MARK SCHEME for the October/November 2006 question paper

9691 COMPUTING

9691/03

Paper 3, maximum raw mark 90

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

• CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2006 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



Page 2		ige 2	Mark Scheme	Syllabus	Paper
			GCE A/AS LEVEL - OCT/NOV 2006	9691	03
1	(a)	(i)	-stores the instruction that -is currently being processed -splits the binary code into operation code and address (1 per -, max 2)		
		(ii)	-stores the address (in memory) -of data to be accessed (from memory) -instruction/raw data (1 per -, max 2)		(2)
		(iii)	-stores the address of the next instruction to be accessed -is incremented (after contents are copied to MAR) -is altered to allow for jump instructions (1 per -, max 2)		(2)
		(iv)	-contains a value which is added to the address (in the CIR -in order to make the address of the data -incremented after use so that a set of data can be read on altering the raw address (1 per -, max 2)		thout (2)
	(b)	(i)	-a number of processors -operate together -so that a set of operations can be carried out simultaneous (1 per -, max 2)	sly	(2)
		(ii)	-any example that requires large amounts of processing e. -because large quantities of processing are required in a s	-	ing (2)
2	(a)	(i)	unique value in the table used to identify the record		
		(ii)	key used to access the records in a different order		
		(iii)	an attribute in one table that is a primary key in another tab tables	le/to provide a link	between (3)
	(b)	-(imp -allov -mor -simp	-reduces duplication of data/no duplication of data -(improved) data integrity -allows for different views of the data -more simple to control access to data -simpler/faster/easier to access specific data through searches/queries (1 per -, max 3)		

Page 3			Mark Scheme		Syllabus	Paper		
	V				/EL - OCT/NOV 2006	9691	03	
3	(i)	-very -time -allov	-the old system and the new system are run together (until the new system is proven) -very important application so the costs are worth paying -time is important in producing results so cannot afford to wait while bugs are corrected -allows workers to become familiar with new system before changeover -reduces risk to end product					
	(ii)	 -one area of the organization is converted to the new system while the remainder uses the old -could be one subject/one area of the world -would mean that effect of any problems would be minimized (and so small that remedial action could be taken) -allows workers to familiarize themselves with the new system on a rota basis 						
	(iii)	-very -time -allov	/ risk e dep ws n	system is switched off/the in the results are bendent no time for training/finding e max 3 per section, max 9)			(9)	
4	(a)	 -the production of a machine code program/intermediate code which -will produce the results intended by the source code -optimisation reduces the size of the object code by -removing any duplicate or redundant instructions -which improves speed of execution (1 per -, max 3) 			(3)			
	(b)	(i)	-to	kers join together (compile produce an executable file eeds to match up address r				
		 (ii) -takes a set of code from storage and copies it into memory -needs to resolve problems with addresses -mention of linking loader (1 per -, max 2 per section, max 4) 			(4)			
5	(a)	(i)	01 ⁻	101101	(1 per nibble)		(2)	
		(ii)	000	01 0000 1001	(1 for use of 12 bits, 1 f	or correct answe	er) (2)	
		(iii)	6D		(1 per digit)		(2)	
	(b)	(i)	-46	3	(1 for negative, 1 for 46)	(2)	
		(ii)	-a j -be -the	ecause the larger value wa ere was carry in and out of	e been added together and the re s positive. f MSB therefore ignore carry out wer, max 2 for discussion, max 3	, (result is correc	ct). (3)	

	Page	e 4	Mark Scheme	Syllabus	Paper
			GCE A/AS LEVEL - OCT/NOV 2006	9691	03
6	 -workers supervised more closely because of electronic 'spying' -can be disciplined for lack of work -can be rewarded for 'hidden' work -less trade union power -because workers do not work as a unit -less pressure on workers in disputes -call centre type jobs -clean, well paid -soul destroying -need to train to keep abreast of use of technology -more qualified worker can demand higher rewards -meetings and video conferencing -use of emails and other communication -dangerous tasks made safer -new job types created -allows more work to be done in the same amount of time -use of technology to carry out old tasks in a new way/new data storage and retrieval techniques (1 per -, max 8) 				
7	-e -t -f	each pa ags pro	Iter language used to create multimedia pages ge consists of the text to be displayed viding special instructions about the display s links to files/pages (picture/sound/video/) max 2)		(2)
	 - -	-ill∟ Tags ca -siz Tags ma -ba Tags ma -ba -ba -ba -ba -ba -ba -ba -ba -ba -b	ay be used to indicate where istrations are to be inserted into the text in be used to change text style ces/fonts ay be used to change colours of ckgrounds/text ay be used to define some text as a link as a hot button/spot ovide a fast way of navigating between pages lifferent page areas which ow different rules in each area/heading and body/makes se ir, max 3 pairs, max 6)	earching easy	(6)
8			y two from touch/radar/proximity/infra red sensors Any two from alarm/speakers/lights/motors to activate whee	ls/steering/actu	ators (4)
	(b) (i	-rao -us Pos -an -dis	tical sensors dar ed to detect obstacles sitions determined by gular bearing from reference point stance from radar per -, max 2)		(2)
	(i	-tes	sign must be created using simulation because of large co sting also simulated because not possible to test in real env per -, max 2)	•	(2)
	ir -I re	nmediat Mars rot each it/ii	obot is physically available to people to control it/command rely/need to have immediate action because of proximity to pot cannot be controlled in real-time because of the time ta instructions need to be sent as a batch and then acted upor on earth.	humans ken for instruction	

Pa	age 5	Mark Scheme	Syllabus	Paper
		GCE A/AS LEVEL - OCT/NOV 2006	9691	03
9 (a)	-proo -in o -the use o	umber of jobs will want to be run at the same time cessor can only run one job at a time rder that the jobs are treated 'fairly' operating system has to have rules to determine the order of resources er –, max 2)	of execution/make m	naximum (2)
(b)	-eac -imp -jobs - Rea proc -HLS -HLS -MLS -LLS -pree follow	er of jobs according to list of priorities h job allocated priority according to ortance/time already spent on job/need for peripheral devi s can be in any of three states: ready, running or blocked ady Q contains list of jobs waiting for processing in the ord essed S handles ready Q and loads jobs S handles the swapping of data between memory and stor s moves jobs in and out of running state emptive scheduler has control over what is in running state ws the Q er -, max 5)	er in which they shou age	
10 (a)	 -a number of programmers can all work on the same piece of software -individual expertise can be utilized -errors are far more easily spotted because -each procedure/function is much simpler to solve than the original problem -individual procedures are far easier to test than a whole project -library routines can be utilized -procedure can be used multiple times -functions are mathematically provable to be correct/faulty (1 per -, max 4) 			(4)
(b)	(i)	a variable whose value only applies in a particular proce	dure	
	(ii)	a variable whose value applies throughout a program		
	(iii)	a value which is applied to a variable within a procedure,	and only within that p	procedure
	(iv)	the value to be applied is stored in a memory location when procedure. Any change will be carried out of the procedure	•	(4)
(c)	-alor -para -any -retu	rn address placed on stack ng with values of parameters ameters read off stack by procedure returning values placed on stack by procedure rn to address at top of stack at end of procedure. er -, max 4)		(4)