	GCE A Level H2 Biology						
	9648 Biology November 2018						
1.	N18Q1	В	$ \begin{array}{c} \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $				
2.	N18Q2	A	Envelope made of phospholipid bilayer which may contain embedded protein which contains nitrogen. Capsid is made of protein (which has nitrogen) and nucleic acids have nitrogen containing nitrogenous bases.				
3.	N18Q3	С	A: wrong, as amylose being linear does not promote rapid digestion and amylopectin being branched does allow hydrolysis and NOT CONDENSATION.B: wrong, the part about gaps in amylose is wrongD: wrong, the close association does not promote rapid digestion.				
4.	N18Q4	A	Glutamine has side-chains that are hydrophilic, hence hydrophobic interactions cannot occur between 2 glutamine amino acids. Since the bonds were formed between amino acids are in the same polypeptide chain, this implies that the polypeptide had folded back on itself and as a result, these bonds are likely to be within the inner core.				
5.	N18Q5	С	 A – incorrect. Not all ions are moved against the concentration gradient and the reason why they cannot pass through the phospholipid bilayer is not because they are too large but because they are charged. B – Incorrect. Glucose moves into cells via facilitated diffusion not active transport C – Correct. Oxygen is small enough to diffuse between the phospholipid molecules D – Incorrect. Water can also pass through the membrane by simple diffusion (in between the phospholipid molecules). Even though they are polar, they are small enough. 				

6.	N18Q6	В					
			enzyme added to a solution of substrate J	product	Pt where enzyme acts		
			E2	К	J → K		
			E2 and E3	M	E2: J → K		
					E3: K → L		
			E1 and E2	К	E2: J → K		
			E1: M -		E1: M → N		
			E1, E2 and E3	N	E2: J→ K		
					$L \rightarrow M$		
					E3: K → L		
					E1: M → N		
			Why not option A?				
			If option A, when only E2 is added, the product obtained would be L not K.				
7.	N18Q7	С	At low substrate concentration, rate of reaction is lower in the presence of the inhibitor. However, at high substrate concentration (200 mg cm ⁻³), rate of reaction is almost the same in the presence or absence of inhibitor. This means that the effect of inhibition is overcome at higher substrate concentration and is characteristic of competitive inhibition. Also, it has to be reversible as the inhibitor must detach to allow the substrate to bind at higher concentrations.				
8.	N18Q8	D	Statement 2 is true but does not explain why long non-coding				
			RNAs are <u>more likely</u> to cause cancer in a bone marrow stem cell than mutations of $p53$. Inactivating tumour suppressor genes is a similarity in the				
			effects of a $p53$ mutation and the presence of long non-coding RNAs. Inactivating tumour suppressor genes cannot therefore be used to account for differences in the consequences of $p53$ mutations and the presence of long non- coding RNAs.				
			Statement 3 is true. Since it is mentioned in the question: the long non-coding RNAs inactivate tumour suppressor genes and activate proto-oncogenes compared to p53 mutation which is only the tumour suppressor gene and requires two mutations.				
			Statement 4 is true because a p53 mutation is random, spontaneous and may only occur in one cell. Since the long non-coding RNAs is present in all stem cells, chances of them interfering with cancer-causing genes is higher.				

