

WESTERN AUSTRALIA

TERTIARY ADMISSIONS EXAMINATION, 1978

HUMAN BIOLOGY

Please place one  
of your Candidate Identification labels  
in this box

CANDIDATE'S NUMBER:

In figures

--	--	--	--	--	--

In words

--

TIMES 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 - 25  
PART II Pages 26 - 27  
Essay sheets for PART II Pages 28 - 35  
Answer sheet for PART I Page 37  
Space for rough work Page 37

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 essay questions, TWO of which have to be answered (10 marks each).

The Answer sheet for questions 1 - 40 is printed on Page 37. 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 28 - 35 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.

## PART I

1. Which of the following, when added to our water supply in prescribed quantities, has been shown to reduce the incidence of dental caries?

- a. iodide
- b. fluoride
- c. calcium
- d. phosphorus

2. The small granules of calcium carbonate located in the part of the middle ear responsible for our sense of balance are called

- a. ampullae
- b. perilymph
- c. otoliths
- d. saccules

3. Which of the following substances is actively reabsorbed by the kidney?

- a. glucose
- b. lactose
- c. uric acid
- d. galactose

4. Which of the following elements commonly occurs in proteins but not in carbohydrates or fats?

- a. carbon
- b. oxygen
- c. hydrogen
- d. sulphur

SEE PAGE 4

4.

5. Mesodermal tissue in the developing embryo forms the

a. skin  
b. mucosa  
c. muscles  
d. nerves

6. The function of the villi in the small intestine is

a. absorbing undigested fats  
b. increasing the surface area for absorption  
c. protecting the gastric glands from bile  
d. aiding the absorption of cellulose

7. Many children in Australia suffer from asthma. Wheezing in asthma is directly produced by

a. constriction of the bronchi and bronchioles  
b. grass pollens in the air  
c. mucus obstructing the nasal passages  
d. atmospheric pollution

8. Antibiotics are not often effective against viruses because viruses

a. keep changing their external protein coat  
b. are able to disguise themselves in the host cell membrane  
c. are not true living cells and thus do not metabolise  
d. can change antibiotics into useful food substances

SEE PAGE 5

5.

9. Macrophages present in the blood are responsible for

a. manufacturing antibodies  
b. engulfing foreign cells or particles  
c. aiding in the clotting of blood  
d. detoxifying harmful substances

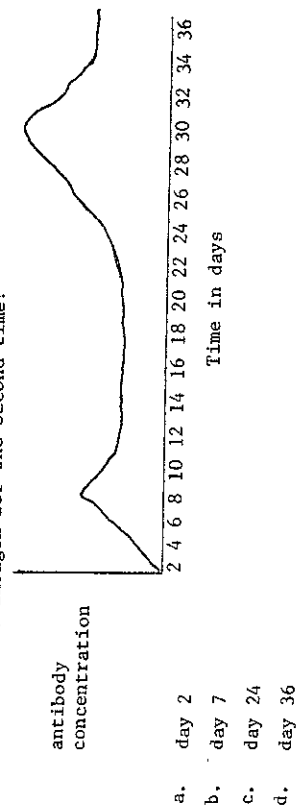
10. Which of the following fossil hominids is an example of Homo erectus?

a. The Neanderthals  
b. Cromagnon man  
c. Proconsul  
d. Java man

11. The decrease in sensory input resulting from emotional deprivation of the young child often causes

a. schizophrenia  
b. faulty bone growth and autism  
c. mental and physical retardation  
d. physical deformities

12. Below is a graph showing changes in antibody concentration in the blood with time. On which day is it most likely that this person came in contact with the antigen for the second time?



SEE PAGE 6

13. The prostaglandins are a group of chemicals possessing diverse properties which enable them to be used in the treatment of a wide range of conditions. The prostaglandins could best be described as

- a. hormones
- b. enzymes
- c. chemostabilisers
- d. buffers

14. Which of the following primates is a prosimian?

- a. capuchin
- b. common marmoset
- c. potto
- d. agile gibbon

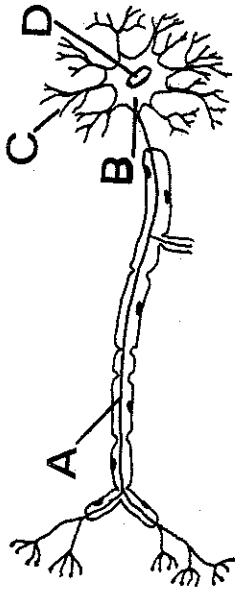
15. The primary function of ribosomes in the cell is

- a. removal of waste products
- b. storage of glycogen
- c. synthesis of mucopolysaccharides
- d. synthesis of polypeptide chains

16. Which of the following substances does not normally move across the placenta into the circulation of a developing foetus?

