



**Core 1**

**(c)** The male sex hormone causes a number of changes in the body during puberty. State **two** of these changes other than changes to the reproductive system.

1. ....

.....

2. ....

.....[2]

[Total : 9]

Core 2

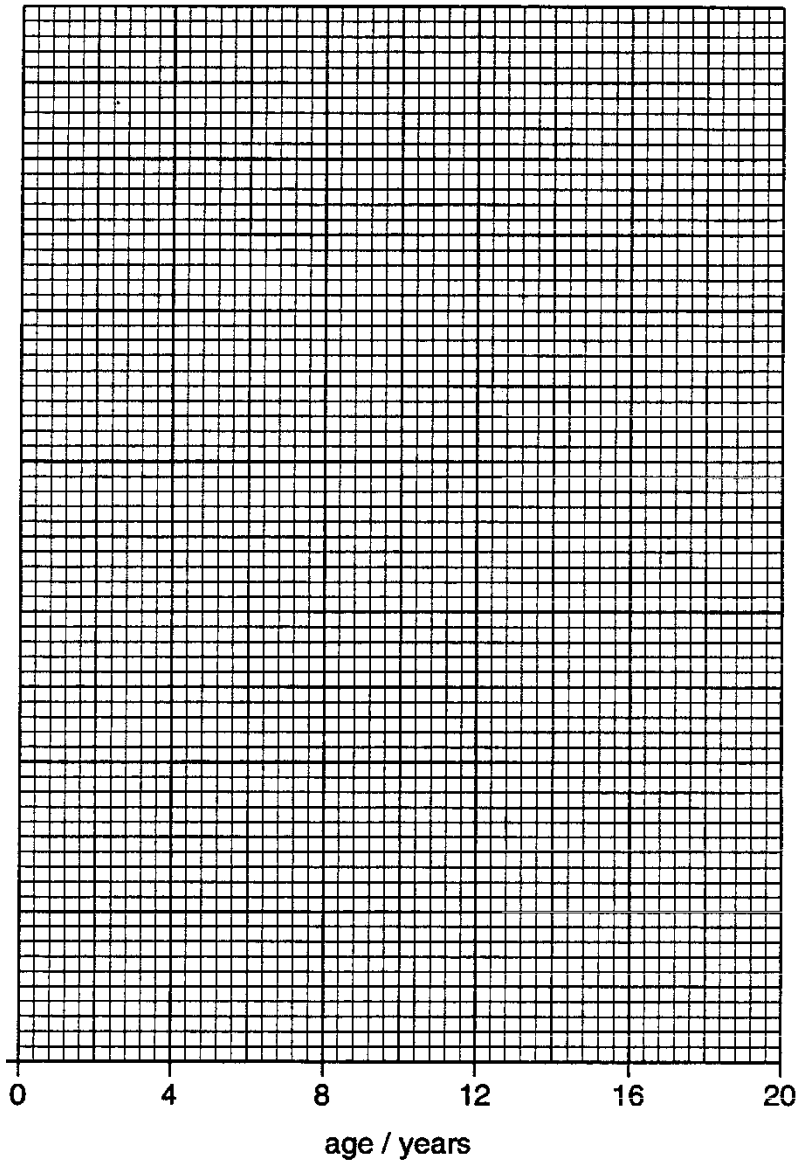
Table 1 shows the average masses of girls and boys from birth to 20 years of age.

Table 1

girls		boys	
age/years	mass/kg	age/years	mass/kg
0	3	0	4
1	9	1	10
4	16	4	16
8	25	8	28
12	40	12	38
16	53	16	59
20	56	20	65

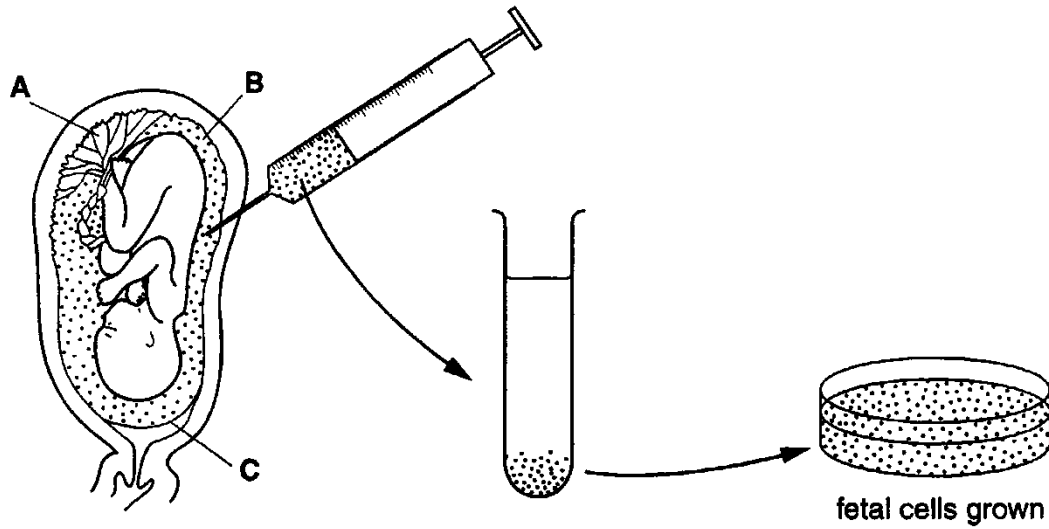
- (a) (i) Plot both sets of data as separate curves on the grid provided opposite. [5]
- (ii) Using your graph, state at which ages the average masses of girls and boys are the same.  
 .....[2]
- (iii) State **two** factors, apart from its sex, which could affect the mass of a baby at birth.
1. ....
2. ....[2]
- (b) (i) What evidence in the graph shows that girls undergo puberty before boys?  
 .....[1]
- (ii) Name the hormone responsible for the changes which occur at puberty in females.  
 .....[1]
- (iii) State **two** changes which occur at puberty in females.
1. ....
2. ....[2]

