GCE

Mark Scheme for January 2013

Question		Answer	Marks	Guidance
1	(a)	*idea that* growing taller / increase in height / legs lengthening / proportions of body change ;	1	**CREDIT** Growth rate varies (within or between children) **ACCEPT** Ref growth spurts **IGNORE** General comments about 'growing' or variations in height unqualified
	(b) (i)	*idea that* sample may not be representative ;	1	**IGNORE** reference to being hard to generalise from a small sample without further qualification **IGNORE** ref to reliability / accuracy **ACCEPT** idea it is not a typical sample (of that population) eg parents of obese children may choose not to take part (and so not representative)
	(ii)	*idea that* families with obese children may be more likely to refuse permission for children to be measured ; *idea that* there is a stigma attached to obesity ;	1	**IGNORE** ref to fewer obese children in the sample / more obese children in the other 9% without a reason given
	(c)	(coronary) heart disease / CHD / angina ; cardiovascular disease / atheroma / atherosclerosis ; hypertension ; (osteo)arthritis ; breast cancer ; bowel cancer ; gall stones ; sleep apnoea ;	2	**Mark the first answer on each prompt line.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks** **ACCEPT** high blood pressure **DO NOT CREDIT** lung cancer / cancer unqualified

Question		Answer	Marks	Guidance
(d)	**(i)**	52 397 ; ;	2	**Correct answer = 2 marks** even if no working shown If answer incorrect **CREDIT** 1 mark for correct working 256 848 x $\frac{20.4}{100}$ **or** 256 848 x 0.204 If answer not given to nearest whole number **CREDIT** 1 mark for an unrounded answer eg 52396.9 **or** 52396.99
	(ii)	agree / yes **AND** both increase slightly **OR** disagree / no **AND** difference in increase between boys and girls not significant ;	1	**ACCEPT** agree because girls by 0.5% and boys by 0.4% **ACCEPT** 'there is a bigger increase' for agree **ACCEPT** idea that girls at 0.5% and boys at 0.4% are very similar
	(iii)	more boys are obese than girls ; pair of figures to support ;	2	**CREDIT** numbers of obese individuals or prevalence for boys and girls taken from the <u>same</u> year eg (in 2010) 20.4% of boys were obese and 17.0% of girls **ACCEPT** '(In 2010) 20.4% of boys were obese **but only** 17.0% of girls' = 2 marks (as this implies more obesity in boys than girls)

Question	Answer	Mark	Guidance
(e)	blood glucose level, below normal range / below 4 (mmoldm⁻³) ;	1	**ACCEPT** 'blood sugar' instead of 'blood glucose' **IGNORE** 'blood glucose level is low' unqualified **ACCEPT** 'very / dangerously / too low' as qualification
(f)	*up to 4 marks maximum* blood added to test strip ; test strip contains, immobilised enzyme ; (enzyme is) glucose oxidase ; glucose oxidase / enzyme specific to glucose ; glucose binds to (active site of), glucose oxidase /enzyme ; glucose converted to gluconalactone ; 4 max electrode detects the, chemical change / reaction ; *idea that* electrical current generated ; *idea that* concentration proportional to current size ;	5 max	**ACCEPT** idea that enzyme is attached to the strip **CREDIT** 'glucose dehydrogenase' instead of 'glucose oxidase' **NOTE** 'only glucose, binds to / forms an ESC with. the enzyme' = 2 **ACCEPT** phonetic spelling
(g)	*idea that they can* do more / regular, exercise / AW ; eat more, fruit / vegetables / high fibre foods ; eat less, fatty / fast / junk, food / AW ; reduce calorie intake / smaller portions ; eat less, sugar / AW ; raise awareness of consequences of obesity ;	3	**Mark the first 3 suggestions** For each mark point, **CREDIT** suitable specific examples eg go for walks, go swimming, go for bike rides **IGNORE** ref to 'balanced' or 'healthy' diet unqualified
		Total **19**	

Question		Answer	Marks	Guidance
2	**(a)**	treatment, successful / more effective / AW ;	2	**IGNORE** 'Treatment is more specific' or 'Only targets specific cells' as this is in the question
		idea that money not wasted on drugs that are, ineffective / unnecessary ;		**IGNORE** reference to not needing a 'cocktail of drugs' without qualification as this is given in the case study
		idea that fewer side effects because, fewer drugs taken ;		
		idea that treatment less generally toxic / harms fewer healthy cells ;		
	(b)(i)	(tumour specific) proteins, act as <u>antigens</u> ; recognised by, macrophages / dendritic cell ;	3	**ACCEPT** proteins have (areas which are) antigens **IGNORE** ref to lymphocytes or phagocytes for mp 2.
		formation of an antigen presenting cell / APC ;		**ACCEPT** a description of antigen presentation for mp 3
		(which have) complementary receptors ;		
		antigen, binds to / fits , the receptor ;		**ACCEPT** antigen / protein, binds to, antibody (variable region)
		idea that B/T, lymphocytes / cells, activated ;		**IGNORE** reference to lymphocytes detecting antigen for mp 6
		correct ref to, cytokines / T-helper, lymphocyte / cell ;		
	(ii)	T killer / cytotoxic T (lymphocyte) ;	1	**Mark the first answer.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks**
	(c)(i)	no immune response (to own tissue) / tissue will not be rejected ;	1	**ACCEPT** idea that tissues or organs are not destroyed by the immune system **IGNORE** not destroyed by body
	(ii)	able to give rise to many different cell <u>types</u> ; **ORA**	1	**CREDIT** totipotent / pluripotent **OR** adult stem cells are multipotent

