Acknowledgements:

Question 1: Morales, Alberto C. *East Meets West: Vol.I 1760-1815*, Hong Kong: Macmillan, 1989, p114.

Question 2: Morales, p129.

Question 3: Dickinson, Martin. *The French Revolution.* London: Macmillan, 1984, p42.

Question 4: Heater, Derek. *Reform and Revolution.* Oxford: Oxford University Press, 1987, p62.

Question 6: From a Russian language text.

Question 8: Johnston, T.H. *The Oxford Companion to American History* (1966), quoted in Kelly, Nigel *The First World War* Edinburgh: Heinemann, 1990, p47.

Question 10: Denning, Michael. *China 1900-49.* London: Edward Arnold, 1981, p11.

Question 12: O'Callaghan, B. *A History of the Twentieth Century.* London: Longman, 1987, p211.
Fitzgerald, J. *Soviet-American Relations in the Nuclear Age.* Melbourne: Nelson, 1988, p80.

Question 13: Neil, K. *Our Changing Times.* Dublin: Gill and McMillan, 1975, p174.

Question 18: Grigsby, J.R.J. and Gurry, T.F. *The Turbulent Years.* Melbourne: Heinemann, 1984, p234.

Question 20: Barcan, A. et al. *Modern Australia* (2nd ed). Melbourne: Macmillan, 1982, p157.

Question 21: Curthoys, A. et al (eds). *Australians from 1939.* Sydney: Fairfax, Syme and Weldon, 1987, p67.

Question 22: Souter, Gavin. *Acts of Parliament: A narrative history of the Senate and House of Representatives, Commonwealth of Australia.* Melbourne: Melbourne University Press, 1988, pp463-464.

TERTIARY ENTRANCE EXAMINATION, 1992

QUESTION/ANSWER BOOKLET

HUMAN BIOLOGY

Please place one of your student identification labels in this box

SEA STUDENT NUMBER – In figures | | | | | | | | |

In words _____

_____

TIME ALLOWED FOR THIS PAPER

Reading time before commencing work: Ten minutes
Working time for paper: Three hours

MATERIAL REQUIRED/RECOMMENDED FOR THIS PAPER

TO BE PROVIDED BY THE SUPERVISOR

This Question/Answer Booklet comprising

PART I	Pages 3-16
PART II	Pages 18-34
PART III	Pages 35-36
Space for rough work	Pages 37-39

Separate Multiple Choice Answer Sheet
Standard Answer Book
Paper Binder

TO BE PROVIDED BY THE CANDIDATE

Standard Items: Pens, pencils, eraser or correction fluid, ruler

Special Items: A '2B' pencil for the Separate Multiple Choice Answer Sheet

IMPORTANT NOTE TO CANDIDATES

No other items may be taken into the examination room.

It is your responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you hand it to the supervisor BEFORE reading any further.

SEE PAGE 2

INSTRUCTIONS TO CANDIDATES

PART I Questions 1-40 80 marks
This part consists of multiple choice questions, which should be answered on the Separate Multiple Choice Answer Sheet.
USE A '2B' PENCIL.
DO NOT USE A BALL POINT OR INK PEN.

PART II Questions 41-50 80 marks
This part consists of ten (10) diagram and short answer questions. These MUST be answered in the spaces provided in this Question/Answer Booklet.
Write your answers in blue or black ball point or ink pen.
DO NOT WRITE ANY ANSWERS TO PART II QUESTIONS IN THE STANDARD ANSWER BOOK.

PART III Questions 51-54 40 marks
This part consists of four (4) extended answer questions.
Answer ONE question from Section A and ONE question from Section B.
The answers for PART III should be written in the Standard Answer Book in blue or black ball point pen or ink pen. Draw any diagrams in pencil.

At the end of the examination carefully check that you have placed your Student Identification Label, and that you have written your SEA Student Number in figures and words, in the spaces provided on the front cover of this Question/Answer Booklet and Standard Answer Book(s).

At the end of the examination, attach the Standard Answer Book to the back of your Question/Answer Booklet with the paper binder provided.

SEE PAGE 3

PART I

Mark your answers to questions 1-40 on the **SEPARATE MULTIPLE CHOICE ANSWER SHEET**, using a "2B" pencil. If you make an error follow the instructions given to you on the answer sheet.

IN EACH QUESTION CHOOSE THE BEST ALTERNATIVE.

1. Substances identified in four urine samples are shown below. Which sample indicates **NORMAL** kidney function ?

(a) Sample A: Potassium, urea, sodium and creatinine present.
(b) Sample B: Potassium, sodium, glucose and protein present.
(c) Sample C: Urea, sodium, glucose, and creatinine present.
(d) Sample D: Potassium, urea, sodium and glucose present.