- a. erythrocytes
- b. antibodies
- c. glucose
- d. amino acids

17. Which of the structures labelled on the diagram below is responsible for conducting nervous impulses away from the cell body?



18. A person with the sex chromosome complement of XXY would

- a. not live beyond the age of 20
- b. have normal male reproductive organs
- c. have normal female reproductive organs
- d. have abnormal reproductive organs

19. The term menopause refers to

- a. cessation of ovulation and menstruation
- b. a time of emotional disturbance in all women
- c. a change in the lifestyle of a woman aged 45
- d. a dramatic rise in the level of circulating oestrogen

EXPECTATION OF LIFE AT BIRTH AND AGES 1, 20, 40 AND 60, IN AUSTRALIA										
Period	Birth		1		20		40		60	
	male	female	male	female	male	female	male	female	male	female
1901-11	55.2	58.8	60.0	62.9	44.7	47.5	28.6	31.5	14.4	16.2
1920-22	59.2	63.3	62.7	66.0	47.0	50.0	30.1	33.1	15.1	17.2
1946-48	66.1	70.6	67.3	71.5	49.6	53.5	31.2	34.9	15.4	18.1
1960-62	67.9	74.2	68.8	74.5	50.4	56.2	31.8	37.0	15.6	19.5
1970-72	67.8	74.5	68.3	74.7	50.2	56.4	31.6	37.2	15.4	19.7

Questions 20 - 22 refer to information from the above table.

20. In which years could a newborn male expect to live longest?

- 1920-22
- 1946-48
- 1960-62
- 1970-72

21. It can be seen from the data that in the period 1901-11 the chances of both sexes living a longer life increased if they reached the age of one year. The most probable reason for this is

- over that year the nutritional standards rose in Australia
- in that period there was a relatively high infant mortality rate
- the discovery of insulin enabled many diabetic babies to be saved
- in that period polio was a frequent cause of infant death

SEE PAGE 9

22. According to the table, which person living in the period 1970-72 can anticipate the longest total life span?

- A newborn male
- A 20 year old female
- A 40 year old male
- A 60 year old female

23. The function of the gall bladder is to store

- cholesterol
- bile
- gall stones
- lymphocytes

24. The dentine in the tooth is composed mostly of

- calcium carbonate
- calcium phosphate
- calcium nitrate
- calcium hydroxide

25. The study of the way in which cells carry out essential life-maintaining reactions is called

- pathology
- anatomy
- biochemistry
- psychology

SEE PAGE 10

26. Blood normally has a pH value of 7.35 indicating that it is

- a. mildly acidic
- b. mildly alkaline
- c. strongly basic
- d. strongly acidic

27. Fertilisation of a human ovum normally occurs in the

- a. uterine (Fallopian) tubes
- b. uterus
- c. vagina
- d. ovary

28. If you knew a person was suffering from the effects of an overdose of insulin, the best remedial step would be to give the person

- a. unsweetened tea
- b. copious quantities of cold water
- c. a glucose containing solution
- d. a strong salt solution

29. Which of the following is the main organ associated with the production of voiced sound?

- a. pharynx
- b. larynx
- c. soft palate
- d. adenoids

SEE PAGE 11

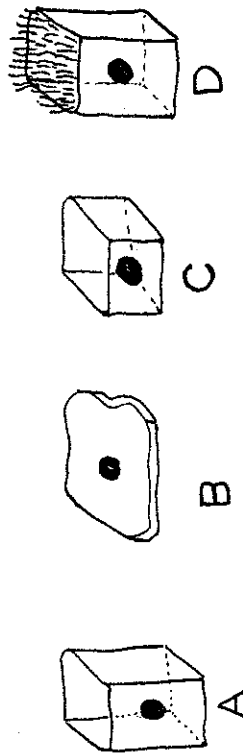
30. Which of the following usually joins a muscle to a bone?