Question		Answer	Marks	Guidance
(d)	**(i)**		7	
		1 (DNA replication occurs during) interphase / S phase ;		
		2 DNA, unwinds/unzips ; **3** (catalysed by) DNA helicase ; **4** causes hydrogen bonds to break ;		
		5 free (DNA) <u>nucleotides</u> pair up with exposed bases ; **6** complementary base pairing rule / A-T and C-G ; **7** purine(s) pair with pyrimidine(s) ; **8** causes formation phosphodiester bond ;		8 **ACCEPT** 'formation of bonds between sugar and phosphate'
		9 (catalysed by) DNA polymerase / ligase ; **10** by a condensation reaction ; **11** new strands have exactly the same sequence of bases as original molecule ; **12** (DNA) molecule has one old and one new strand ;		
		QWC – for correct order of events ;	1	**Award if** **mp 1** is awarded **and** **1** mark from **mps 2 – 4** is followed by **1** mark from **mps 5 – 12**
	(ii)	they divide by mitosis ; they, differentiate / become specialised ; to produce liver cells / to replace damaged cells ;	2	**IGNORE** ref to repairing damaged liver as this is in the question

Question		Answer	Mark	Guidance
(e)	**(i)**	only effective in one in four patients ; **ORA** (very) expensive / waste of money to use when not effective ; not all women have been tested (for HER2) ; *idea that* diagnosis might have been too late / cancer too far advanced to make treatment, appropriate / effective ; AVP ;	2	**Mark the first 2 suggestions** **IGNORE** 'only 1 in 4 have the protein / HER2' **IGNORE** 'targets only 1 in 4' unqualified eg • palliative care may be more appropriate • patient may have another condition meaning that Herceptin® use is inappropriate
	(ii)	chemotherapy ; lumpectomy / mastectomy / removal of lymph nodes ; radiotherapy ; tamoxifen ;	2	**Mark first two suggestions** **ACCEPT** 'surgery / operation'
		Total	**22**	

Question		Answer	Marks	Guidance
3	(a)	(by) droplet (infection) ; (infected person) coughs / sneezes / breathes out bacteria ; bacteria inhaled ;	2	**IGNORE** ref to airborne unqualified
	(b)	persistent / AW, cough ; blood stained, mucus / sputum ; fever / AW ; weight loss ; night sweats ; fatigue / AW ;	2	**Mark the first 2 suggestions** **IGNORE** 'chesty' or 'bad' cough – looking for idea of a cough that does not go away
	(c) (i)	too many **new** cases to count, accurately / easily ; *idea that* many cases not, reported / diagnosed ;	1	eg 'they do not know they have the disease'
	(ii)	Sub-Saharan Africa / low income country, shows a percentage increase (in incidence of TB) ; in **all** other groups / middle **and** high income groups, there is a percentage decrease ; in middle income groups, South East Asia and the Western Pacific shows the biggest decrease **ORA** (for Central and Eastern Europe) ; the high<u>est</u> income group / Australia and North America and Western Europe, show(s) the biggest decrease (overall) ; (the trend is) the higher the country's income the greater the percentage decrease ;	3	**ACCEPT** '+' or '−' figures for increase and decrease throughout

Question	Answer	Marks	Guidance
(iii)	• increase transmission linked to any of following mps ;	8	
	social		ACCEPT 'densely populated'
	• overcrowding / poor living conditions ;		
	• more homeless ;		
	• more migration ;		
	• more people, with HIV / AIDS ;		
	• weakened immune system ;		
	• don't complete course of, drugs / antibiotics ;		
	• poor education about, symptoms / how it is spread ;		
	economic – idea that cannot afford:		
	• drugs / antibiotics (needed to treat TB) ;		
	• vaccine ;		
	• (access to) medical centres / hospitals ;		
	• provision of, doctors / nurses ;		
	• malnutrition ;		
	ethical issues		
	• stigma of being diagnosed ;		CREDIT 'become socially isolated'
	• fear that diagnosis leads to loss of job ;		
	• refusal because of, religious / cultural / political beliefs ;		
	• patents / over-priced drugs / black market drugs ;		
	QWC – balanced account (1) ;	1	Award if 1 mark from mps 2 – 8 AND 1 mark from mps 9 – 17
	Total	17	

