1)

)(i)	1. central carbon with {R / H / eq} and H attached by single bonds ; 2. {NH_2 / NH_3^+ } attached to a carbon by single bond ; 3. {COOH / COO^- } attached to a carbon by single bond ;	Mp1 Must show C, H and R or a plausible R-group MP2 and 3 ACCEPT groups attached to a central C that is not shown (chemical notation) ACCEPT groups written wrong way round e.g. C-H_2N NOT incorrect bonding within groups if shown e.g. C=OH ACCEPT if correct group attached to wrong molecule e.g. glucose	(3)
(ii)	peptide (bond) ;	ACCEPT peptide link NOT polypeptide or dipeptide	(1)
(iii)	1.Idea that fibrinogen is globular and fibrin is fibrous ; 2.fibrinogen is soluble and fibrin is insoluble ; 3.Idea that they are different sizes ;	ACCEPT marks to be pieced together across the response. NB: answers must be comparative e.g. fibrin is fibrous fibrinogen is not 1. ACCEPT fibrinogen globular and fibrin (long) strand or chain. 3. ACCEPT fibrinogen is {smaller / larger / more amino acids} than fibrin	(2)

2)

(a)	1. triplet code / 3 bases to each code / eq ; 2. reference to adenine, thymine, guanine and cytosine ; 3. idea that each triplet of bases codes for one amino acid ; 4. idea that the code is not overlapping ; 5. idea that code is universal ; 6. idea that code is degenerate ;	1. IGNORE codon, triple 2. ACCEPT phonetic spelling	(2)

(b) **VC**	(QWC– Spelling of technical terms must be correct and the answer must be organised in a logical sequence) 1. reference to *semi-conservative replication* ; 2. DNA (*molecule* / strands) {unwinds / separate / eq} ; 3. *(mono)nucleotides* line up along (both) strands / eq ; 4. reference to *complementary* pairing between bases ; 5. reference to *hydrogen bonds* formed (between bases) ; 6. reference to formation of *phospho(di)ester* bonds (between adjacent *mononucleotides*) ; 7. ref. to condensation reaction; 8. name of an enzyme involved in DNA replication ;	QWC– Spelling of technical terms must be correct – penalise 1st error only – can still reach Max 5 marks if 6 points given. **If context is transcription, Max 2 marks from Mp2, 5, 6, 7, 8.** 1. ACCEPT clear description 2. ACCEPT unzipped / hydrogen bonds broken / eq 3. NOT RNA OR one strand only described IGNORE bases line up 4. ACCEPT description, NOT uracil / U 5. NOT between nucleotides in the same strand ACCEPT between (DNA) strands 8. e.g. (DNA) *polymerase*, (DNA) *helicase, ligase*	**(5)**

3)

(a (i)	D ; **(1)**
[a (ii)	B ; **(1)**
(a)(iii)	B ; **(1)**
(a)(iv)	A ; **(1)**

4)

(a)	Idea that the {increase / change} in relative risk of developing cirrhosis is {reflected / accompanied / eq} by the {increase / change} in alcohol consumption ;	ACCEPT 'the higher the consumption, the higher the risk' and similar IGNORE causation comments, it is positive	(1)
(b)(i)	1. both show an increase in risk with an increase in alcohol consumption / eq ; 2. idea that the risk increases markedly at 30 g day^{-1} in study A but at 40 g day^{-1} in study B ; 3. study A found the risk was higher than study B / eq ; 4. credit use of comparative manipulated figures ;	ACCEPT mps to be pieced together IGNORE faster ACCEPT steeper 3. ACCEPT for specified value of alcohol consumption or risk 4. E.g. for 30g alcohol per day study A women have a relative risk 2 higher than study B women If units given they must be correct	(2)
(b)(ii)	Any **two** from differences in: age / diet / medication / other drug abuse / nationality / ethnicity / genetics / body mass /activity levels / other medical conditions / study method / sample size / {over / under / eq} estimation of consumption of alcohol / pattern of drinking (e.g. binge compared to regular/type of drink) ;;	ACCEPT two correct answers in first section IGNORE environmental factors, lifestyle, occupation, pregnancy, ACCEPT smoking, weight, BMI, countries, regions, areas, metabolism, liver size	(2)
(c)	1. Each study found women to have a greater risk than men / eq ; 2. idea that the risk increases markedly at 50 g day-1 for men but at {30 /40 / both} g day-1 for women ; 3. idea that gradient of increased risk smaller for men than women (in both studies) ; 4. credit correct use of figures e.g. above 42-44 g day^{-1} men are at a lower risk / eq ;		(2)
(d)	1. the results of both studies are (fairly) similar suggesting that the results are reliable / eq ; 2. comments on the numbers of people in the studies / eq ; 3. comment on lack of error bars / eq ; 4. idea that the results do not reliably show at what level risk increases significantly ;	1. ACCEPT results show same pattern e.g. men lower than women in both studies 2. E.g. we don't know the sample size. IGNORE number of studies 3. ACCEPT no information about the range of results in each study	(2)
(e)	misreporting the amount of alcohol they had consumed / {did not know /guessed} the alcohol content of their drinks / used average values for alcohol content of drinks / {lost track of / could not remember } how much they drank / eq ;		(1)