- a. cartilaginous tissue
- b. elastic tissue
- c. a ligament
- d. a tendon

31. Which of the following vitamins is essential for the production of rhodopsin?

- a. Vitamin C
- b. Vitamin A
- c. Vitamin B<sub>1</sub>
- d. Vitamin E

32. Which of the cells shown below would be found in the upper respiratory tract?



33. The first sign of syphilis is usually

- a. a small copper coloured rash at the site of contact
- b. benign growths occurring randomly in the body
- c. white ulcers in the mouth
- d. superficial sores at the site of contact

SEE PAGE 12

34. The most effective and least harmful way of increasing peristalsis in order to prevent constipation is to

- a. eat more foods containing roughage
- b. drink smaller quantities of water
- c. take gentle laxatives
- d. refrain from exercising after meals

35. Peritonitis is an inflammation of the

- a. pericardium
- b. peripheral nervous system
- c. lining of the abdominal cavity
- d. pleural membrane

36. Motor accidents are the major cause of death in the age group

- a. 15 - 24 years
- b. 20 - 31 years
- c. 25 - 29 years
- d. 32 - 40 years

37. Botulism is a very severe and usually fatal type of food poisoning caused by

- a. a virulent virus
- b. a type of staphylococcus
- c. a type of fungus
- d. a toxin produced by a micro-organism

SEE PAGE 13

38. Cells in the human body use as their primary source of energy

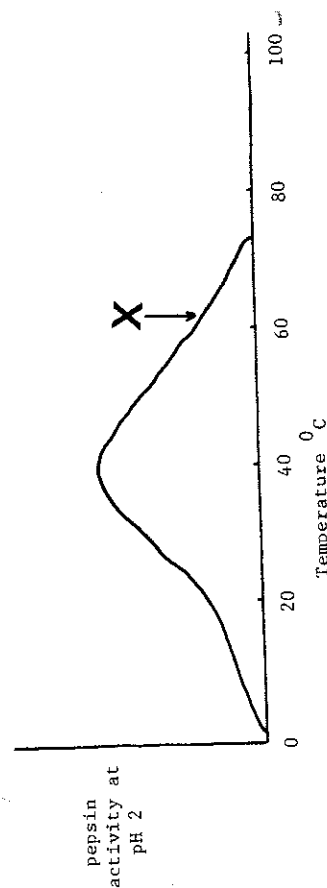
- a. amino acids
- b. glucose
- c. fatty acids
- d. sucrose

39. The sac of fluid between the surfaces of a joint is called a

- a. synovium
- b. capsule
- c. bursa
- d. sesamoid

40. Below is a graph showing the activity of the enzyme pepsin at various temperatures. The low enzyme activity at point X is probably due to

- a. the enzyme becoming too cold to function
- b. the medium being too acidic
- c. the medium being too alkaline
- d. the enzyme becoming denatured under these conditions



SEE PAGE 14

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

41. Haemoglobin containing cells, without nuclei, circulating in the blood stream \_\_\_\_\_
42. The substance necessary in the diet to prevent scurvy \_\_\_\_\_
43. Structures present in the retina responsible for colour vision \_\_\_\_\_
44. The condition in which a thickening and hardening of the arterial walls interferes with circulation \_\_\_\_\_
45. The fibrous protein component of bone, cartilage and connective tissue \_\_\_\_\_
46. Cellular organelles involved in ATP production \_\_\_\_\_
47. A group of nerve cells located outside the central nervous system \_\_\_\_\_
48. The type of muscle found in the walls of internal organs such as the bladder and intestine \_\_\_\_\_
49. The junction between the axon of one neurone and the dendrite of the next \_\_\_\_\_
50. Inflammation of the kidney \_\_\_\_\_
51. The term describing abnormally high blood pressure \_\_\_\_\_

