

WESTERN AUSTRALIA

TERTIARY ADMISSIONS EXAMINATION 1980

Please place one
of your Candidate Identification
labels in this box

HUMAN BIOLOGY

CANDIDATE'S NUMBER:

In figures

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In words

TIME ALLOWED FOR THIS PAPER:

Reading time before commencing:

Fifteen minutes

For working of paper:

Three hours

MATERIAL TO BE PROVIDED FOR THIS PAPER:

Question Paper comprising PART I Pages 3 - 23
PART II Pages 24 - 25
Essay sheets for PART II Pages 26 - 33
Answer sheet for PART I Page 35
Space for rough work Page 34

INSTRUCTIONS TO CANDIDATES: SEE PAGE 2

FOR EXAMINER'S USE ONLY

	1st Mark	Check		1st Mark	Check	
41-60			67			
61			68			
62			69			
63			70			
64			71			
65			1-40			
66						
SUB TOTAL			TOTAL			

INSTRUCTIONS TO CANDIDATES:

Part I consists of 40 multiple choice questions (40 marks), 20 word-completion questions (20 marks), and 5 diagram completion questions (40 marks).

Answer ALL questions in Part I.

Part II consists of three (3) sub-sections. TWO (2) questions have to be answered, but each question MUST come from a different sub-section (10 marks each).

The Answer sheet for questions 1 - 40 is printed on Page 35. At the commencement of the examination OPEN your answer sheet OUT and use it alongside questions 1 - 40.

Answer questions 41 - 65 in the spaces provided on the question paper.

The essays for PART II should be written on Pages 26 - 33 of the question paper.

At the end of the examination carefully check that you have written your candidate number in figures and words on both the front cover of the question paper AND on the answer sheet for questions 1 - 40. FOLD your completed answer sheet BACK inside this question paper and hand the question paper to the supervisor.

SEE PAGE 3

PART I

1. A series of interconnecting canals transporting fluids has been observed in the cell. These canals are called
 - a) mitochondria
 - b) endoplasmic reticulum
 - c) centrioles
 - d) lysosomes
2. The process whereby any substance may spread from an area of high concentration to an area of low concentration is called
 - a) filtration
 - b) osmosis
 - c) diffusion
 - d) pinocytosis
3. The innominate bone (hip bone) is formed by the fusion of three bones. Which of the following is NOT part of the innominate?
 - a) ilium
 - b) ischium
 - c) pubis
 - d) sacrum
4. A muscle that causes an increase in the joint angle is known as
 - a) an extensor
 - b) an abductor
 - c) an adductor
 - d) a flexor
5. Which one of the following would form the voluntary sphincter located around the mouth?
 - a) smooth muscle
 - b) striated muscle
 - c) tendon
 - d) ligament
5. Clench your jaw, then place your finger on the surface of the cheek opposite the second upper molar. The hard moveable cylindrical structure felt would be the duct of the
 - a) submandibular gland
 - b) parotid gland
 - c) sublingual gland
 - d) lacrimal gland

SEE PAGE 4

QUESTIONS 7, 8, 9 refer to Figure 1 below:

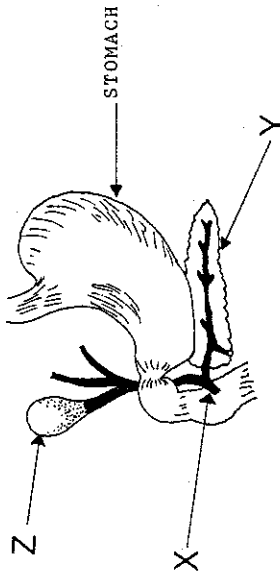


FIGURE 1.

