# Anglais Scientifique 3ème année de licence: UE5-5 3TS5LM21

Juin 2006

**Nom**________________________________**Prenom**________________________________

**Instructions.** Pour les questions (1)-(5), encercler la bonne réponse qui complétera correctement la phrase Pour les questions (6)-(10), encercler la reponse qui completera la phrase dans le sens exprimé entre les parenthèses. Lire les textes en questions (11) et (12), et répondre **en anglais** aux questions. Traduire en anglais (sur une feuille séparée) au moins un texte sur trois au choix des textes donnés en (13)-(15).

1. This new motor is far more efficient, **nevertheless** more work is requireds to reduce noise levels.

   **a. thereby** **b. nevertheless** **c. besides**
   **d. therefore** **e. whereas** **f. thus**

2. Job applicants should speak at least one other European language, **besides** French.

   **a. moreover** **b. obviously** **c. on the whole**
   **d. nevertheless** **e. actually** **f. besides**

3. A new device, **namely** the infra-red camera, allows the penetration of dust surrounding new stars.

   **a. in other words** **b. e.g.** **c. besides**
   **d. in fact** **e. namely** **f. whereas**

4. The presence in these sediments of elements that are rarely found on Earth, **such as** irridium, suggests that a large meteorite hit the Earth roughly 65 million years ago.

   **a. namely** **b. moreover** **c. on the whole**
   **d. such as** **e. whereas** **f. that is to say**

5. The new detection system is extremely fast, **in spite** of this, it has several serious drawbacks.

   **a. whereas** **b. in spite** **c. consequently**
   **d. however** **e. moreover** **f. despite**

6. These statistics **might be** the result of a series of coincidences. (but I don't think so)

   **a. can be** **b. are liable to** **c. might be**
   **d. are expected to be** **e. would be** **f. are doubtless**

7. This new material **ought to** improve the efficiency of the cooling system (theoretically this will happen, but it has not been practically tested)

   **a. will probably** **b. could** **c. will doubtless**
   **d. would** **e. ought to** **f. are liable to**

8. The device has stopped, there **must have been** a short ciruit. (it is almost certain that there was)

   **a. may have been** **b. must be** **c. must have been**
   **d. will have been** **e. will probably** **f. probably was**

9. **Unless** you reduce pressure on that steel bar, it **will** bend. (there is no doubt about it)

   **a. If / will not** **b. If / ought not to** **c. Unless / will**
   **d. Otherwise / must** **e. Povided / will** **f. Provided cannot**

10. If water is heated under these conditions, it **doubtless turns** into steam. (it has always happened in the past so it will certainly happen in the future)

    **a. would turn** **b. should turn** **c. doubtless turns**
    **d. turns** **e. might turn** **f. must turn**

    **f. must turn** est correct également

11. **Fluids in Motion**

The study of moving fluids is important in engineering. A large quantity of liquid may have to flow rapidly through a pipe from one location to another, or air entering the inlet of a machine, e.g. a jet engine, may have to be transported to the outlet, undergoing changes of pressure, temperature and speed as it passes. In all such cases of mass transport, efficient design is not feasible without prior knowledge of conditions existing at various points in the system.

**Viscosity**

If adjacent layers of a material are displaced laterally over each other as in Fig.1, the deformation of the material is called a shear. Basically, the simplest type of fluid flow involves shear. All liquids and gases (provided the density is not very low) adhere to a solid surface so that when they flow the velocity must gradually decrease to zero as the wall of the pipe or containing vessel is approached. The existence of a stationary layer may be assumed from the fact that, whilst large particles of dust can be blown off a table, small particles remain which can be removed subsequently with the finger. A fluid is therefore sheared when it flows past a solid surface and the opposition set up by the fluid to shear is called its viscosity. Liquids, such as syrup and engine oil, which flow slowly, are more viscous than water.

Viscosity is a kind of internal friction exhibited to some degree by all fluids. It arises in liquids because the forced movement of a molecule relative to another one is opposed by the intermolecular forces between them. ...

(a) Why do engineers need to study fluid flow?

Engineers study fluid flow in order to efficiently design systems involving mass transport.

(b) Describe shear in a material medium.