SEE PAGE 15

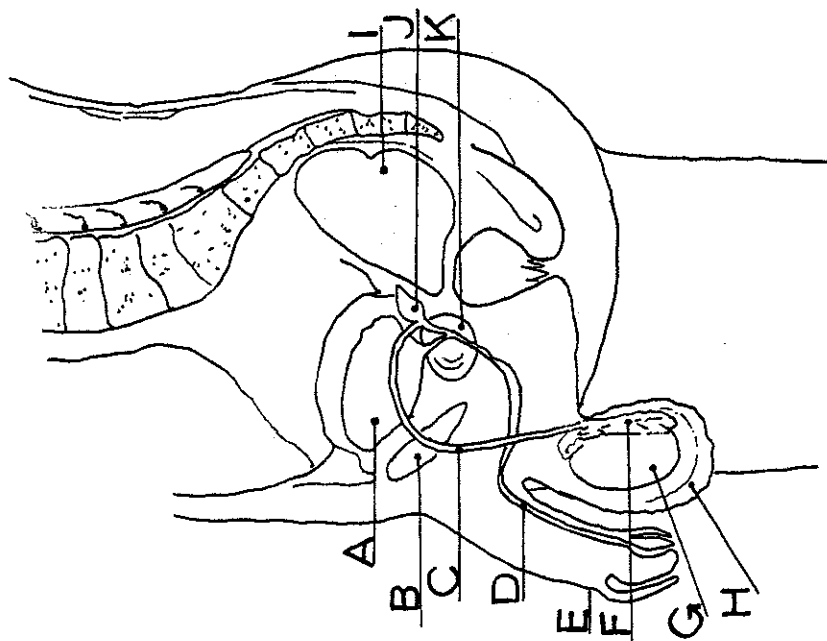
52. The passage through which urine is discharged from the body \_\_\_\_\_
53. The yellowish fluid remaining after the removal of cellular and clotting factors from the blood \_\_\_\_\_
54. The outward visible expression of the hereditary constitution of an organism \_\_\_\_\_
55. The sum total of all physical and chemical reactions occurring in a cell \_\_\_\_\_
56. The condition affecting a person with an extra chromosome number 21 or 22 \_\_\_\_\_
57. The predominant protein of milk \_\_\_\_\_
58. The reagent used to test for the presence of protein \_\_\_\_\_
59. The mineral essential to the process of blood clotting and muscle contraction \_\_\_\_\_
60. The small bones in the toes and fingers \_\_\_\_\_

Total 20 marks

SEE PAGE 16



61. The diagram below illustrates the male reproductive system.



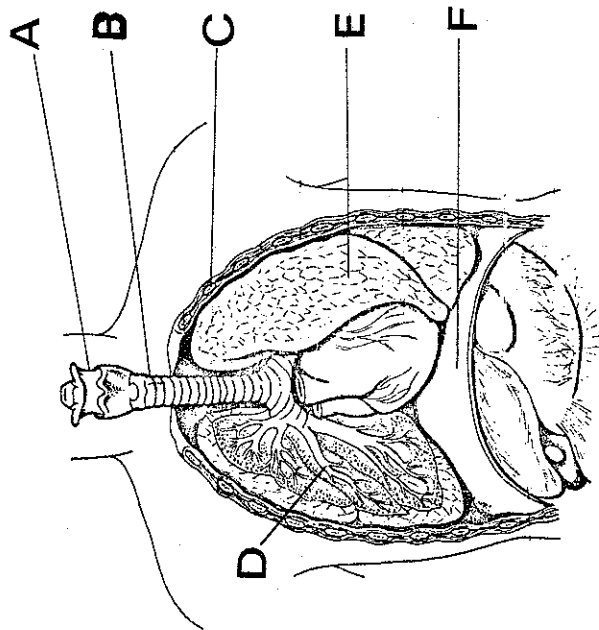
SEE PAGE 17

61. (Continued)

- |       |   |   |       |               |
|-------|---|---|-------|---------------|
| (i)   | Name the structures labelled  | A | _____ |               |
|       |   | B | _____ |               |
|       |   | C | _____ |               |
|       |   | D | _____ |               |
|       |   | E | _____ |               |
|       |   | F | _____ |               |
|       |   | G | _____ |               |
|       |   | H | _____ | (4 marks)     |
| (ii)  | Which structure produces the hormone responsible for male secondary sexual characteristics? |   | _____ | (1 mark)      |
| (iii) | In which organ are mature sperm stored?   |   | _____ | (1 mark)      |
| (iv)  | Which of the labelled structures has no reproductive function?                              |   | _____ | (1 mark)      |
| (v)   | Through which structure do sperm leave the body?  |   | _____ | (1 mark)      |
|       |   |   |       | Total 8 marks |

SEE PAGE 18

Question 62 refers to the following diagram.



62. (i) Name the structures labelled.