7. Organ Y releases several hormones one of which is
- adrenalin
 - glucagon
 - thyroxin
 - oestrogen
8. Which of the following pairs of substances pass through structure X?
- insulin and bile
 - bile and bicarbonate
 - ptyalin and trypsin
 - gastrin and hydrochloric acid
9. Which of the following conditions is associated with structure Z?
- gall stones
 - cystitis
 - hepatitis
 - haemorrhoids

SEE PAGE 5

10. A newborn baby would have suffered the most damage if exposed to mutagenic agents (eg X-rays) during the period of pre-natal life from
- 0 - 3 months
 - 3 - 5 months
 - 5 - 7 months
 - 7 - 9 months
11. One of the old ideas of race divides the human species into 3 main groups. Which one of the following is NOT one of the three groups?
- Mongoloid
 - Negroid
 - Caucasian
 - Polynesian
12. Which of the following substances is a product of protein catabolism?
- Glycerol
 - maltose
 - ascorbic acid
 - amino acids
13. There is a wide range in individual nutritional needs. Which of the following groups is absolutely essential for survival?
- fats, proteins and vitamins
 - carbohydrates, vitamins and minerals
 - vitamins, minerals and proteins
 - carbohydrates, fats and proteins
14. In which of the following groups is Peking Man placed?
- Homo erectus
 - Homo habilis
 - Australopithecus africanus
 - Homo sapiens
15. In which of the following is fertilisation NOT possible?
- uterine tube
 - peritoneal cavity
 - uterus
 - urethra

SEE PAGE 6

16. When red blood cells (rbc) and white blood cells (wbc) are counted in normal blood the count is approximately

- one wbc per 700 rbc
- 350 wbc per 700 rbc
- 700 wbc per 700 rbc
- 1400 wbc per 700 rbc

17. Fossil evidence indicates the Australian Aborigine has been living in Australia for at least

- 10,000 years
- 50,000 years
- 100,000 years
- 250,000 years

18. The normal adult heart-beat at rest has an average count of

- 210 beats per minute
- 25 beats per minute
- 153 beats per minute
- 86 beats per minute

19. In which of the following ways is carbon dioxide mainly transported in the blood?

- dissolved in plasma
- loosely combined with haemoglobin
- as bicarbonate
- as gas bubbles

20. Carbohydrates are NOT broken down by secretions from

- the salivary glands
- the gastric glands
- the glands of the pancreas
- duodenal glands

21. The branch of human biology which deals with the function of living organisms is called

- physiology
- pathology
- anatomy
- anthropology

SEE PAGE 7

QUESTIONS 22 and 23 refer to Figure 2 below:

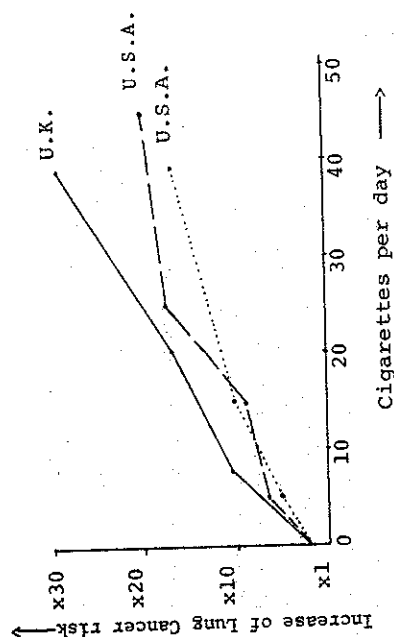


FIGURE 2.

The figures are derived from:
Doll and Hill's study of British doctors aged 35 and over
Hammond and Horn's study of American men aged 50-69
Dorn's study of American ex-service men aged 30 and over.

22. Figure 2 shows that

- people in the USA smoke more than people in the United Kingdom
- the risk of contracting lung cancer increases with the number of cigarettes smoked per day
- people in the USA have more chance of contracting lung cancer
- there is no difference in risk

23. In drawing conclusions about death rates in the total population in the two countries, the data presented in the graph could be misleading for which one of the following reasons?

- United Kingdom sample limited to doctors
- American sample restricted to males
- restricted age range
- all of the above

SEE PAGE 8

24. Over-activity of the thyroid gland would probably result in

- a) decreased thyroxin production
- b) decreased appetite for food
- c) increased nervous excitability
- d) increased body weight

25. Which of the following statements is NOT true concerning human chromosomes?

- a) the genes are carried on chromosomes
- b) all the chromosomes are similar in size
- c) males possess an X and a Y chromosome
- d) there is a total of 46 chromosomes

26. Natural selection presupposes variation. If selection is effective in promoting evolution, the variation is most likely due to

- a) environmental factors
- b) decreased use of particular structures
- c) gene mutations
- d) isolation

27. If someone is stabbed with a 15cm knife through the fifth intercostal space, 6cm from the midline of the body, then it is likely the knife will damage the

- a) apex of the left lung
- b) lower lobe of the left lung
- c) tip of the left ventricle
- d) aortic arch

28. Which of the following does a simple reflex NOT involve?

- a) the spinal cord
- b) a motor pathway
- c) the cerebellum
- d) a sensory pathway

29. Which of the following conditions is most commonly suffered by males in later life?

- a) PKU (phenylketonuria)
- b) haemophilia
- c) prostate gland enlargement
- d) cancer of the cervix

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30. Which of the following tissues make up tendons?