Shear describes the deformation of a material medium involving lateral displacements of adjacent layers.

(c) During fluid flow, what does one assume about liquid and gass molecules lying next to a solid surface?

One assumes that gas and liquid molecules lying next to a solid surface have the same velocity as the solid surface itself.

(d) What effect does a blast of air usually have on small particles lying on a solid surface?

A blast of air usually does not displace small particles on a solid surface because the air molecules slow to near zero velocity as they approach the surface.

(e) Reread the text. Apart from one example, “may” is used in this text with the meaning of “perhaps”. Find the context where it is used with the meaning of “it is permitted” or “can”.

In the phrase : “The existence of a stationary layer **may** be assumed from the fact that ...”.

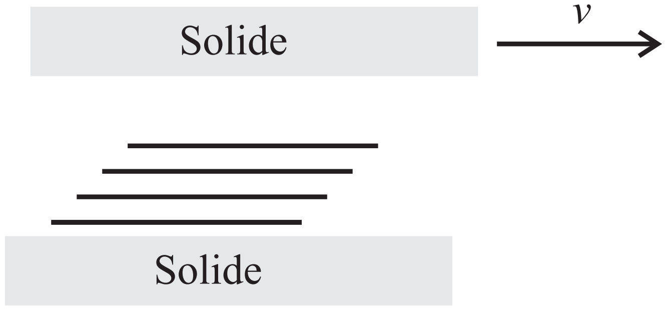


Figure 1:

12. **Magnetism, Medicine and Monoclonal Antibodies** :

Up to now, doctors have relied on two main ways of treating cancerous cells: namely by drugs or by radiation. Both methods, however, have certain drawbacks. The most serious of these is that they do not discriminate, attacking both healthy and diseased cells alike. As a result of this, treatment, and high dosage treatment in particular, cannot avoid damaging other parts of the body as well.

Especially vulnerable in this respect is bone marrow[1], the source of white blood cells, which forms the body's defence system. When a patient requires high dosages of radiation, it is usual for the bone marrow to be transplanted. A certain amount of bone marrow is first removed from the patient and stored during treatment, thereby protecting it from damage. This technique can be successful, provided the bone marrow itself is not already infected. The trouble is that in most cases this is precisely the case, and putting the extracted marrow back only means reinfecting the organ with cancer. This was the problem facing us at the Imperial Cancer Research Centre. What we needed was to find a way of "cleaning" the bone marrow before its return to the body, but how?

Some scientists are currently experimenting with "monoclonal antibodies" as a means of cleaning bone marrow. These antibodies track down and attach themselves to cancer cells, but they don't actually kill them. In order to do that, as a rule, drugs are attached to the antibodies, which can then be focused on the cancerous target. Instead of trying to attach such chemical "warheads" to the antibody "missiles", one of our doctors had the idea of attaching tiny particles of iron to them instead. Why iron? The idea was that these particles would attach themselves to the cancer cells, thereby rendering them magnetic. The bone marrow is then passed through a tube surrounded by magnets, which trap the "magnetic" cancer cells, leaving the healthy cells untouched. So far, this technique has been used to treat over a hundred patients.

[1] Bone marrow : the soft substance in the hollow part of bones. It is attacked by leukaemia.

(a) What are the disadvantages of the "standard" cancer treatments?
Standard cancer treatments attack healthy and diseased cells alike.

(b) How does one typically deal with the fact that large quantities of healthy blood marrow are destroyed when destroying cancerous cells?
One removes some blood marrow before the treatment, and then returns it after treatment.

(c) What is the particularity of "monoclonal antibodies"?
They attach themselves to cancerous cells without killing them.

(d) What is the role of iron in this new procedure ?
It renders the cancerous cells magnetic.