- A \_\_\_\_\_
  - B \_\_\_\_\_
  - C \_\_\_\_\_
  - D \_\_\_\_\_
  - E \_\_\_\_\_
  - F \_\_\_\_\_
- (3 marks)

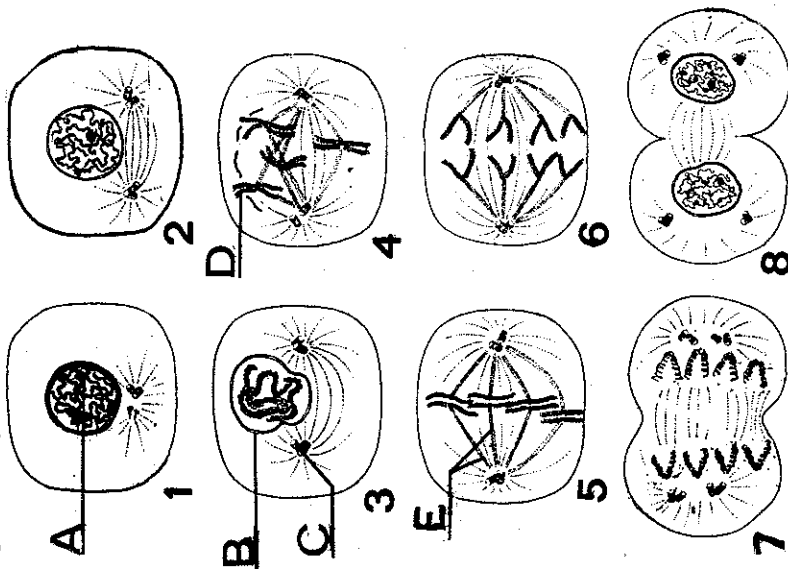
SEE PAGE 19

62. (Continued)

- (ii) What is the name of the cavity in which E lies? \_\_\_\_\_  
(1 mark)
  - (iii) What is the name of the membrane covering E? \_\_\_\_\_  
(1 mark)
  - (iv) What disease is associated with inflammation of the membrane covering E? \_\_\_\_\_  
(1 mark)
  - (v) What is the function of F? \_\_\_\_\_  
(1 mark)
  - (vi) What structure usually prevents food entering structure B? \_\_\_\_\_  
(1 mark)
- Total 8 marks

SEE PAGE 20

Question 63 refers to the diagram below;



63. (i) What is the correct biological term for the process shown in the diagram? \_\_\_\_\_ (1 mark)

(ii) What is the diploid number for this cell? \_\_\_\_\_ (1 mark)

(iii) Name the structures labelled A \_\_\_\_\_  
 B \_\_\_\_\_  
 C \_\_\_\_\_  
 D \_\_\_\_\_ (4 marks)

SEE PAGE 21.

63. (Continued)

(iv) Which numbered phase illustrates anaphase? \_\_\_\_\_ (1 mark)

(v) What is the function of the structure labelled E? \_\_\_\_\_ (1 mark)

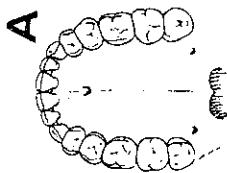
Total 8 marks

SEE PAGE 22

Question 64 refers to the selection of hominoid jaws drawn to scale.

64.

- (i) From the study of diagram A what can you conclude about this animal's diet?

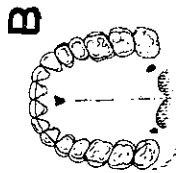


(1 mark)

- (ii) If fossil upper jaw A is approximately 1.5 million years old, to which hominid group does it probably belong?

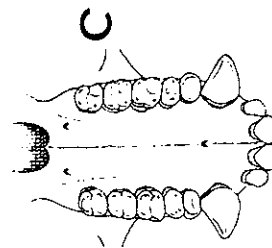
(1 mark)

- (iii) In what way is jaw A essentially different from jaw B?