- a) dense bone
- b) yellow elastic
- c) hyaline cartilage
- d) white fibrous

31. By which of the following routes does lymph enter the general circulation?

- a) internal jugular vein
- b) left atrium
- c) spleen
- d) aorta

32. A woman with blood group O and a man with blood group B have two children. Which of the following pairs of children includes a child with a blood group which could NOT be the result of this union (disregarding mutation)?

	1st child	2nd child
a)	O	O
b)	B	O
c)	B	B
d)	B	A

33. Freshly voided urine normally does NOT contain

- a) sodium chloride
- b) urea
- c) glucose
- d) phosphates

34. Which one of the following is the most important in the body's response to infection?

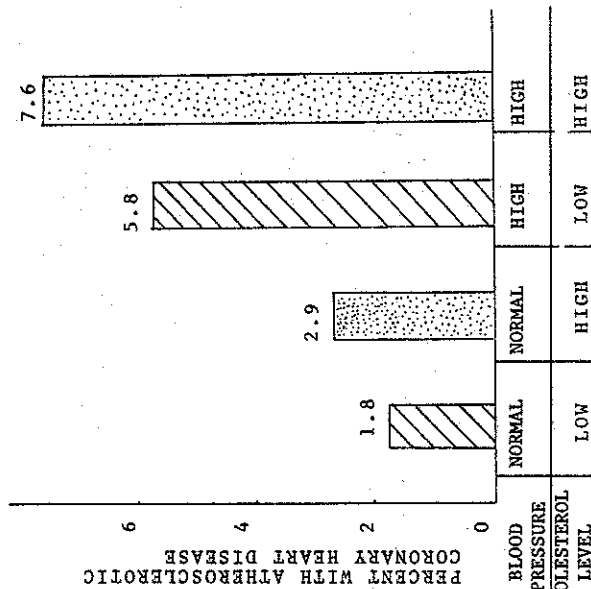
- a) erythrocytes
- b) platelets
- c) lymphocytes
- d) osteocytes

35. Lack of Vitamin D is associated with

- a) rickets
- b) tuberculosis
- c) scurvy
- d) tetanus

SEE PAGE 10

QUESTIONS 36 & 37 refer to Figure 3 below:



36. Figure 3 shows that

- the most important factor contributing to atherosclerosis is the amount of cholesterol in the blood
- high blood pressure and low cholesterol contributes more to atherosclerosis than high cholesterol
- atherosclerosis is more likely with high blood pressure and high cholesterol
- high blood pressure is the only factor which is implicated in atherosclerosis

37. Which of the following is correct? The difference in the incidence of atherosclerosis between high and low cholesterol was

- greater if blood pressure was high
- the same for high blood pressure as for normal blood pressure
- greater if blood pressure was normal
- unaffected by blood pressure

SEE PAGE 11

38. When Europeans first colonised Australia there was a dramatic rise in the death rate amongst Aborigines due to infectious diseases introduced by the Europeans. The lack of resistance to these diseases reflected the Aborigine's

- lack of hygiene
- inability to produce antibodies to disease
- long isolation from other populations
- lack of knowledge of these diseases

39. Which one of the following is true of antigens? They

- are also called immunoglobulins
- destroy foreign bodies
- are normally present in the body
- are large foreign molecules

40. Which of the following is NOT a major component of the immune system?

- lymph nodes
- palatine tonsils
- thymus gland
- thyroid gland

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In questions 41-60 give the most appropriate biological term to match the statement. Answer the questions in the spaces provided.

