



EXAMINERS' REPORT ON 2001 TERTIARY ENTRANCE EXAMINATION

SUBJECT: HUMAN BIOLOGY

STATISTICS

Year	Number Who Sat	Non-Examination Candidates	Did Not Sit
2001	4122	172	343
2000	3905	217	379
1999	3871	223	350

The Examiners' Report is written by the Chief Examiner (or another examiner on their behalf) to comment on matters relating to the Tertiary Entrance Examination in their subject. The opinions and recommendations expressed in this report are those of the Chief Examiner and not necessarily representative of or endorsed by the Curriculum Council.

The Marking Guide provided at the end of this report was prepared for markers and substantially amplified by discussions held in the pre-marking meeting. It is not intended as a set of model answers, and is not exhaustive as regards alternative answers. Some of the answers are less than perfect, but represent a standard of response that the examiners deemed sufficient to earn full marks. Teachers who use this guide should do so with its original purpose in mind.

SUMMARY/ABSTRACT

The objective of the Human Biology Examining Panel was to set a paper of comparable difficulty to that in 2000, but to incorporate, where possible, changes based on feedback from the Syllabus Committee, markers and teachers. The relative inexperience of the panel (2 of its 3 members involved for the first time) made this process difficult, but the end result was a paper of only slightly reduced difficulty and of comparable reliability. Feedback from markers was generally positive, and it was of interest that the initial view of many that the paper was far too easy (a view shared by the Syllabus Committee) was not fully supported by the final statistics.

Overall the performance of the candidates was quite good, averaging 62.8%. The panel recognizes that in each section of the extended answers there appeared to be some inequity between the two choices available. Accordingly, this part of the paper correlated relatively poorly with the overall score. The suggestions for improvement from the Syllabus Committee are welcomed and, where possible, these will be incorporated into the 2002 paper.

GENERAL COMMENTS

Organisation and structure of the exam

The structure of the exam followed the conventional layout of multiple choice (40%), short answers (40%) and extended answers (20%). The setting of the exam involved each member of the panel being allocated several sections in which to set both multiple choice and short answer questions. Each section was covered by 2 of the 3 members of the panel, and questions were eliminated after consultation among all three members. The extended answer questions were developed initially by the whole panel before individual members were assigned the task of finalising specific questions. At all stages, consideration was given to ensuring all parts of the syllabus were covered, and answers to questions were included in all drafts. Deliberate emphasis was placed on graph interpretation (Q42 & Q43) and generation (Q45) based on feedback from previous exams.

The balance of questions across the syllabus was as follows:

Topic	Multiple Choice	Short Answer	Total
Nervous and hormonal control	14	20	34
Regulation	12	8	20
Body fluids	12	10	22
Infection and immunity	8	10	18
Genetics and mechanics of evolution	10	11	21
Human evolution	8	9	17
Human variation and lifestyle	8	5	13
Human ecology	8	7	15
TOTAL	80	80	160

As noted by the Syllabus Committee the 'Body Fluids' section received more coverage than was usual, but importantly this area was not an option in the extended answers.

Candidates' Performance

The minimum raw score among the 4122 candidates was 16% and the maximum raw score was 94%. The mean mark was 62.8% with a standard deviation of 12.8%. This shows that the exam was easier than that in 2000, but was within the range of the two previous years:

Year	Mean percentage
2001	62.8
2000	57.5
1999	65.2
1998	60.0

The reliability of the written paper was 0.84 and of the whole paper was 0.82, up slightly from 2000 (0.79), but similar to the two previous years (0.83 in 1999 and 0.81 in 1998).

COMMENTS ON SPECIFIC QUESTIONS

The answers for the multiple-choice questions were as follows:

Question	Correct answer	Percent correct	Question	Correct answer	Percent correct
1	C	64.3	21	A	37.0
2	B	77.4	22	A	80.3
3	B	42.7	23	D	81.4
4	C	85.1	24	*	*
5	B	70.3	25	C	65.0
6	A	88.4	26	D	85.3
7	B	97.4	27	A	85.9
8	D	78.5	28	C	88.5
9	D	64.9	29	B	94.4
10	D	69.1	30	C	64.5
11	B	89.7	31	B	38.8
12	A	82.2	32	A	95.0
13	D	28.3	33	A	32.6
14	C	76.9	34	B	89.1
15	A	78.9	35	A	85.2
16	B	78.3	36	A	76.7
17	D	65.5	37	C	77.5
18	B	53.9	38	D	89.8
19	C	89.5	39	A	89.3
20	B	60.9	40	B	82.2

* This question was cancelled following the discovery of an error in the marking key.