2. The normal concentration of protein in

(a) urine is greater than in blood.
(b) glomerular filtrate is less than in urine.
(c) blood is greater than in urine.
(d) blood and in urine is the same.

3. Urine passes from the

(a) kidney to bladder to ureter.
(b) glomerulus to urethra to ureter.
(c) urethra to bladder to ureter.
(d) ureter to bladder to urethra.

4. Antidiuretic Hormone (ADH) makes the walls of the kidney tubules more permeable to

(a) sodium.
(b) potassium.
(c) water.
(d) all of the above.

SEE NEXT PAGE

5. "A standard drink" is defined as any drink that contains about 10 grams of alcohol. To ensure that alcohol intake does not impair health, the daily alcohol limit for an average sized woman should be

(a) none. Any amount of alcohol is unsafe.
(b) 1 standard drink.
(c) 2 standard drinks.
(d) 3 standard drinks.

6. The target organ for Follicle Stimulating Hormone (FSH) is the

(a) uterine tube.
(b) ovary.
(c) uterus.
(d) vagina.

7. When blood sugar level increases, a hormone is secreted from an endocrine gland and blood sugar level returns to normal. With reference to this statement, which of the following is the **CORRECT** sequence ?

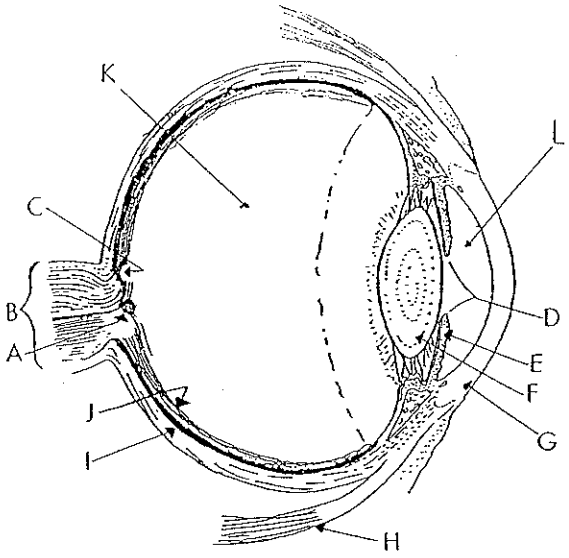
(a) Stimulus, receptor, modulator, response, effector.
(b) Modulator, stimulus, receptor, effector, response.
(c) Stimulus, receptor, modulator, effector, response.
(d) Stimulus, effector, modulator, receptor, response.

8. After removal of a gland, a patient was unable to regulate body temperature effectively. The gland removed was the

(a) thyroid.
(b) pancreas.
(c) thymus.
(d) adrenal gland.

SEE NEXT PAGE

Questions 9 and 10 refer to the diagram below of the human eye.



9. Which of the following is **CORRECT** ?

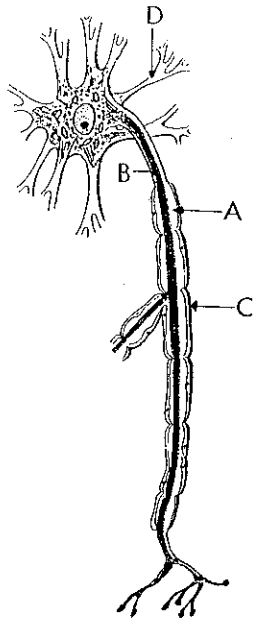
(a) **K** contains aqueous humour.
(b) Structure **G** is involved in accommodation.
(c) Visual discrimination is highest at structure **A**.
(d) Structure **E** is involved in controlling the amount of light entering the eye.

10. Which of the following is **INCORRECT** ?

(a) Structure **J** is involved in generating nerve impulses.
(b) Structure **I** prevents internal reflection of light.
(c) Structure **B** consists of nerve fibres.
(d) Structure **C** consists mainly of rods.

SEE NEXT PAGE

Question 11 refers to the diagram below of a nerve cell (neuron).



11. In the diagram

(a) **A** is the neurilemma, **B** is the axon, **C** is the myelin sheath, **D** is a dendrite.
(b) **A** is the neurilemma, **B** is the myelin sheath, **C** is a dendrite, **D** is the axon.
(c) **A** is the myelin sheath, **B** is the axon, **C** is the neurilemma, **D** is a dendrite.
(d) **A** is the myelin sheath, **B** is the dendrite, **C** is the neurilemma, **D** is an axon.

12. Which of the following groups of drugs includes **one** which is depressant to the nervous system **AND one** which is hallucinogenic ?

(a) Alcohol, caffeine, amphetamines, nicotine.
(b) Caffeine, amphetamines, cocaine, LSD.
(c) Amphetamines, nicotine, alcohol, caffeine.
(d) Cocaine, alcohol, LSD, caffeine.