(1 mark)

- (iv) Name a modern primate to which jaw C could belong



(1 mark)

SEE PAGE 23

64. (Continued)

- (v) List two major ways in which jaw C differs from the other jaws illustrated

(2 marks)

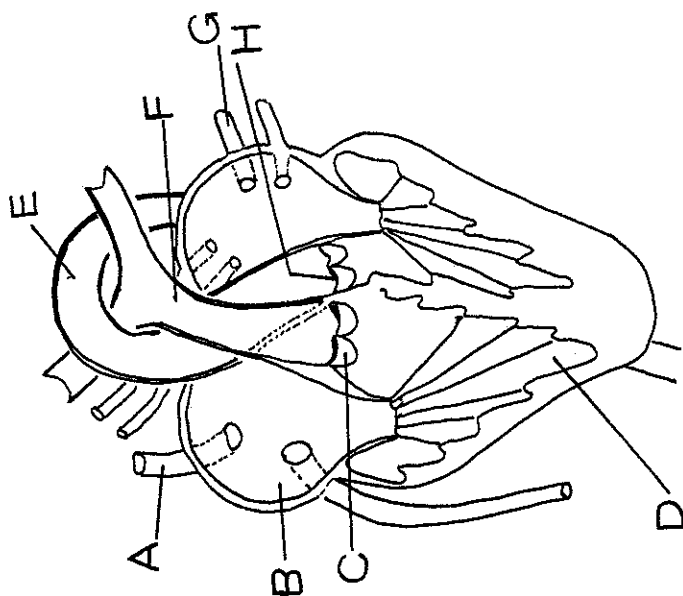
- (vi) Could the fossil age of animal A have been determined using the carbon dating method? Explain your answer.

(2 marks)

Total 8 marks

SEE PAGE 24

Question 65 refers to the diagram of the human heart.



65. (1) Name each of the structures labelled (state whether right or left where applicable).

A	_____	E	_____
B	_____	F	_____
C	_____	G	_____
D	_____	H	_____

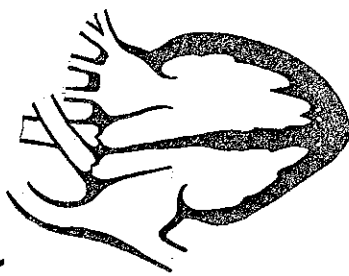
(4 marks)

SEE PAGE 25

65. (Continued)

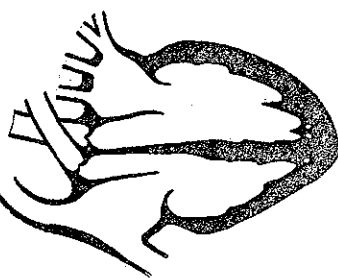
- (11) On these smaller diagrams, show the passage through the heart of oxygenated blood on diagram A and deoxygenated blood on diagram B.

A oxygenated blood



(2 marks)

B deoxygenated blood



(2 marks)

Total 8 marks

SEE PAGE 26

## PART II

## Essay Section

ATTEMPT TWO OF THE FOLLOWING QUESTIONS. LIMIT YOUR ANSWERS TO THE LINED PAGES WHICH FOLLOW. DO ANY ROUGH WORK ON THE UNLINED SHEET ON PAGE 37 AND THEN CROSS IT OUT.

66. As we age, many of our body organs deteriorate in function, making the process of living more difficult. Discuss four (4) services provided in our community to help the aged cope with the restrictions placed upon them by the dysfunction of their body organs. (10 marks)

67. Humans belong to one species - Homo sapiens, but observation of the many differences between groups of people have led to the concept of race. Discuss these differences. (10 marks)

68. Discuss the structure and function of any two of the following components of the central nervous system.

- The hypothalamus and its role in the endocrine system
- The brain stem (medulla oblongata and the pons)
- The sensory areas of the cerebral cortex
- cerebrospinal fluid

(5 marks each - Total 10 marks)

69. The Australopithecines are a group of early hominids. Discuss their (a) physical and social characteristics and (b) their importance in hominid evolution. (10 marks)

SEE PAGE 27

70. School canteens should provide meals of nutritive value.

- Suggest a possible canteen menu and explain how it meets adolescent requirements for the basic nutrients.
- Give details of the nutrients provided by each item on your menu.
- Explain why adolescents have particular nutrient requirements. (10 marks)

71. Write notes on two of the following;

- The consequences of the increasing incidence of drug abuse in Australia.
- The need for genetic counselling services.
- The effects on a pre-school child of both parents working outside the home.
- The recently discovered links of cancer with the functioning of the immune system.
- The reason for public health department regulations concerning the food we eat, the water we drink and our environment. (10 marks)

END OF PAPER

1978