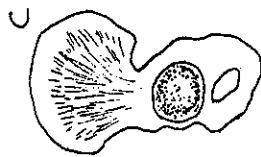
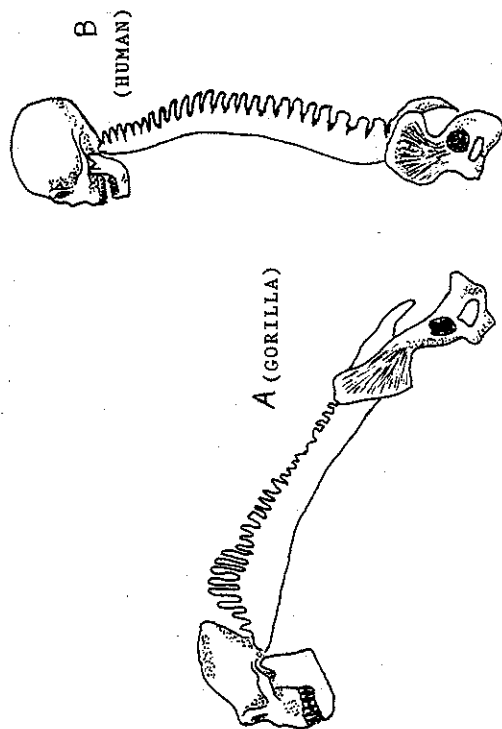
41. The cavity in the teeth which contains blood vessels and nerve endings embedded in connective tissue _____
42. Structure joining the foetus to the placenta _____
43. Collective name for sex cells _____
44. Changes in genetic structure which are heritable _____
45. Shortsightedness _____
46. Embedding of the fertilized ovum in the uterine lining _____
47. Receptors located in muscles, joints and tendons _____
48. A group of organisms which can interbreed under natural conditions to produce fertile offspring _____
49. A sustained muscle contraction produced by a series of stimuli in rapid succession _____
50. The suborder to which gorilla and chimpanzee belong _____

SEE PAGE 13

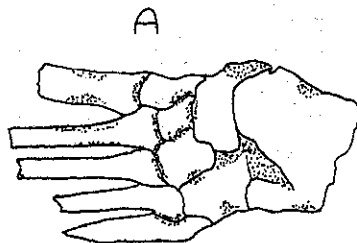
51. The organic nutrient with the highest energy store per gram _____
52. The type of organism which causes influenza _____
53. The type of tissue lining the oviduct which sweeps the egg along _____
54. The tool culture associated with Neanderthal Man _____
55. The scientific name for Cro-Magnon Man _____
56. The type of grip used in writing _____
57. The process occurring in mitochondria which releases energy from glucose _____
58. The process which results in a population becoming better adapted to its environment _____
59. The spreading of a malignant tumor _____
60. Drugs such as aspirin which are taken for pain relief _____

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61.



Left innominate bone of a fossil primate. Lateral view.



Fossil foot. Some toe bones and heel bone missing. Left foot viewed from above. From Homo habilis.

FIGURE 4.

DIAGRAMS OF PARTS OF PRIMATE SKELETONS

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61. (continued)

(a) Comparing Diagrams A and B in Figure 4

(i) Outline one difference in pelvic structure

(1 Mark)

(ii) Name one structural difference in the vertebral column

(1 Mark)

(iii) Which animal would require stronger neck muscles? Explain.

(2 Marks)

(iv) What opening in the base of the skull would be an indicator of the type of stance in these animals? Explain.

(3 Marks)

(b) What would be the most likely stance adopted by the primate to which fossil C belonged?

(1 Mark)

(c) Which characteristic of D is typical of a bipedal anthropoid?

(1 Mark)

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62.

