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Monday 1 June 2015 – Afternoon

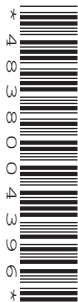
AS GCE HUMAN BIOLOGY

F222/01/ADVANCE NOTICE Growth, Development and Disease

For issue on or after:

13 MARCH 2015

Duration: 1 hour 45 minutes



NOTES FOR GUIDANCE (CANDIDATES)

- 1 This document contains two case studies, which are needed in preparation for questions 1 and 2 in the externally assessed examination **F222/01**.
- 2 You will need to read the case studies carefully and also have covered the learning outcomes for Unit F222/01 (Growth, Development and Disease). The examination paper will contain questions on the two case studies. You will be expected to apply your knowledge and understanding of the work covered in F222/01 to answer these questions. There are 100 marks available on the paper.
- 3 You can seek advice from your teacher about the content of the case studies and you can discuss them with others in your class. You may also investigate the topics yourself using any resources available to you.
- 4 You will **not** be able to take your copy of the case studies, or other materials, into the examination. The examination paper will contain fresh copies of the two case studies as an insert.
- 5 You will not have time to read the case studies for the first time in the examination if you are to complete the examination paper within the specified time. However, you should refer to the case studies when answering the questions.

This document consists of **4** pages. Any blank pages are indicated.

Case Study 1

INTERVIEW WITH A PHLEBOTOMIST

Mark is interviewing Michelle, a professional phlebotomist, for his student newspaper.

| | |
|------------------|---|
| Mark: | Can you tell us in a few words what being a phlebotomist involves? And also, is my pronunciation correct? |
| Michelle: | Yes, it's perfect. Well, my son calls me "a helpful vampire." |
| Mark: | Oh? |
| Michelle: | I take blood from people. |
| Mark: | Yes, but— |
| Michelle: | But with a needle, yes. I extract blood that can then be tested for the presence of molecules and cells that tell us things about the patient. |
| Mark: | What type of things can you look for in the blood? |
| Michelle: | All sorts. Measuring the concentrations of sodium ions, cholesterol and saturated fats is common nowadays. |
| Mark: | Sodium ions? |
| Michelle: | Yes, to see if someone's eating too much salt in their diet. |
| Mark: | Ah yes. And what about tests for diseases? I watched a programme about HIV testing. |
| Michelle: | Yes, there are a few different tests that can be conducted for HIV. But doctors can test for almost any disease you could mention if a blood sample is available: malaria, TB, diabetes, and even cancer. |
| Mark: | What does the cancer test involve? |
| Michelle: | The doctors analyse the blood for the presence of tumour markers. There's one for prostate cancer, for example, called PSA. |
| Mark: | And what are these tumour markers? Antigens from the cancer cells? |
| Michelle: | Yes, exactly... you've been taught well! |
| Mark: | Um, thanks. One final thing. I gave blood the other day and I was wondering if they would test my blood before it's used in a transfusion. I guess that they have to check the blood group. |
| Michelle: | You're right. It's called blood typing. It's crucial to check the blood group, otherwise the patient receiving it can have a nasty reaction to the donated blood. |
| Mark: | Of course. Anyway, thanks for your time. I'm not going to let you take any blood today though. I'm still sore from the other day. |
| Michelle: | Ha! I don't blame you. |

Background reading

<http://www.nhscareers.nhs.uk/explore-by-career/wider-healthcare-team/careers-in-the-wider-healthcare-team/clinical-support-staff/phlebotomist/>

Case Study 2

VACCINATING THE YOUNG

The National Health Service (NHS) has changed its vaccination policy for whooping cough. Traditionally, babies have been vaccinated against whooping cough at two months old. They then receive several booster vaccinations over the subsequent months. In babies younger than two months old, however, cases of whooping cough have been rising. Pregnant mothers are now being encouraged to have vaccinations between weeks 28 and 32 of pregnancy. This allows immunity against whooping cough to be passed across the placenta to the baby.

The BCG vaccination for tuberculosis (TB) is not given as part of the routine childhood vaccination schedule in most regions of the United Kingdom (UK). However, the vaccination is given to babies in some boroughs of London where TB rates are higher than in other parts of the country. BCG does not always produce immunity to TB. Potential replacement vaccines are being researched. Two of the vaccines are MVA85A and MTBVAC.

MVA85A

- Has undergone clinical trials in South Africa.
- Half of the children were given MVA85A and half were given a placebo.
- The trial results were disappointing: no difference between the vaccine and the placebo was found.

MTBVAC

- Has been tested in the laboratory.
- Increases the production of a particular type of T helper lymphocyte.
- Early stage clinical trials have begun.

Another development in the NHS vaccination programme is the availability of the Human Papilloma Virus (HPV) vaccination. HPV infection is sexually transmitted and has been linked to the development of cervical cancer. The vaccination is now offered to 12-year-old and 13-year-old girls in the UK. This vaccination programme could save hundreds of lives each year.

Background reading

<http://www.nhs.uk/Conditions/Whooping-cough/Pages/Introduction.aspx>

<http://www.nhs.uk/conditions/vaccinations/pages/hpv-human-papillomavirus-vaccine.aspx>



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