SEE NEXT PAGE

13. After a head injury a person had difficulty in maintaining balance. Which part of the brain was **MOST LIKELY** to have been damaged ?

(a) Cerebellum.
(b) Cerebrum.
(c) Hypothalamus.
(d) Medulla.

14. Some characteristics of four different persons are described below. Which person would you expect to belong to a race that was adapted to a hot dry climate ?

(a) Person A: tall, muscular with blonde hair and blue eyes.
(b) Person B: short and stocky with dark skin and curly hair.
(c) Person C: short, rounded body shape with a well developed epicanthic fold.
(d) Person D: tall, slender build with dark skin.

Question 15 refers to the following report:

During the excavation of an ancient Aboriginal living site the following items were found:

(i) a layer of charcoal containing kangaroo and reptile bones.
(ii) a fragment of human cranium.
(iii) lumps of ochre with flattened surfaces indicating that they had been used to mark objects.
(iv) a human tooth with a hole drilled through it.
(v) chips of stone left over from tool manufacture.
(vi) lumps of resin from trees that grew several kilometres away.
(vii) pollen grains from plants that used to grow in the area.

15. Which of the following is a **CORRECT** list of all the items that could be used as evidence of Aboriginal culture ?

(a) Kangaroo and reptile bones, pollen grains, ochre.
(b) Human cranium, ochre, human tooth, stone chips, resin.
(c) Charcoal, kangaroo and reptile bones, ochre, human tooth, stone chips, resin.
(d) Charcoal, kangaroo and reptile bones, human cranium, ochre, human tooth, resin.

SEE NEXT PAGE

16. It is estimated that when Europeans first arrived in Australia the Aboriginal population was about 300 000. The reason for this relatively low population was that

(a) Aborigines had not been in Australia long enough to build up larger numbers.
(b) Aborigines had not yet migrated to all parts of the Australian continent.
(c) large parts of Australia were uninhabitable.
(d) Aborigines practised a hunting and gathering lifestyle.

17. Most scientists believe that Australian Aborigines entered Australia from

(a) South East Asia.
(b) Polynesia, through Tasmania.
(c) Africa by island hopping.
(d) Papua New Guinea and the islands of Melanesia.

18. It is believed that Aborigines entered Australia

(a) 40 000 years ago.
(b) between 60 000 and 100 000 years ago.
(c) 80 000 years ago.
(d) between 100 000 and 140 000 years ago.

19. Before Europeans colonised Australia the Aborigines lived in groups of varying sizes. The availability of resources and the location of the resources determined the population density in a particular locality. Which of the following sets of conditions would have resulted in the greatest population density ?

	Availability of Resources	Location of Resources
(a)	Poor	Spread out
(b)	Good	Spread out
(c)	Poor	Concentrated
(d)	Good	Concentrated

SEE NEXT PAGE

20. In 1798, Thomas Malthus, a British economist, published an essay in which he claimed that human populations constantly tend to outstrip their food supplies. He predicted that starvation, disease, warfare and other natural disasters would limit the growth of human populations. Malthus' predictions

(a) do not apply to the human species because advances in technology are able to keep up with increased requirements for food.
(b) do not apply to humans because modern contraceptives are very effective at limiting population growth.
(c) could prove to be correct because the earth is now approaching the limit of population it can support.
(d) are probably correct but are not likely to occur within the next two hundred years.

21. Reduction in the ozone content of the earth's upper atmosphere is a serious problem because

(a) more heat radiation will pass through the atmosphere resulting in global warming.
(b) more ultraviolet radiation will pass through the atmosphere resulting in increased incidence of skin cancers.
(c) changing the balance of gases in the atmosphere could result in respiratory problems, especially for the elderly.
(d) changing gas composition of the atmosphere could increase the rate of mutations in living organisms.

22. In the table below column **X** shows world energy sources that are used today and column **Y** shows sources of energy that may be more widely utilised in the future. Which row of the table correctly shows the **MAIN** source of the world's energy at present and the **MOST DESIRABLE** energy source for the future ?

	X	Y
(a)	Fossil fuel	Renewable energy
(b)	Coal	Solar energy
(c)	Nuclear energy	Hydroelectricity
(d)	Oil	Nuclear energy

SEE NEXT PAGE

23. Which of the following is **INCORRECT** ?

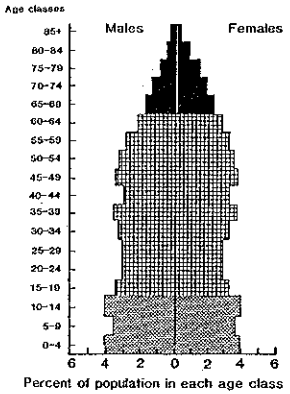
Manufacturing goods from recycled waste is generally preferable to manufacturing from raw materials because

(a) less energy is required.
(b) fewer pollutants are produced.
(c) it is usually cheaper.
(d) finite resources are conserved.