Question		Answer	Marks	Guidance
4	(a)	arterioles ; nicotine ; carbon monoxide / CO ; haemoglobin ; oxygen / O_2 ; weight ;	6	**CREDIT** arteries
	(b) (i)	*syndrome* a group of symptoms / characteristics of a condition / AW ; *in FAS* *any 2 marks from* small head / upper jaw ; eyes, narrow / small / AW ; thin / smooth, upper lip ; heart defects ; poor muscle tone / lack of coordination ; mental retardation / learning difficulties ; behavioural problems ; *2 max*	3	**ACCEPT** idea of structural problems with face **ACCEPT** a description of eyes eg 'eyes do not appear to be fully open'
	(ii)	alcohol enters maternal blood ; alcohol crosses the placenta ; travels in, fetal blood / circulation ;	2	**IGNORE** ref to umbilical cord
	(c)	ultrasound scan ; bi-parietal / crown rump, measurements ; compare to standard measurement / AW ;	2	**ACCEPT** description of bi-parietal and / or crown rump measurement

Question		Answer	Marks	Guidance
(d)	**(i)**	25 ; ;	2	**Correct answer = 2 marks** even if no working shown If answer incorrect **CREDIT** 1 mark for correct working $\dfrac{(25-20)}{20} \times 100$ **OR** $\dfrac{2.5-2.0}{2.0} \times 100$
	(ii)	*increase in size due to* increase in number of / more, cells ; (as a result of) mitosis ; *separation of digits* <u>cell</u>, death / destruction ; (as a result of) apoptosis ;	4	
		Total	19	

Question			Answer	Marks	Guidance
5	**(a)**	**(i)**	by observing tissue under microscope ; cancer / abnormal, cells seen / AW ; (cells) stained ; AVP ;	2	eg • reference to named test or PAP test • using antibodies to test for antigens on <u>cancer cells</u> • ref to checking for HPV DNA in <u>cancer cells</u>
		(ii)	*idea that* significantly, more HPV in the confirmed cancer cases ; always, more HPV in the confirmed cancer cases ; correct data quote ;	2	**DO NOT CREDIT** 'more cases of cancer show HPV' without further qualification **LOOK FOR** a figure for control and confirmed cases from at least one named country
		(iii)	<u>DNA</u> from HPV enters cell / nucleus ; causes a, mutation / change in cell's DNA ; that affects, proto-oncogenes / tumour suppressor genes / AW ; leads to / AW, loss of control of cell division ;	2	**ACCEPT** genetic material or genes for 'DNA' **IGNORE** 'cells divide uncontrollably' without the link to a cause
	(b)		*idea of* having unprotected, sex ; *idea of* having many sexual partners ;	1	**Mark the first answer.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks** **IGNORE** ref to not having been vaccinated (as vaccination does not prevent transmission)
	(c)		smoking ; exposure to other, (named) carcinogens / mutagens ; genetically susceptible / family history ;	2	**ACCEPT** tar / benzpyrene eg UV, X- rays, gamma rays, ionising radiation, high alcohol **ACCEPT** heredity

Question	Answer	Marks	Guidance
	low socio-economic group / AW ;		
	compromised immune system ;		
	AVP ;		eg early onset of puberty
(d)	*idea that* might encourage underage sex ; *idea that* might encourage promiscuity ; *idea that* some cultures / religions may object to a vaccine against a sexually transmitted disease ; might reduce uptake for cervical cancer screening / AW ; may have unknown, side / long term, effect ; discriminates against boys ; (because) HPV may cause cancer in boys ;	2	**IGNORE** reference to parental consent being required since this is true of all childhood vaccination programmes
(e)	viruses <u>mutate</u> frequently **OR** viral antigen(s) change *idea that* the existing vaccine will not protect against the new virus **OR** most people will have no immunity to a new virus ;	2	**DO NOT CREDIT** in the context of antibiotic or drug resistance **CREDIT** 'we do not have a vaccine against the new virus' **CREDIT** description of immunity such as having 'correct' antibodies **CREDIT** 'little immunity in the population'
		Total **13**	

Question		Answer	Marks	Guidance
6	(a)	(i)	highest mortality in Black (Americans) ; lower mortality in, Asian / Pacific Islanders / Hispanic ; higher mortality in men / lower mortality in women ; pair of comparative figs to support ;	3	**Award** for same gender in different ethnic groups **or** different genders within the same ethnic group **with** correct units (per 100 000) for the mortality
		(ii)	smoking ; genetic predisposition to CHD ; obesity ; high consumption of, high fat / fast / junk / processed, food ; high salt in the diet ; diabetes ; high blood pressure / hypertension ; high cholesterol ; lack of / AW, exercise ; stress ; low uptake of treatment;	4	**Mark the first 4 suggestions** **IGNORE** ref to age **ACCEPT** idea of family history or heredity **IGNORE** ref to 'diet' unqualified **ACCEPT** an example e.g. refusal to take statins
	(b)		*fatty deposits* – <u>atheroma</u> ; *chest pain* – <u>angina</u> (pectoris) ; *heart attack* – <u>myocardial infarction</u>;	3	
				Total 10	

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance
programme your call may be recorded or monitored

PART OF THE
CAMBRIDGE ASSESSMENT
GROUP

UKAS
MANAGEMENT
SYSTEMS

001