Among the remaining multiple-choice questions, the following points are noteworthy:

Q3: 40% of candidates incorrectly answered 'C'. Although this distracter had the white/grey matter related correctly, it incorrectly indicated that the motor root is dorsal (rather than ventral).

Q13: Many candidates (47.8%) chose distracter 'C', suggesting that the anatomical relationships among epithelial cells of the tubule, the interstitial fluid and peritubular capillaries is poorly understood.

Q18: Around 40% of candidates answered 'A' or 'C', both clearly incorrect statements about glomerular function.

Q21: Although more candidates chose the correct answer than any other specific alternative, all distracters attracted a substantial number of responses. Some candidates may have missed the importance of 'initial targets of the HIV virus' in this question.

Q24: This question was cancelled.

Q31: The relatively poor result (38% correctly answered) possibly reflects the requirement for mathematical computation in this question.

Q33: The majority of candidates (65%) incorrectly answered 'D', seemingly reflecting a poor understanding of the "Founder Effect".

Short answer questions

Q41: Answered quite well (average 74%).

Q42: Not well answered (average 54%) especially given that it was initially viewed as a relatively easy question. This may partly reflect its 'graph interpretation' aspect, although in this regard parts 'g' and 'h' were answered correctly by most candidates. Identification of the two hormones for which profiles were shown caused problems, with many candidates suggesting one or both were LH / FSH. This was clearly not possible given the actual profiles, and both were identified in the question as steroid hormones. In part 'e', corpus luteum was the required answer (rather than ovary). Performance in this question did not correlate well with the overall score (0.44), possibly reflecting the contribution of 'graph interpretation'.

Q43: Answered very well (average 76%).

Q44: Poorly answered (average 42%). Part 'a' presented a particular problem, with relatively few candidates able to identify anatomical location and specific processes (eg, re-absorption). This poor performance is consistent with results in questions 13 & 18 in the multiple-choice section (see above).

Q45: Poorly answered (average 41%). Candidates did not link the definitions of 'attenuated' and 'pathogen' and tended to define one or the other. In part 'b' very few candidates were able to sketch the antibody response accurately (many drew a straight line), and the contribution of specific cells to the immune response was poorly understood, especially helper T cells and plasma cells.

Q46: A mixed performance. Overall the average of 54% suggests only a fair performance, but in fact parts a,b,c,d,f and h were answered quite well. In part 'e' many candidates answered 'Aa' instead of $X^A X^a$. Part 'g', which attracted 4 of the 11 marks, was very poorly answered, indicating poor understanding of this area and possibly difficulty in explaining phenomena without visual or other cues.

Q47: A reasonable performance (average 65%). Candidates had difficulty explaining *why* the position of the foramen magnum was adaptive for bipedalism.

Q48: Reasonably well answered (average 60%). Very few candidates could explain why the figure may be described as a clinal zone (part 'a'), but the remainder of the question presented less problems. This question also correlated relatively poorly with overall score, possibly reflecting more general knowledge (from the media etc) of the effects of UV radiation on the incidence of skin cancer.

Q49: Not well answered (average 55%). Many candidates appear to be confused between the greenhouse effect and depletion of the ozone layer. Candidates seemed to know some of the facts, but synthesising these into a logical explanation proved to be difficult.

Extended answer questions

Overview. The extended answer section was the most difficult part of the paper, returning the lowest marks (averages 50% and 55% for parts 'a' and 'b' respectively). Scores here also correlated relatively poorly with the overall paper. While this may reflect shortcomings in the questions themselves, it also suggests that candidates have difficulty constructing logical explanations without prompts such as diagrams etc. A similar conclusion can be drawn from some of the more challenging short answer questions (eg, Q49).

A brief account of each extended answer question follows.