24. An ecosystem is

(a) all the organisms living in an area.
(b) an area that contains living organisms.
(c) all the organisms in an area and the physical environment in which they live.
(d) a system of interactions between organisms in an area.

Question 25 refers to the population pyramid below



25. The population pyramid shown is for a country that has a

(a) high birth rate and high death rate.
(b) low birth rate and low death rate.
(c) high birth rate and low death rate.
(d) low birth rate and high death rate.

SEE NEXT PAGE

26. In the table below, which row is **MOST CORRECT** ?

MILLIONS OF YEARS AGO

	BEGINNING OF LIFE ON EARTH	EVOLUTION OF EARLIEST PRIMATES	APPEARANCE OF FIRST HOMINIDS
(a)	4000	65	5 to 10
(b)	6000	95	8 to 12
(c)	4000	35	3 to 5
(d)	6000	115	18 to 19

27. Which of the following is the **CORRECT** way to calculate change in a population ?

(a) Change = (births – deaths) + (emigration – immigration).
(b) Change = (births – immigration) + (emigration – deaths).
(c) Change = (births + emigration) – (deaths + immigration).
(d) Change = (births + immigration) – (deaths + emigration).

28. Which of the factors in the following list may determine the future growth of human populations ?

1. population density
2. effects of pollution
3. availability of resources
4. laws and customs of each society

(a) 2 and 3.
(b) 1, 2 and 3.
(c) 2, 3 and 4.
(d) 1, 2, 3 and 4.

SEE NEXT PAGE

29. Which of the following statements is **CORRECT** ?

(a) All australopithecines so far discovered have been classified in the same species.
(b) It is unlikely that australopithecines manufactured tools.
(c) Australopithecines were able to walk bipedally.
(d) Australopithecines are a common ancestor of both the great apes and humans.

30. Which one of the following characteristics could **NOT** be used to decide whether a particular primate should be classified as a hominid or a pongid ?

(a) Number of incisor teeth.
(b) Arches formed by the bones of the foot.
(c) Shape of the tooth row (dental arcade).
(d) Relative size of canine teeth.

31. *Ramapithecus* fossils have characteristics that are

(a) more like hominids than pongids.
(b) more like pongids than hominids.
(c) both pongid and hominid.
(d) neither pongid nor hominid.

32. The foramen magnum is

(a) an area at the back of the skull for attachment of neck muscles.
(b) a gap in the tooth row to accommodate large canines.
(c) a thickened area of the skull which rests on the vertebral column.
(d) a hole in the base of the skull through which the spinal cord passes.

33. It is believed that primates evolved from a tree living ancestor. Which of the following primate characteristics would **NOT** have developed as an adaptation to life in trees ?

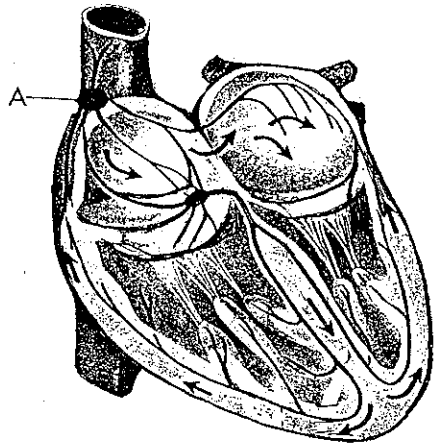
(a) Forward facing eyes.
(b) Nails on the ends of the digits.
(c) Opposable first digit.
(d) Bony orbits (eye sockets) around each eye.

SEE NEXT PAGE

34. Evidence indicates that the first humans to change from a nomadic to a village way of life lived in

(a) the Middle East.
(b) Western Europe.
(c) Africa.
(d) the Americas.

Question 35 refers to the diagram below illustrating the chambers of the heart and the direction of impulses through the conducting system.



35. Which of the following is **CORRECT** ?

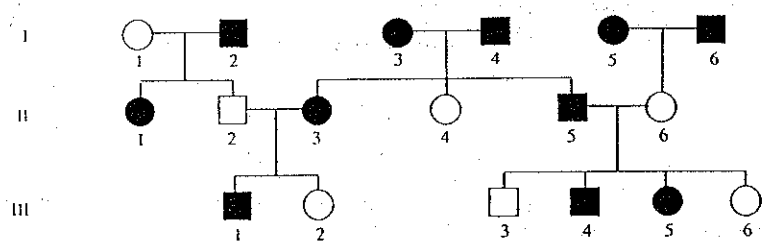
(a) **A** is stimulated by sympathetic nerve fibres to increase heart rate.
(b) **A** is inhibited by sympathetic nerve fibres to increase heart rate.
(c) **A** is stimulated by parasympathetic nerve fibres to increase heart rate.
(d) **A** is inhibited by parasympathetic nerve fibres to increase heart rate.