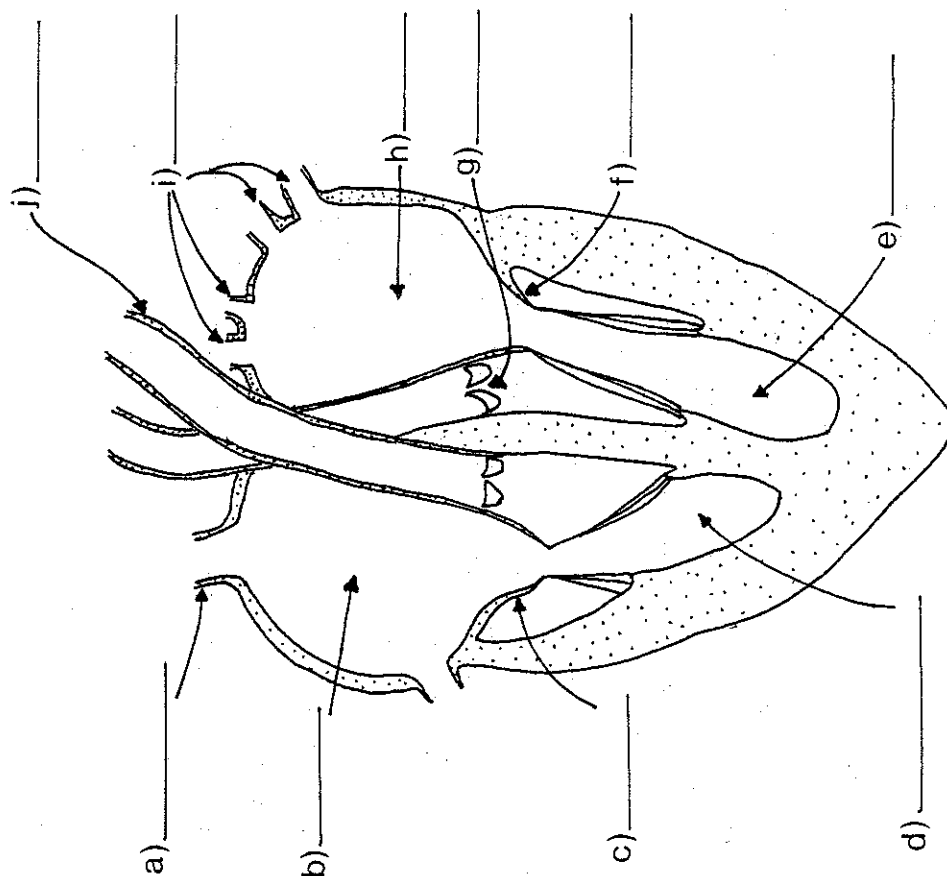


Fig.5 Anterior view of longitudinal section of the heart

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62. (continued)

- (a) Label the diagram of the heart in the spaces provided in Figure 5.

(5 Marks)

- (b) Explain the functions of the following structures

- (i) aorta _____

 (ii) chordae tendinae _____

 (iii) tricuspid valve _____

(3 Marks)

- (c) Irreversible damage to cardiac muscle results from blockage of an artery not shown in the diagram. Name this artery.

(1 Mark)

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63.

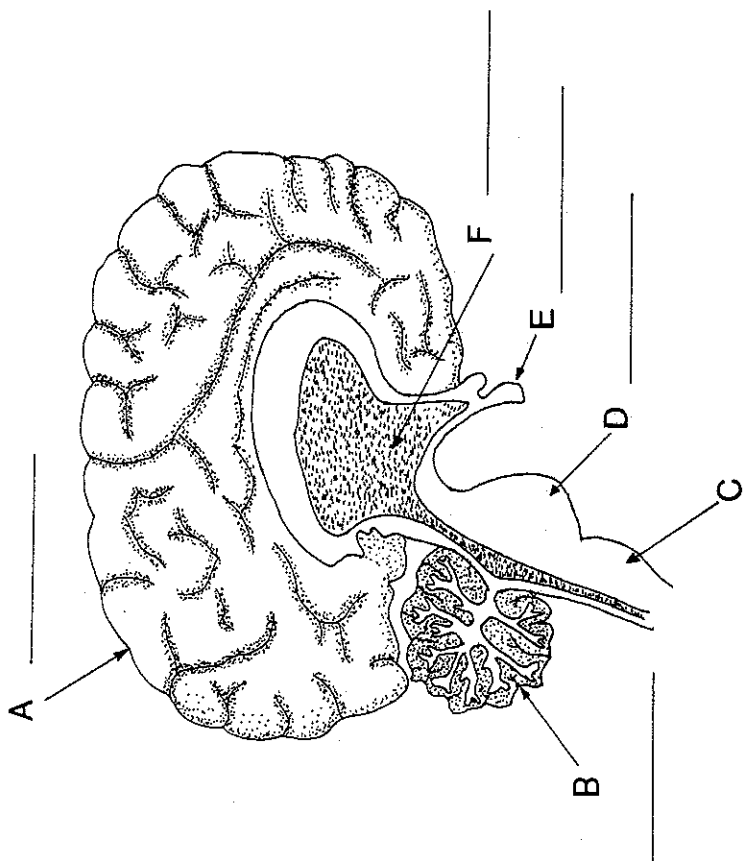


FIGURE 6. Midsagittal (longitudinal) section of the brain.