9.	N18Q9	С	Only 1 and 2 involve base pairing . 1 refers to codon base pairing with anti codon and ribonucleotide are added to mRNA via complementary base pairing to bases in DNA. In 2 transcription occurs and RNA polymerase is involved. In 3 activation of amino acid by aminoacyl tRNA synthetase, 4 refers to peptide bonds formed by peptidyl transferase which catalyse formation of peptide bond.
10.	N18Q10	D	Not conjugation cos involve 2 living bacteria, not transduction as no phage involved. So the DNA of heat-killed strain S must have been released and taken up by strain R by transformation.
11.	N18Q11	A	Options B and C may cause differentiation which will not retain potency. Option B activates differentiation; Option C is very vague ie determining cell specialisation (differentiation) may accelerate differentiation. Option D refers to pre-mRNA which means the gene is already transcribed which will not help with retain potency
12.	N18Q12	A	The <i>lac</i> operon is found in prokaryotic cells and does not have enhancer sequences.
13.	N18Q13	С	Trp (UGG)→ Lys (AAG): 2 changes; Tyr (UAC)→His(CAC): 1 change; His(CAU/CAC) →Cys(UGU/UGC): 2 changes
14.	N18Q14	D	One of the roles of the tumour suppressor genes, <i>p</i> 53. The p53 protein will help in DNA repair. So ATM will increase the quantity of p53 protein so that it will be able to repair the DNA. The p53 protein functions at the checkpoints of the cell cycle, stopping it until the DNA repair is completed before proceeding.
15.	N18Q15	D	 All three events must happen for breast cancer to develop. No. Not necessary as breast cancer due to tumour suppressor genes not proto-oncogenes. Breast cancer will only develop if mutated alleles of both BRCA1 and BRCA2 are inherited. No. The information given is that mutation of <u>either</u> BRCA1 or BRCA2 can increase the risk of cancer. Inheritance of the mutated BRCA1 and BRCA2 alleles will only result in breast cancer when both alleles of a proto-oncogene are mutated. No. BRCA 1 and 2 are tumour suppressor genes not proto-oncogenes. Mutations due to faulty DNA repair accumulate randomly with age. Yes.

16.	N18Q16	В	TF NON-	DISJUNCTION O	occurred of:			_
			D Meiosis T	in female pare	nt	() Meiosis II	in temale parer	H
			(XX) Mei I			(X) ANIT	\mathbf{x} \mathbf{x}	
			R		ei II		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	oj D
			Kchr Kchr from room				0 0 0	
			momer famer	2x in romosom	es in each gamete	2	x innormosimes in	each perc
			3) Meiosis I	in male paren	<i>I</i>	4) Meiosis II	in male parant	
			(Xx) meis	× ()		(Xx) - (× ×	
			X the Ville	A mei s	T	_	V / Vmer	1
			fram fram fram tuther			(U))
			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1X + 1Y cham cach gamete	asome in	24	this admines	gam et
			days is fill	narios (1), (2)	+ (4) gameres	WHA JX CHA	masomen is po	souble.
			This there of	gometes can to a zygote	un XXX ch	nmal gamete u nmoscorren .	own Ix chrome	u ane
			10 110					
17.	N18Q17	В	Since question	n says mother	is heterozygo	ous, her genoty	ype for blood g	group A
			will be l ^a l ^o . An	id the genotyp	be of the father	r with blood gr	oup O will be	1º1º.
			Probability of I	baby having b	lood group O	= 0.5		
			Mother is also	a carrier for g	grey platelet sy	/ndrome (i.e. ł	neterozygous	e.g. Gg)
			and father has	s no family his	tory for the sy	ndrome (i.e G	G).	
			Probability of I	baby being a d	carrier for the	grey platelet s	yndrome = 0.8	5
			So probability	of hahy havir	a blood arour	0 and being	a carrier for th	ne arev
			platelet syndro	baby haven bme = 0.5 x 0.	$5 = 0.25 = 25^\circ$	%		le grey
18	N18018		Patio of 12 h	lack:3 purples	1 red indicate	as that genet	when of red is	aabb So
10.	NIUGIU	D	answer is D			es that genot	ype of red is	aabb. 00
19.	N18Q19	С	If two F1 are	crossed it i	s heterozvaoj	is crossed wi	th heterozva	ous and if
	mouro	Ũ	following norm	al Mendelian	laws, the expe	ected ratio sho	ould be 9:3:3:1	
			offspring	observed	expected	(O – E)	(O – E) ²	$(O - E)^{2/3}$
			phenotype	numbers	numbers	~ /	· · · ·	
			curly wings	40	(⊏) 45	-5	25	0.55
			red eyes	20	15	5	25	1 67
			wings red	20	10	J	20	1.07
			eyes	16	15	1	1	0.07
			purple	10	15	1		0.07
			eyes					