SEE NEXT PAGE

36. In a mating between two individuals both of the genotype **Pp** it can be predicted that any progeny will be

(a) homozygous dominant, heterozygous and homozygous recessive genotypes in the ratio 1:1:1.
(b) heterozygous and homozygous recessive genotypes in the ratio 1:1.
(c) dominant and recessive phenotypes in the ratio 1:1.
(d) dominant and recessive phenotypes in the ratio 3:1.

Question 37 refers to the pedigree below



Six statements have been made about this pedigree:

1. **III** 4 has three sisters.
2. **III** 4 has three brothers.
3. **III** 4 is the grandson of **I** 3.
4. **III** 4 is the grand-daughter of **I** 1.
5. **III** 4 has two uncles and two cousins
6. **III** 4 has two aunts and two cousins.

37. Which of the six statements are **CORRECT** ?

(a) 1 and 3.
(b) 2 and 4.
(c) 3 and 6.
(d) 2, 4 and 5.

SEE NEXT PAGE

38. Which of the following statements is **INCORRECT** ?

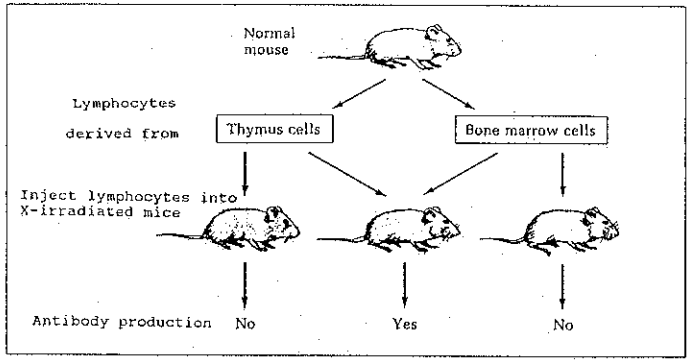
(a) Mutations are kept at low frequency in the population by the action of natural selection.
(b) Ionising radiation, such as X rays, increases the mutation of genes in direct proportion to the radiation dosage.
(c) Most mutations result in unfavourable characteristics.
(d) Changes in a physical characteristic of a population can only come about following the mutation of a gene.

39. Lymph nodes

(a) increase in number in response to infective agents.
(b) enlarge in response to infective agents.
(c) are evenly distributed throughout the body.
(d) are the functional units of organs such as the tonsils and thymus.

SEE NEXT PAGE

Question 40 refers to the experiment illustrated below. The reason for the experiment was to test the role of lymphocytes derived from the bone marrow and thymus in the production of circulating antibodies. The experiment utilised X-irradiated mice so the lymphocytes of these animals could no longer produce antibodies.



40. The experiment indicates that

(a) only thymus cells are required for the production of antibody.
(b) only bone marrow cells are required for the production of antibody.
(c) both thymus cells and bone marrow cells are required for the production of antibody.
(d) insufficient data is given to be able to draw any conclusions about what cells are required for the production of antibody.

END OF PART I

SEE NEXT PAGE

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SEE NEXT PAGE

PART II

Answer **ALL** questions in the spaces provided with each question. **DO NOT** answer questions from this section in the answer booklet intended for your essay answers.

QUESTION 41.

Howard Florey, an Australian scientist working at Oxford, discovered that penicillin was able to cure bacterial infections. The crucial experiment in the discovery was performed on 25 May, 1940. At 11.00 am on that day each of eight mice was injected with a dose of 100 million streptococci, a type of bacterium. The mice were of the same weight and age and it was known from previous experiments that a dose of that size would kill 100% of mice injected.

After the injection with the streptococci four of the mice were put back in their cages with no further treatment. Of the four remaining mice, two were labelled "A" and two were labelled "B". One hour after injection of the bacteria the group A mice were injected with 10 milligrams of penicillin and the group B mice were injected with 5 milligrams of penicillin. No further treatment was given to group A but the group B mice were given four more injections of penicillin, each of 5 milligrams, over a period of 12 hours.

The results of this historic experiment are shown in the table below.

Treatment	Mouse								
Penicillin	A	1	10 mg						survived 4 days
		2	10 mg						survived 6 days
	B	3	5 mg	5 mg	5 mg	5 mg	5 mg		survived 13 days
		4	5 mg	5 mg	5 mg	5 mg	5 mg		survived 6 weeks+
No penicillin		5						died	
		6							died
		7							died
		8							died

2 4 6 8 10 12 14 16

100 million streptococci injected

Hours after infection

(a) Name **THREE** variables that were controlled in Florey's experiment.