Question 50

Although the performance in this question was relatively low (average 42%), it was rated by some markers as the best of the 4 extended answer questions. In support of this is its correlation with the overall total (0.79), clearly the highest among the 4 extended answer questions. The question was attempted by 1621 of the candidates. There was some difficulty in marking, with candidates addressing aspects of normal control (part 'a') in their answer to part 'b'. Specific concerns were that many candidates considered blood oxygen concentrations (rather than CO₂) to be a key regulator of breathing, and many thought that oxygen levels fall with hyperventilation.

Question 51

This question was answered by more candidates (2478) than its pair, and performance was considerably better (average 55%). The inclusion of 'Scientific Method' in the question was in direct response to feedback after the 2000 exam. Candidates demonstrated reasonable understanding of the social effects of heroin, but the biological effects and the experimental design parts of the question were not as well answered. There remains much confusion over dependent and independent variables, and relatively few candidates could construct appropriate hypotheses (often incorrectly stating one as an experimental aim). There was also a tendency for candidates to complicate their experimental design with several groups etc, rather than addressing the hypothesis in a simple and readily testable way.

Question 52

A relatively small number of candidates attempted this question (1082) and the performance was poor (average 43%). Informal feedback from some markers suggests that this question was considered unusual because of its focus on *homo habilis*. It is not clear why this should be the case since there is no apparent difference in the coverage of this particular species relative to *homo erectus* and *homo sapiens* in the syllabus document. In any event, it was part 'c' of this question, which related to tool cultures in *homo erectus* and *homo sapiens neanderthalensis*, that was answered the most poorly (average 40%). Most candidates seemed to know the words (eg, Acheulian and Oldowan) but did not convey understanding about the tools and how they were used.

Question 53

This question was the most popular (2988) and best answered (average 60%) among the 4 extended answer questions. One concern, however, is that because of the nature of the question (i.e. describe the population growth and age structure before and after demographic transition), candidates were able to receive marks for expressing effectively the same point in each section. On a more positive note, there was a clear demonstration that this part of the syllabus is well understood by many candidates, an observation shared by several markers.

POINTS FOR CONSIDERATION BY THE SYLLABUS COMMITTEE

The Examining Panel acknowledges the important feedback already provided by the Syllabus Committee on the 2001 paper, and looks forward to incorporating suggestions for improvement for 2002. This will be especially important given that 2 of the 3 members will be new in 2002. The support of the Syllabus Committee to tighten the marking key in future is also acknowledged.

An ongoing concern is the difficulty faced by the Examining Panel in pitching an examination appropriately in terms of both depth and, perhaps surprisingly, actual content. The problem of appropriate depth is an inherent one given the relative brevity of the syllabus document, but was not insurmountable given the extremely valuable input provided by the teacher representative on our panel. There was a suggestion from the Syllabus Committee, however, that parts of this year's paper tested 'obscure' sections of the syllabus. If this is the case, it is imperative that the Syllabus Committee indicate which sections of their document should be considered 'obscure', because, as written, there is no such indication.

Some concern was raised about the over-representation of urinary system in the paper (see comments above). While this is acknowledged, it is of some concern that this part of the syllabus was clearly not handled well by the candidates (see comments above on Q13, Q18 and Q44). The Syllabus Committee may wish to consider the

depth of coverage in this area, and whether it could be reduced without compromising the candidates' fundamental understanding of kidney function.

ACKNOWLEDGMENTS

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I am also grateful to Bob Peck, Kerry Tarrant and other staff at the Curriculum Council for the assistance they provided to our panel. I also thank our Independent Reviewer and Final Checker for their constructive comments on the paper, and I am indebted to Jenny Donovan for her guidance and advice, especially in relation to the finer details of the marking key. Finally, I acknowledge the enormous efforts of the Chief Marker, Ms Julie Hill, in streamlining the entire marking process both before and during the markers' meetings.