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63.(continued)

(a) Label the diagram of the brain, in the spaces provided in Figure 6.

_____ (3 marks)

(b) Which of the labelled structures has evolved most recently?

_____ (1 mark)

(c) Which of the labelled structures is involved in the coordination of involuntary movement?

_____ (1 Mark)

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64. Some parts of this question refer to the information in Figure 7.

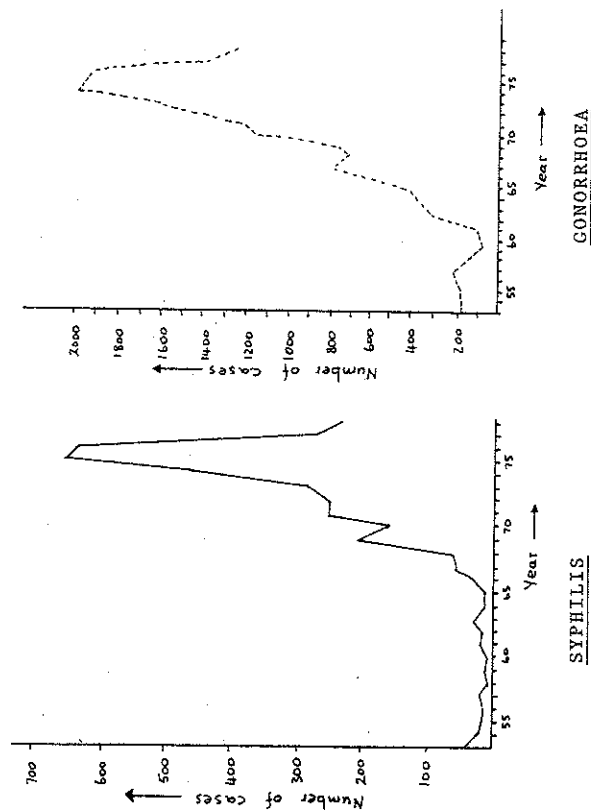


FIGURE 7. Notifications of cases of syphilis and gonorrhoea in Western Australia between 1953 and 1978

(a) What type of organism causes syphilis and gonorrhoea?

(1 mark)

(b) How are these two diseases transmitted?

(1 mark)

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64. (continued)

- (c) In Western Australia there is a venereal disease clinic in Moore Street opposite Royal Perth Hospital where treatment is available. What information in the graphs helps explain why the clinic was set up in late 1971? (1 mark)
- (d) Which of the two diseases has been more common in Western Australia over the last 20 years or so? (1 mark)
- (e) Reports of patients are used by contact tracing officers to locate carriers of venereal disease. How might this result in a decrease in the incidence of venereal disease? (2 marks)
- (f) Name two effects syphilis has on the body in the "tertiary" stage of infection. (2 marks)

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65. (continued)

Imagine you are a genetic counsellor who is approached for advice by Miss Y and Mr X who wish to get married but are 1st cousins. They are concerned about the children they may have because they have relatives affected by two traits; one, a distinctive type of woolly hair (which is harmless) second, a form of anaemia (which usually results in death before the age of 50).

A detailed pedigree has been prepared from information supplied by the family (see pedigree chart-Figure 8).

- (a) Which of the following modes of inheritance - autosomal recessive, autosomal dominant, X-linked dominant, X-linked recessive - is the most likely mode of inheritance for

- (i) the woolly hair trait? _____
(ii) the anaemia trait? _____

(2 Marks)

- (b) What are the genotypes for both traits in the following individuals?

- (i) I 1 _____
(ii) III 9 _____
(iii) III 10 _____

In the space below give a key to symbols used

(3 Marks)

- (c) Give the probability of individuals III 9 (Miss Y) and III 10 (Mr X) having

- (i) a boy with anaemia _____
(ii) a girl with anaemia _____
(iii) a boy with woolly hair and anaemia _____

Show how you arrive at your answers.