(3 marks)

SEE NEXT PAGE

41. (continued)

(b) Explain why four of the mice were given a lethal dose of streptococci but no penicillin.

(1 mark)

(c) For the experiment described, what was the

(i) independent variable ?

(ii) dependent variable ?

(2 marks)

(d) What conclusions could be drawn from the results of Florey's experiment ?

(2 marks)

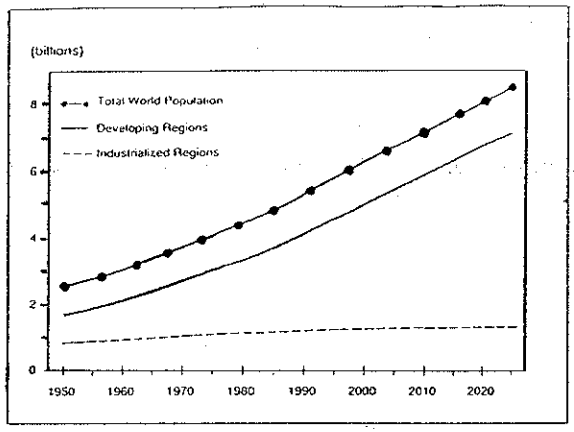
(e) After the experiment described, Florey performed many similar experiments. Why is it necessary to repeat an experiment a number of times ?

(1 mark)

SEE NEXT PAGE

QUESTION 42 on the opposite page (PAGE 21) refers to Graphs **A** and **B** below showing world population growth and predicted future growth for the years 1950 to 2025.

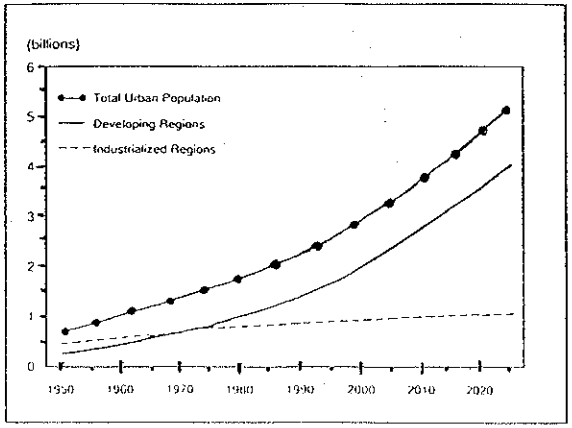
World Population Growth



← A

Source: United Nations Population Division, *World Population Prospects 1988* (United Nations, New York, 1989).

Urban Population Growth, 1950–2025



← B

Source: United Nations Population Division, *World Population Prospects 1988* (United Nations, New York, 1989).

SEE NEXT PAGE

QUESTION 42

Examine Graphs **A** and **B** on the opposite page and answer the following questions.

(a) By how much is world population expected to grow in the 30 years between 1990 and 2020 ?

(1 mark)

(b) In 1990, what percentage of the world's population lived in urban areas ?

(1 mark)

(c) From the data in the graphs what regions of the world will experience the greatest population growth in the next 30 years ?

(1 mark)

(d) Will future population growth occur mainly in rural or urban areas ?

(1 mark)

SEE NEXT PAGE

QUESTION 42 (continued)

The table below shows some population statistics for the world as a whole and for selected countries. Use the data in the table to answer parts (e) - (g) of this question on the page opposite (PAGE 23).