Brendan Waddell
December 2001

2001 Examining Panel

Chief Examiner: Dr Brendan Waddell
Deputy: Dr Jim Cummins
Third Member: Mrs Melissa Haskett

Chief Marker: Ms Julie Hill

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PART II (80 marks)

QUESTION 41 (Total 12 marks)

- (a) Short sight/myopia (1 mark)
- (b) Lens (1 mark)
- (c) Cornea, vitreous humour, aqueous humour
(Any two 1 mark each for 2 marks)
- (d) Fovea/macula (lutea)/yellow spot (any one of these) (1 mark)
- (e) Cones (1 mark)
- (f) Area of best focus/point of focus/visual acuity/High concentration of cones/sharpest vision/colour (any one) (1 mark)
- (g) Optic nerve/cranial nerve II (1 mark)
- (h) Transmission of impulse/electrochemical message to brain / sensory message (to brain) (1 mark)
- (i) Iris (1 mark)
- (j) In bright light the iris constricts/contracts/makes smaller the pupil (1 mark)
while in dark conditions it dilates/expands/makes bigger the pupil (1 mark) (1 mark each for 2 marks)

QUESTION 42 (Total 8 marks)

- (a) oestrogen/oestradiol (1 mark)
- (b) progesterone (1 mark)
- (c) any 3 days between Days 9 & 13 (1 mark)
- (d) Ovulation/release of egg/LH surge or release/oestrogen or hormone A drops (1 mark)
- (e) Corpus luteum/yellow body (1 mark)
- (f) LH/luteinizing hormone (1 mark)
- (g) Day 22 (1 mark)
- (h) Day 24 or 25 (1 mark)

QUESTION 43 (Total 8 marks)

- (a)
 - (i) Medulla/cardiac centre/not brainstem (1 mark)
 - (ii) Sino-atrial node/SA node/pacemaker (1 mark)
 - (iii) Increases/up arrow (1 mark)
 - (iv) Sympathetic (1 mark)
(max 4 marks for part a)
- (b)
 - (i) Amount of blood leaving the heart (each ventricle) every minute / $HR \times SV$ (1 mark)
 - (ii) 5 L/min; must show units (1 mark)

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- (iii) 25 L/min; 24-26 accepted; must have units **(1 mark)**
- (iv) stroke volume / SV **(1 mark)** **(max 4 marks for part b)**

QUESTION 44 (Total 10 marks)

- (a)
- (i) glucose is (actively) reabsorbed **(1 mark)**
(primarily) in the PCT **(1 mark)** **(max 2 marks)**
- (ii) Due to more reabsorption of water **(1 mark)**
and little (or no) urea being reabsorbed / urea left in filtrate **(1 mark)**
any one of PCT/ DESCENDING loop of Henle/ DCT/ Collecting Duct **(up to 2 marks)**
(Max 3 marks) **(max 5 marks for part a)**
- (b) Molecules are relatively large **(1 mark)**
and so cannot undergo (glomerular) filtration / to fit thru the barriers between glomerulus and Bowman's capsule **(1 mark)** **(max 2 marks)**
- (c) (Deamination) takes place in the liver **(1 mark)**
(Excess) proteins/amino acids **(1 mark)**
are broken down/catabolized/metabolized have their amino group removed/ammonia removed **(1 mark)**
(max 3 marks)

QUESTION 45 (Total 10 marks)

- (a) Weakened / less virulent **(1 mark)**
disease-causing micro-organism **(1 mark)** **(2 marks)**
- (b) Graph should show two peaks: the first between 0 and 3 weeks **(1 mark)**
then the second peak, higher (and sharper) **(1 mark)**
immediately after the second injection (between 4&5 weeks) **(1 mark)** **(3 marks)**
mark off for going back to zero between two peaks
- (c) Initiation of immune response / primary response/humoral response/production of memory cells **(1 mark)**
- (d) Macrophage Phagocytosis/presents antigen (to lymphocytes) **(1 mark)**
- Helper T cell Stimulate B cells to divide/initiate Ab production/trigger immune response/attract/enhance macrophage/phagocyte activity **(1 mark)**
- Memory B cell Allow subsequent response more quickly/larger, longer lasting response **(1 mark)**
- Plasma cell Antibody production/humoral response **(1 mark)** **(4 marks for part d)**

QUESTION 46 (Total 11 marks)

- (a) Recessive **(1 mark)**
- (b) Unaffected parents have affected children/trait skips a generation **(1 mark)**
- (c) X-linked **(1 mark)**
- (d) No father to son transmission/no affected females/only males affected/show all genotypes **(1 mark)**
- (e) $X^A X^a$ **(1 mark)**
- (f) 50% $\frac{1}{2}$ / 1 in 2 $\frac{1}{0.5}$ **(1 mark)**