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(3 Marks)

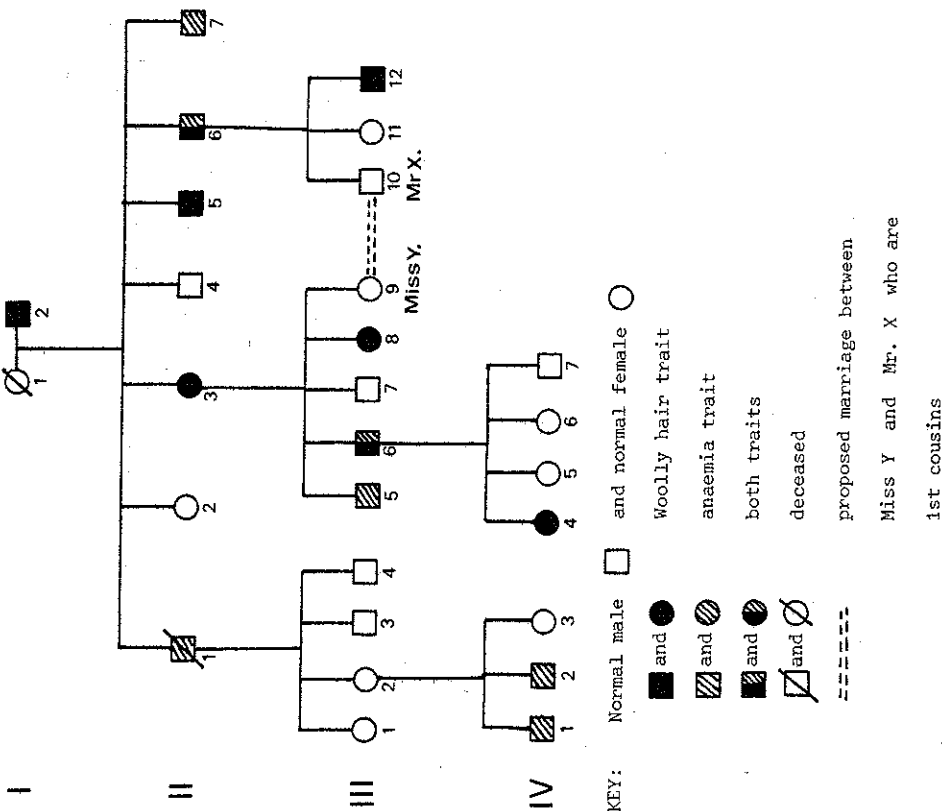


FIGURE 8. Pedigree Chart

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PART II

Essay Section

THIS SECTION IS DIVIDED INTO THREE (3) SUB-SECTIONS. ATTEMPT TWO (2) QUESTIONS WHICH MUST COME FROM DIFFERENT SUB-SECTIONS E.G. QUESTION 2 (SUB-SECTION I) AND QUESTION 3 (SUB-SECTION II). ILLUSTRATE YOUR ANSWERS WITH DIAGRAMS, WHERE APPROPRIATE.

SUB-SECTION I

1. The body produces and loses heat. Discuss the mechanisms involved in the regulation of these processes.

(10 Marks)

2. Describe:

(a) the structure of a synovial joint.

(7 Marks)

(b) all the movements possible at the knee and elbow joints.

(3 Marks)

SUB-SECTION II

3. Discuss the biological consequences to humans of any TWO (2) of the following

- (a) alcohol
- (b) high salinity in drinking water
- (c) noise
- (d) X-rays

(10 Marks)

4. In the evolution of the hominids from their primate ancestors, the following developments have taken place.

- (a) an increase in brain capacity and complexity
- (b) opposable thumbs
- (c) upright posture

Discuss the selective advantages it is thought these developments offered.

(10 Marks)

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Essay Section (continued)

SUB-SECTION III

5. Use a specific example of a water-borne disease, describing

(a) how it is detected in the community water supply.

(3 Marks)

(b) its entry and effects on the human body

(4 Marks)

(c) how the Public Health Department controls the organism in the water supply.

(3 Marks)

6. Describe the

(a) structural and functional

(7 Marks)

(b) emotional and intellectual

(3 Marks)

changes that occur in the individual during the period covering puberty and early adolescence.

END OF PAPER