[Total: 13]



**Extension 1**

Pregnant women at high risk of having a baby with Down's syndrome are often offered an amniocentesis. This technique is shown in Fig. 2



**Fig. 2**

(a) Complete the table by identifying the parts labelled **A**, **B** and **C** and stating a function of each one.

part	name	function
<b>A</b>		
<b>B</b>		
<b>C</b>		

[6]

The technique involves taking a sample of **B** from within the uterus. Fetal cells in the sample are then grown and analysed.

(b) (i) Suggest how the cells would be different from normal cells if the fetus has Down's syndrome.

.....  
 ..... [1]

(ii) What is the cause of this difference?

.....  
 ..... [1]

**Extension 1**

**(c)** Suggest how the sex of the fetus could be identified by observation of fetal cells.

.....  
.....  
.....  
..... [3]

During pregnancy women may also be monitored in other ways, including urine sampling.

**(d)** Suggest why the urine of pregnant women is analysed.

.....  
.....  
..... [2]

[Total: 13]

## Extension 2

- (a) Describe the movement of **named** materials from the mother to the fetus. [6]
- (b) Describe the signs, symptoms and effects of the disease syphilis. [6]
- (c) Explain
  - (i) how HIV is transmitted, and
  - (ii) how its spread can be prevented. [7]
- (d) Explain why the methods for treating syphilis cannot be used for the treatment of AIDS. [2]

## Core 1

- a increase in numbers / producing new individuals  
requiring the fusion / joining  
of gametes / sperm and ovum / two special cells / genetic material / DNA  
form two individuals
  
- b(i) X – testis  
production of sperm / gametes  
production of testosterone / male hormone
  
- (ii) mark / cut shown clearly on sperm duct, not at the junction with the urethra
  
- c any two from  
deepening of voice / breaking of voice  
development of facial hair  
development of pubic / axillary hair  
widening of shoulder girdle  
enlargement of limb muscles



## Core 2

- a(i) five marks awarded as follows  
vertical axis labelled  
logical scale  
points plotted accurately  
points joined  
lines identified
- (ii) 10 / 11 years  
14 / 15 years
- (iii) any two from  
mother's diet  
genetic factors  
disease  
if mother smokes / passive smoking  
if it is a single / multiple birth / premature birth
- b(i) increase in mass in teenage years begins earlier / girls at 12 are heavier than boys
- (ii) oestrogen
- (iii) any two of these  
onset of menstrual cycle / periods start / ovulation starts  
widening of hips  
development of breasts / mammary glands  
axillary hair / pubic hair  
redistribution of fat layer under skin

### Extension 1

- a      A = placenta              reference to transfer / exchange of materials, mother to foetus / v.v.  
          B = amniotic fluid        cushions foetus from physical damage / absorbs excretory materials from foetus / supports foetus  
          C = amnion / amniotic sac / amniotic membrane  
                                         contains amniotic fluid / secretes amniotic fluid
- b(i)    reference to presence of 47 chromosomes / extra chromosome
- (ii)    reference to mutation  
          reference to unequal chromosome division  
          reference to extra number 21 chromosome
- c      reference to use of microscope / analyse or observe chromosomes  
          presence of xx chromosomes = girl / female  
          presence of xy chromosomes = boy / male
- d      EITHER  
          reference to testing for presence of glucose  
          to test for diabetes
- OR  
          reference to testing for protein  
          reference to possible consequences of protein loss  
          reference to testing for diseases  
          reference to testing for drugs  
          reference to checking hormone levels

## Extension 2

- a any six of these points  
reference to placenta  
allows maternal blood to come close to that of foetus  
allows diffusion of materials  
reference to foetal capillaries  
reference to transfer of oxygen  
from maternal red blood cells / haemoglobin  
reference to transfer of glucose / amino acid / other named nutrient  
reference to transfer of antibodies  
reference to plasma, linked to above  
pass from placenta to foetus via umbilical cord / vein
- b any six of the following  
chancre / hard lump / painless sore / blister  
on part of body which contacted partner  
reference to rash / sore throat  
reference to raised temperature  
reference to headache  
reference to ulceration / sores on other parts of body  
reference to discharge  
any tertiary symptom or effect: hair loss / teeth / nose / skeleton / skin / brain /  
nervous system / liver / blood vessels / paralysis / blindness / infertility / insanity /  
aneurism / death / damage to foetus  
reference to 3 stage disease / stages named
- c(i) any four of these  
transmitted in named body fluid e.g. blood, semen  
passed during unprotected sex  
reference to use of shared needles / razors / unsterilised needles  
reference to blood transfusions with unscreened blood / organ transplants  
reference to transmission from mother to foetus
- (ii) any three of these  
reference to education about AIDS / HIV  
use of condom during sexual intercourse / reference to safe sex  
use of sterile needles / do not share needles / avoid contact with contaminated  
blood  
avoid casual sex
- d any two from  
syphilis is caused by a bacterium  
HIV is a virus, not AIDS  
antibiotics are not effective against viruses