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- (g) (i) Where more than two alleles / variations of the gene exist **(1 mark)**
 e.g I^A, I^B, I **(1 mark)** **(2 marks)**
- (ii) Effects of both alleles are apparent / expressed in the phenotype **(1 mark)**
 eg blood group AB **(1 mark)** **(2 marks)**
- (4 marks total for part g)**
- (h) Rh (Rhesus)/MN/PS/Kell/Lewis **(1 mark)**

QUESTION 47 (Total 9 marks)

- (a) Complete the following table about these three primate species

Species	Position of foramen magnum	Shape of dental arcade
Chimpanzee	<i>Posterior / towards the back</i> (1 mark)	<i>U-shaped/parallel sided</i> <i>/ drawing showing shape</i> (1 mark)
Homo erectus	<i>Centrally-placed / directly underneath</i> (1 mark)	Parabolic
Homo sapiens	<i>Centrally-placed / directly underneath/central</i> (1 mark)	<i>Parabolic / drawing showing shape / horseshoe</i> (1 mark)

(5 marks)

- (b) Balances weight of head (on vertebral column(spine))/above upright body **(1 mark)**
 and therefore enables efficient carrying of head/reduces energy needed to hold head up/reduces need for bulky neck muscles/allows forward-facing eyes **(1 mark)** **(2 marks)**
- (c) (i) Precision **(1 mark)**
- (ii) Opposability of thumb/saddle joint/long thumb (& short fingers) **(1 mark)** **(2 marks)**

QUESTION 48 (Total 5 marks)

- (a) it shows a (gradual) change or transition from one area to another **(1 mark)**
- (b) In equatorial regions, UV radiation is strong (all year round)/high risk of skin cancer **(1 mark)**;
 dark skin provides protection from UV skin cancer, or dark skin absorbs UV/prevents UV breakdown of folic acid/folate (and so reduces spina bifida incidence) **(1 mark)**
(or may put case for no adaptive significance – 2 marks) **(2 marks)**
- (c) (Increased susceptibility to) sunburn/skin cancer/gets a suntan **(1 mark)**
 Due to lighter skin colour/decreased amounts of melanin/suntan due to increased melanin production **(1 mark)** **(2 marks)**

QUESTION 49 (Total 7 marks)

- (a) (i) variable food supply/dependence on availability of game/little time or resources for technical innovation/minimal possessions/need for more space/temporary shelters **(1 mark)**
- (ii) Less risk of disease transmission / more varied diet / less reliance on monoculture crops / more time for storytelling / follow more favourable climate or resources **(1 mark)**
(2 marks total for part a)
- (b) Increased CO₂/other greenhouse gases (eg, CFCs/methane/nitrous oxide etc) **(1 mark)**
 released from factories/burning of fossil fuels/cars/aircraft/cows & sheep etc **(1 mark)**
(this second mark dependent on correct matching to first mark)
 (emitted into atmosphere) has trapped/blanketed heat (being radiated from earth's surface) **(1 mark)**

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(3 marks)

- (c) Rise in (mean) global temperatures **(1 mark)**
 rising sea levels/melting polar ice caps/loss of coastal land **(1 mark)**
 change in rainfall patterns (world wide) **(1 mark)**
 increase in plants **(1 mark)**

(2 marks max for part c)

PART III (40 marks)

SECTION A

QUESTION 50 (Total 20 marks)

(a) (12 marks)

Normal breathing controlled by respiratory centre (1 mark) in the medulla (oblongata) (1 mark)	2 marks	max 7 marks for this section (out of 12 possible so far)
Normal breathing: inspiratory center (1 mark) sends out nerve impulses (along phrenic/intercostal nerves) (1 mark) to diaphragm (1 mark) and intercostals (1 mark)	Max 2 marks out of these 4 marks	
to contract (1 mark)	1 mark	
Inspiratory centre switched off / inhibited (1 mark) relaxation of muscles (1) therefore expiration (1) Expiratory centre not involved during /normal/tidal breathing (1 mark) Apneustic/pneumotaxic centres in pons can alter rate & depth of breathing (1 mark)	Max 2 marks	
If CO ₂ levels rise in the bloodstream due to (e.g exercise) also leads to an increase H ⁺ conc/low pH/increased acidity in blood (1 mark) Detected by chemoreceptors (1 mark) centrally / in medulla (1 mark) and peripherally in carotid (1 mark) and aortic (1 mark) bodies Respiratory centre in medulla activates nerve impulses (1 mark) to diaphragm and intercostals increasing rate and depth of breathing (1 mark)	Max 5 marks for this section (out of 7 possible)	