Trends in Births, Life Expectancy, Fertility, and Age Structure, 1965-90

	Crude Birth Rate (births per 1,000 population)		Life Expectancy at Birth (years)		Total Fertility Rate		Percentage of Population in Specific Age Groups					
							1970			1990		
	1965-70	1985-90	1965-70	1985-90	1965-70	1985-90	<15	15-65	>65	<15	15-65	>65
WORLD	33.9	27.1	54.9	61.5	5.9	3.3	37.5	57.1	5.4	32.4	59.4	8.2
ASIA	38.4	27.6	53.3	61.1	5.7	3.5	40.4	56.6	4.0	32.8	62.2	5.0
Afghanistan	53.2	49.3	36.0	39.0	7.1	6.9	42.9	57.1	2.2	42.0	55.2	2.8
Bahrain	43.4	28.2	60.0	70.6	7.0	4.1	46.0	54.0	2.5	32.7	65.3	2.0
Bangladesh	47.5	42.2	43.3	49.6	6.9	5.5	45.4	54.6	3.5	43.9	53.2	2.9
Bhutan	41.8	38.3	40.6	47.9	5.9	5.5	40.3	55.7	3.2	39.7	56.9	3.4
China	36.9	20.5	59.6	69.4	6.0	2.4	39.7	56.1	4.3	26.2	68.0	5.8
Cyprus	21.0	18.6	70.3	74.6	2.8	2.3	31.1	66.4	10.1	25.6	64.1	10.3
India	40.2	32.0	48.0	57.9	5.7	4.3	40.4	56.1	3.7	36.5	59.0	4.5
Indonesia	42.6	27.4	45.1	56.0	5.6	3.3	42.2	54.6	3.1	35.0	61.1	3.9
Iran, Islamic Rep	45.3	42.4	53.2	59.0	7.0	5.6	46.2	50.1	3.1	43.9	52.9	3.2
Iraq	48.8	42.6	53.0	63.9	7.2	6.4	46.6	49.1	2.4	46.4	50.9	2.7
Israel	25.5	21.6	70.8	75.1	3.8	2.9	33.1	56.8	6.7	30.9	60.2	8.9
Japan	17.8	11.4	71.1	77.2	2.0	1.7	24.0	68.9	7.1	18.5	69.8	11.7
Jordan	52.5	45.9	51.7	66.0	8.0	7.2	45.9	51.0	3.1	47.9	49.6	2.5
Kampuchea, Dem	43.9	41.4	45.4	48.4	6.2	4.7	43.2	54.4	2.8	34.9	62.2	2.9
Korea, Dem People's Rep	38.8	28.9	57.6	69.4	5.7	3.6	43.9	49.4	3.5	37.0	59.2	3.8
Korea, Rep	31.9	18.8	57.6	69.4	4.5	2.0	42.0	50.9	3.3	26.5	68.8	4.7
Kuwait	49.7	32.3	64.4	72.7	7.5	4.8	43.4	53.5	1.7	38.7	59.8	1.5
Lao People's Dem Rep	44.4	41.3	40.4	52.0	6.2	5.7	42.3	54.9	2.6	42.6	54.4	3.0
Lebanon	38.8	28.9	62.9	67.2	6.1	3.4	43.9	52.6	4.9	35.3	59.6	5.1
Malaysia	38.5	28.6	59.4	68.6	5.9	3.5	44.6	52.1	3.4	35.2	60.9	3.8
Mongolia	41.9	38.9	58.0	64.5	5.9	5.4	43.8	54.5	3.2	41.8	54.9	3.3
Myanmar	39.1	30.6	49.5	60.0	5.7	4.0	41.2	55.1	3.7	37.2	58.7	4.1
Nepal	45.5	39.6	41.0	47.9	6.2	5.9	41.3	56.1	3.0	42.2	54.7	3.1
Oman	50.0	46.0	43.8	55.4	7.2	7.2	44.1	52.7	2.7	45.8	51.7	2.5
Pakistan	47.8	47.0	46.8	52.1	7.0	6.5	46.3	50.7	3.2	45.7	51.6	2.7
Philippines	40.2	33.2	56.2	63.5	6.0	4.3	45.4	51.9	2.7	40.1	56.5	3.4
Qatar	37.0	30.8	59.0	69.2	7.0	5.6	36.7	60.1	1.7	35.1	63.1	1.8
Saudi Arabia	48.1	42.0	49.9	63.7	7.3	7.2	44.5	52.8	3.2	45.4	52.0	2.6
Singapore	24.9	16.5	67.9	72.8	3.5	1.7	38.7	59.6	3.4	22.8	71.6	5.6
Sri Lanka	31.5	22.5	64.2	70.0	4.7	2.7	41.9	54.8	3.6	32.5	62.3	5.2
Syrian Arab Rep	47.6	44.1	54.0	65.0	7.8	6.8	48.9	47.7	4.4	48.1	49.3	2.5
Thailand	41.8	22.3	56.7	64.2	6.1	2.6	46.2	50.2	3.0	32.7	63.4	3.9
Turkey	39.0	28.4	54.9	64.1	5.6	3.6	41.1	54.5	4.4	34.3	61.4	4.3
United Arab Emirates	38.5	22.6	59.0	69.2	6.8	4.8	34.9	62.1	2.4	31.1	67.2	1.7
Viet Nam	38.3	31.9	47.9	60.8	5.9	4.1	43.8	51.8	4.3	39.2	56.4	4.4
Yemen Arab Rep	48.8	47.9	40.9	50.9	7.0	7.0	43.0	54.6	3.1	48.1	48.7	3.2