13. **Des haches polies au diamant :**

Il y a 6 000 ans, des artisans chinois des cultures de Liangzhu et Sanxingcun ont produit des haches spectaculairement lisses. Ces instruments de cérémonie furent réalisés à partir d'une roche dure contenant une grande proportion de corindon, un minéral connu sous le nom de saphir quand il est rouge. Or les anciens artisans chinois n'ont pu polir le corindon qu'à partir d'une roche plus dure. Laquelle? Pour le savoir, Peter Lu, de l'Université de Harvard, a poli des échantillons de hache à l'aide d'une machine à polir utilisant divers abrasifs modernes tels que la poudre de diamant ou l'alumine. Examinant le résultat à l'aide d'un microscope à force atomique, il a constaté que la surface produite par l'abrasif au diamant ressemble à celle obtenue par les anciens artisans chinois. L'emploi de diamant par ces derniers est plausible dans la mesure où des gisements de la pierre dure se trouvent à moins de 150 kilomètres du lieu de découverte des haches.

**Axes polished with diamond :**

Six thousand years ago, Chinese artisans of the Liangzhu and Sanxingcun cultures produced axes that were spectacularly smooth. These ceremonial instruments were created from hard rocks containing large proportions of corundum, a mineral known by the name of sapphire when it is red. The ancient Chinese artisans could only have polished the corundum by using a rock that was even harder. Which one ? In order to find out, Peter Lu of Harvard University polished **sample** axes with a polishing machine while employing diverse modern abrasives like diamond and aluminum powders. Examining the result with the help of an atomic force microscope, he noticed that the surface produced by the diamond abrasive resembled that obtained by the ancient Chinese artisans. Their use of diamond is plausible considering that diamond deposits can be found within less than 150 kilometers from the sight where the axes were discovered.

14. **La supernova qui a retrouvé sa compagne**

En 1572 l'astronome danois Tycho Brahe observe dans la constellation de Cassiopée une nouvelle étoile éphémère, aussi brillante qu'un milliard de soleils. Ce phénomène rare était une supernova de type 1a, l'explosion d'une naine blanche provoquée par l'absorption excessive de gaz arraché à son étoile compagnon. Ce compagnon, expulsé lors de l'explosion, a été identifié par P.Ruiz-Lapeunte, de l'Université de Barcelone, et Rodrigo Ibata de l'Observatoire de Strasbourg ; cette étoile se déplace dans les restes de la supernova, éloignés de 10 000 années-lumière, avec une vitesse anormale tant par sa direction radiale, signe de son explosion, que par sa valeur élevée. C'est une étoile de type solaire.

**Recovering a supernovas partner :**

In 1572, the Danish astronomer Tycho Brahe observed in the constellation of Cassiopeia a new ephemeral star, as brilliant as a billion suns. This rare phenomenon was a type 1a supernova, the explosion of a white dwarf provoked by the excessive absorption of gas torn from its companion star. This companion was expelled during the explosion and has now been identified by P.Ruiz-Lapeunte, of the University of Barcelona, and Rodrigo Ibata of the observatory of Strasbourg ; this star is moving within the remains of the supernova, 10 000 light years away, with a velocity which is abnormal, both with respect to its radial direction and with respect to its high value. It is a solar type star.

15. **Les pattes poilues du patineur :**

Le patineur des étangs (ou gerris) marche sur l'eau. Ses pattes ne percent la couche superficielle de l'eau que si l'on surcharge l'insecte aquatique d'environ 60 fois son poids. Deux chercheurs de l'Académie des sciences de Chine viennent de découvrir que cet étonnant pouvoir hydrophobe des pattes du patineur n'est pas seulement dû à la cire qu'elles sécrètent, mais aussi à leur microstructuration. Au microscope électronique, les membres propulseurs de l'insecte se révèlent couverts d'aiguilles minuscules, longues d'une fraction de millimètre. Les observations montrent que l'eau s'insinue si mal dans ce réseau de fibres, que le volume qui sépare la patte de la surface de l'eau est composé à 97 pour cent d'air. Cela explique les brusques accélérations du patineur : il est monté sur coussins d'air.

**The hairy feet of the strider :**

The water strider (or gerridae) walks on water. Its feet only pierce the superficial layer of water if one overloads this aquatic insect with approximately 60 times its own weight. Two researchers of the Academy of Sciences of China have just discovered that this surprising hydrophobic power of the striders feet is due not only to the wax they secrete, but also to their micro-structuration. The observations show that water penetrates so poorly into this network of fibers that the volume which separates the feet from the surface of the water is 97 percent air. This explains the rapid accelerations of the strider, it glides on a cushion of air.