(b) (8 Marks)

Hyperventilation is a series of rapid deep breaths (1 mark) that blows off / decreases (1 mark) carbon dioxide (1 mark) in blood but O ₂ remains unchanged / is not increased (1 mark) Whilst swimming the oxygen is used up / decreases (1 mark) Breathing is not stimulated (1 mark) due to low carbon dioxide levels (1 mark) and increased pH (1 mark) This results in lack of oxygen to the brain / nerve transmission to brain / decreased oxygen release from hemoglobin to brain (1 mark) Therefore swimmer may black out / faint (1 mark) in the water. When breathing reflex initiated (1 mark) the swimmer will try and breathe underwater and could drown (1 mark)	Maximum 8 marks (out of 12 possible marks)
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QUESTION 51 (Total 20 marks)

(a) (5 marks)

Biological basis: Heroin acts on the brain to relieve pain (1 mark) and make the user feel stimulated/get a 'rush' (1 mark) depression of CNS follows (1 mark) and person has feeling of well-being/euphoria/feel 'high' (1 mark) Breathing suppressed at higher doses / with overdose (1 mark)	Max 3 marks for biological effects	Max 5 marks for part (a)
Tolerance develops in regular users (1 mark) need more drug to achieve same effect (1 mark) this leads to dependence (1 mark) and so regular intake needed (1 mark) withdrawal symptoms will occur if intake reduced (1 mark)	Max 3 marks for why addiction results	

(b) (5 marks)

High financial cost of supply (1 mark) can lead to crime (1 mark) personal/family relationships suffer (1 mark) commitment to work/study compromised (1 mark) social risk of contaminated needles (1 mark) including spread of disease (eg, hepatitis C, HIV) (1 mark) extra strain on medical/emergency care (1 mark) social cost of babies born addicted (1 mark) increased dependence on social welfare (1 mark) increased demand on police resources (1 mark) controversy generated by the need for injection rooms (1 mark) money spent on education (1 mark) cost of controlling distribution networks (1 mark) etc (but must be social)	Max 5 marks for part (b) (out of many possible)
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(c) (10 marks)

A suitable hypothesis for this experiment is that buprenorphine reduces heroin dependence/addiction (1 mark)	6 marks	
The independent variable is buprenorphine treatment (1 mark)		
The dependent variable is heroin dependence/craving for drug/addiction (1 mark)		
The people in the experiment must be heroin addicts (1 mark)		
The control group receives placebo or nothing (1 mark)		
the treatment group receives buprenorphine treatment (1 mark)		
Controlled variables would be number per group (100)/even group size, dosage, time of day dose is given, age, sex, body weight, diet, length of heroin addiction/no other drugs etc	1 mark for each, max 3 marks	Max 4 marks
Experimental error can be reduced by careful attention to controlled variables/repeating the experiment/increasing sample size etc	1 mark for each to max 3 marks	

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SECTION B

QUESTION 52 (Total 20 marks)

(a) (5 marks)

<p>Features generally midway between Australopithicines and modern humans (1) Larger brain (1 mark), smaller teeth (1 mark), narrow face (1 mark), small brow ridge (1 mark) compared with Australopithecines (or vice versa if compared with humans) Pelvic structure consistent with bipedalism (1 mark) foramen magnum central/directly underneath skull (1 mark) ECC is 600-650 cc/ECC intermediate between Australopithecines and humans (1 mark) bulge in Broca's area (1 mark) Relatively long arms (1 mark) small body size relative to modern humans (1 mark) human-like hands and feet (1 mark) although hand structure more robust than modern human (1 mark)</p>	<p>Max 5 marks (out of possible 14 marks)</p>
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(b) (5 marks)

