- a. 35 cm and 45 cm
- b. 30 cm and 60 cm
- c. 31 cm and 40 cm
- d. 40 cm and 50 cm

## Answer Key

1.	d	2.	d	3.	c	4.	b	5.	c	6.	a	7.	a
8.	c	9.	d	10.	c	11.	c	12.	a	13.	c	14.	d
15.	a	16.	d	17.	c	18.	c	19.	d	20.	b	21.	a
22.	d	23.	d	24.	b	25.	c	26.	a	27.	b	28.	c
29.	b	30.	a	31.	a	32.	d	33.	c	34.	c	35.	b
36.	a	37.	b	38.	c	39.	c	40.	c	41.	d	42.	b
43.	c	44.	a	45.	d	46.	a	47.	a	48.	b	49.	a
50.	b												