				-			-		
			normal	4	5	-1	1	0.20	
			wings						
			purple						
			eyes					2 0 10	
			total	80	80	0		$\chi^2 = 2.49$	
								=2.5	
								(to rup)	
			Fill up the tab	le to 1 dp and	add up the las	st column \rightarrow a	nswer is 2.5		
20.	N18Q20	Α	1 true;	electron canno	ot flow down to	NADP, hence	e reduced NA	DP could	
			not be	not be formed hence reduction stage of Calvin cycle cannot proceed.					
			2 true; electron cannot flow down to NADP as flow of e- down ETC is						
			blocked						
			3 true; photoactivation still occurs.						
21	N18021	<u> </u>	1 is false: the	V-avis is por l	init surface ar	00			
21.	1110021	U				ea			
			4 is false; as a	a higher stoma	atal density wo	ould not be exp	pected to lead	to a	
			decrease in th	ne rate of phot	osynthesis sin	Ice it would ind	crease the rate	e of	
			carbon dioxid	e diffusion into	leaves.				
22.	N18Q22	D	Since V has	ethanal as fi	nal product t	hus there is	an inhibitor f	or alcohol	
			dehydrogenas	se preventing	it from conver	rting to alcoho	l. While W ha	s inhibitor	
			for (at least) pyruvate decarboxylase as pyruvate remains.						
23.	N18Q23	В	Only 4 is wrong as electrons and protons are transferred from ETC to NADP						
24.	N18Q24	В	A – faise: the	snakes are als	so able to sequ	uester toxins a	ind does not p	revent the	
			amphibians fr	מווירווטומוזה וויטווו שבוווץ במנכוו שי הוומגבה.					
			C – false [.] Ti	he toxins take	en in via con	sumption and	l are not ma	de by the	
			amphibians						
			amprilolario.						
			D – false: Ir	n this case p	redation still	occurs as th	ne snake still	eats the	
			amphibians.	•					
25.	N18Q25	А	1- True: there	e is still a cha	nge in freque	ncy of alleles	between the	7 types of	
			salamanders.						
			2 – True: The	y are still cons	idered the sai	me species. C	Only variation i	s colour.	
			3 True: The	re is no reproc	luctive isolatic	n an			
26	N18026	B	A- wrong It	does not expl	lain anything	about evolutio	on or change	s in allele	
			frequency.						
			C - wrong. Im	migration can	change allele	e frequency, b	out the popula	tion is not	
			the smallest u	init in which th	is occurs				
			D - wrong. al	though mutati	ons are a sou	urce of new g	enetic combir	ations for	
07	140005		evolution, the	population is	not the smalle	st unit in whic	h this occurs		
27.	N18Q27	A	В – wrong: pa	artial parasitisn	n will not happ	en independe	ntly in so man	y species	
			C/D = wrong	if it evolved	once then th	is is a comm	on ancestor t	all 1300	
			different spec	ies. Preamble	savs "do not s	share commor	ancestor"		
28.	N18Q28	Α	1. hyper-mu	itation of B lym	nphocytes (so	matic hypermi	utation in activ	ated B	
			cells)						

			 activation of B lymphocytes by antigens (activation of naïve B cells) the constant region of an antibody is changed (class switching) the variable region of an antibody is changed (somatic recombination and hypermutation)
29.	N18Q29	С	Once HIV infects the cells, it will reverse transcribe its RNA genome to form viral DNA which integrates into the host genome and the viral enters the latent phase. During this phase, viral replication is dormant and the cell is able to go about its normal functions (i.e. it is not disrupted).
30.	N18Q30	A	 Rise in sea level could lead to the sea turtles being unable to find suitable habitats as there may be reduction in shallow coastal waters. This can cause for decline in populations. Increased air temperature, heating up the surface, will affect the nest temperature drastically. This will result in a higher proportion of females, and with less males available reproduction rates may decrease and lead to a decline in populations. Modified migration pathways can lead sea turtles away from suitable breeding areas, and possibly lead to them being unable to lay their eggs or lay viable eggs. Flooding of land and coastal erosion will destroy the suitable sandy beaches for sea turtles to lay their eggs on. Or those that are laid may be destroyed during intense flooding and erosion periods. As such there will be less viable births and overall drastic reduction in populations.