<p>Simple / primitive / crude / no pre-determined design (1 mark) flake tools (1 mark) cores/choppers (1 mark) Made of stone/pebble tools/Oldowan/volcanic glass/chert/flint (1 mark) Carnivores (1 mark) therefore tools enabled H.habilis to cut open their prey/obtain flesh (1 mark) Tools too simplistic to imply hunting (1 mark) rather living off kills of other animals/scavenging (1 mark)</p>	<p>Max 5 marks (out of possible 8 marks)</p>
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(c) (10 marks)

Maximum 5 if not related to species

<p><i>H. erectus</i> Basic pebble/Oldowan tools (1 mark) (pear shaped/teardrop) hand axes/Acheulian (1 mark) flaked on BOTH surfaces/coupe-de-poing (1 mark) Also borers/scrapers/blades (1 mark) Made of stone (1 mark) More complex /made to a pre-determined design (compared to H.habilis) (1 mark) Tools used for killing and skinning of prey (1 mark) Tools used for making fire (1 mark)</p>	<p>Max 5 marks</p>
<p><i>H.sapiens neanderthalensis</i> Mousterian tools/flake tools/scrapers/points (1 mark) with specific purposes (1 mark) Many flakes made from one corestone (1 mark) Flakes attached to wooden shafts / hafted tools (1 mark) Flakes with toothed/notched edges (1 mark) Tools used for building shelters (1 mark) making clothing from animal skins (1 mark) or hunting (1 mark)</p>	<p>Max 5 marks</p>

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QUESTION 53 (Total 20 marks)

(a) (10 marks)

<p>Before transition, less developed countries have (annual) growth rate above 1-2%/rapid population growth/suitable equation/(1 mark) may explain as Stable population since birth and death rates high.</p> <p>High death rate (1 mark)</p> <p>High infant mortality rate (1 mark)</p> <p>Death rate is defined as the number of people who have died in that year for every thousand people living (at the middle of that year)/suitable equation (1 mark)</p>	<p>Max 4 marks</p>	<p>Max 10 marks part (a)</p>
<p>Due to decreased availability of medicines/poor provision of water supplies/poor waste disposal etc (1 mark each to max 2 marks)</p>		
<p>High birth rate (1 mark)</p> <p>High fertility rate (1 mark)</p> <p>Birth rate is defined as the number of people born in that year for every thousand people living (at the middle of that year)/suitable equation (1 mark)</p> <p>Predominance of extended families (1 mark)</p>	<p>Max 4 marks</p>	
<p>Due to lack of knowledge (education) about contraception/lack of availability of contraceptives/economic importance of children, etc (1 mark each to max 2 marks)</p>		
<p>Each age level contains a smaller number of people than the one preceding it (1 mark)</p> <p>Therefore a population pyramid contains a broad base/large pop of children (1 mark) tapering to a sharp peak/small pop of elderly (1 mark)</p> <p>appropriate sketch of pop pyramid showing age, gender, numbers, would be OK here also for 3 marks if well labelled</p>	<p>Max 3 marks</p>	

(b) (10 marks)

<p>After transition, (annual) growth rate falls below 1-2%/Slow pop growth (1 mark)</p> <p>Death rate decreases (1 mark) (can pay definition if put here first)</p> <p>usually before the drop in birth rate (1 mark)</p> <p>Drop in infant mortality (1 mark)</p>	<p>Max 4 marks</p>	<p>Max 10 marks part (b)</p>
<p>Due to provision of clean water supplies/sanitary methods of waste disposal/improved nutrition/better public health measures (availability of medicines) etc (ANY 2 for 2 marks)</p>		
<p>Decreasing birth rate (1 mark)</p> <p>Birth rates are very close to death rates/zero population growth (1 mark)</p> <p>Predominance of the nuclear family (1 mark)</p>	<p>Max 4 marks</p>	
<p>Due to widespread practice of birth control/vigorous family planning programmes economic liability of children/non productivity of children etc (ANY 2 for 2 marks)</p>		
<p>Shape of population pyramid becomes steeper (1 mark)</p> <p>Ageing population/more people in higher age groups (1 mark)</p> <p>Pyramid has narrower base and wider top (1 mark)</p> <p>Appropriate sketch of population pyramid showing age, gender, numbers, would be OK here also for 3 marks if well labelled</p>	<p>Max 3 marks</p>	