5)

(a)(iii)	D ;	(1)
(a)(iv)	A ;	(1)
(a)(v)	A ;	(1)
(a)(vi)	C ;	(1)
(b)(i)	{rough endoplasmic reticulum / RER / rER} ;	(1)
(b)(ii)	A = (80S/ large) {ribosomes / ribosome } ; B = membrane / {cisterna / eq } ;	(2)

6)

(a)	1. organ ; 2. (organ) system ;	(2)
b)(i)	1. ref to DNA replication ; 2. so that it can halve / eq ; 3. idea that {new cells will have same amount as original /original (DNA) content restored} ; 4. during cytokinesis / eq ;	maxi (2)
(b)(ii)	3.5 to 3.75 (hours) ;	(1)
b)(iii)	1. (75 ÷ 270) X 18 ; 2. answer correct 5 (hours) ;	(2)
*(c) QWC	(QWC - Spelling of technical terms *(shown in italics)* must be correct and the answer must be organised in a logical sequence) 1. *chromosomes* /*chromatids* {condense / become visible / eq} ; 2. {*nuclear* envelope / eq } {breaks down / eq} ; 3. {*nucleolus* / eq } {breaks down / eq} ; 4. *spindle* (fibre) begins to form / eq ; 5. *centrioles* migrate to opposite poles / eq ;	maxi (3)

7)

(a)	Correct ref to: 1. flagellum / eq ; 2. overall shape e.g. streamlined / eq ; 3. fewer mitochondria / other organelles / eq ; 4. acrosome / eq ; 5. zona (pellucida) / jelly layer eq ; 6. cortical granules / eq ; 7. differences in food store types / eq ; 8. sperm cell has less cytoplasm / eq ;	max (3)
(b)	1. enzyme {digest / eq}{ zona (pellucida) / eq} ; 2. idea that sperm can get through to egg {cell / nucleus / eq} ; 3. {contact with / receptor on} {zona pellucida / (glycoprotein) jelly coat / surface of ovum } ; 4. (causes) {acrosome / eq to {rupture / open / eq } ;	max (2)
(c)	1. meiosis (II) is completed / eq ; 2. {male and female / eq } chromosomes come together / (both) nuclei fuse / eq ; 3. {cortical granules / enzymes/ chemicals} released (from cell surface membrane) / eq ; 4. {bind / eq } with { zona (pellucida) / eq } / {zona (pellucida) / eq } then {thickens /hardens / eq } ; 5. to form fertilisation membrane / to make cell impenetrable (to other sperm) / prevents polyspermy / egg cell membrane {changes its charge / becomes positive} / eq ;	maxi (2)
(d)(i)	1. to produce a {zygote / eq} ; 2. to produce {original / full} complement of {DNA / chromosomes / genetic material } / diploid / 2n number / eq ; 3. to allow mixing of {genes / genetic material } / ref to { genetic variation / eq } ;	max (2)
(d)(ii)	(triploid) endosperm nucleus ;	(1)