Yemen, People's Dem Rep	49.0	47.3	40.9	50.9	7.0	6.7	45.4	50.3	2.6	44.7	52.5	2.8
EUROPE	17.7	13.0	70.6	74.0	2.5	1.7	24.9	72.5	11.4	19.7	66.9	13.4
Albania	34.8	24.0	66.2	72.1	5.1	3.0	42.4	46.2	4.4	32.6	62.1	5.3
Austria	17.0	11.6	69.8	73.9	2.5	1.5	24.5	61.4	14.1	17.6	67.4	15.0
Belgium	15.5	11.7	70.9	74.3	2.3	1.6	23.6	72.0	13.4	18.1	67.2	14.7
Bulgaria	15.8	12.7	70.8	72.6	2.2	1.9	22.8	63.1	9.6	20.0	67.0	13.0
Czechoslovakia	15.5	14.0	70.1	72.0	2.1	2.0	23.2	63.4	11.2	23.3	65.1	11.6
Denmark	16.6	10.7	72.9	75.1	2.2	1.5	23.3	67.1	12.3	17.0	67.5	15.5
Finland	16.3	12.5	69.6	74.6	2.1	1.7	24.6	64.2	9.2	19.3	67.5	13.2
France	17.1	14.0	71.5	75.2	2.6	1.9	24.8	62.5	12.9	20.2	66.0	13.8
German Dem Rep	15.1	12.9	71.3	73.1	2.3	1.7	23.4	67.4	15.5	19.8	67.1	13.1
Germany, Fed Rep	16.6	10.4	70.3	74.5	2.3	1.4	23.2	63.9	13.2	14.9	69.7	15.4
Greece	18.0	11.9	71.0	74.8	2.4	1.7	24.9	64.9	11.1	19.7	66.6	13.7
Hungary	14.3	11.6	69.6	71.3	2.0	1.8	20.8	68.1	11.5	19.9	66.7	13.4
Iceland	22.5	16.8	73.4	77.1	3.2	2.1	32.4	56.1	8.9	25.1	64.5	10.4
Ireland	21.5	18.1	71.1	73.8	3.9	2.5	31.1	60.0	11.2	27.7	62.0	10.3
Italy	18.3	10.8	71.0	75.2	2.5	1.5	24.5	64.3	10.9	17.1	68.7	14.2
Luxembourg	14.5	11.5	69.9	71.9	2.2	1.5	22.0	67.1	12.5	17.1	69.5	13.4
Malta	16.6	14.7	69.4	72.7	2.2	1.9	27.6	59.5	9.0	23.1	66.7	10.2
Netherlands	19.2	11.8	73.6	76.5	2.7	1.5	27.3	63.7	10.2	17.8	69.3	12.9
Norway	17.7	12.4	73.8	76.4	2.7	1.7	24.5	65.3	12.9	18.8	64.8	16.4
Poland	16.6	16.4	69.9	72.4	2.3	2.2	27.0	60.1	8.2	25.2	64.8	10.0
Portugal	21.4	13.5	66.1	73.0	2.9	1.8	28.8	62.0	9.2	21.2	65.9	12.9
Romania	21.3	15.5	69.0	71.1	3.1	2.2	25.9	65.5	8.6	23.4	66.3	10.3
Spain	20.5	12.8	71.6	75.0	2.9	1.7	27.9	62.3	9.8	20.4	66.6	13.0
Sweden	14.8	11.2	74.1	76.8	2.1	1.7	20.8	65.5	13.7	18.5	65.2	16.3
Switzerland	17.7	11.7	72.2	76.5	2.3	1.6	23.3	65.3	11.4	16.4	68.3	15.3
United Kingdom	17.6	13.4	71.4	74.5	2.5	1.8	24.2	62.5	12.9	18.9	65.6	15.5
Yugoslavia	19.8	15.0	66.6	71.7	2.5	2.0	27.5	64.7	7.8	22.9	68.0	9.1
OCEANIA	24.5	20.1	64.2	69.1	3.5	2.6	32.2	60.5	7.3	26.8	64.1	9.1
Australia	19.8	15.0	70.9	75.7	2.9	1.9	28.8	60.9	8.3	22.2	66.8	11.0
Fiji	32.0	27.3	62.7	70.4	4.6	3.2	43.5	55.5	2.4	36.7	59.4	3.9
New Zealand	22.6	15.6	71.3	74.5	3.2	1.9	31.7	59.5	8.5	22.5	66.5	11.0
Papua New Guinea	42.4	36.7	45.1	54.0	6.2	5.7	42.1	54.5	3.0	42.0	55.4	2.6
Solomon Islands	X	X	X	X	X	X	X	X	X	X	X	X

Source: United Nations Population Division
Notes: X = not available

SEE NEXT PAGE

QUESTION 42 (continued)

Use the data in the table (ON PAGE 22) to answer parts (e) - (g) of this question.

(e) For a child born in 1969 what was the life expectancy of that child (in years)

(i) for the world ? _____

(ii) in Australia ? _____

(2 marks)

(f) How does the birth rate in Australia for 1985-1990 compare with that of

(i) Pakistan ? _____

_____

(ii) Sweden ? _____

_____

(2 marks)

(g) In 1990

(i) What percentage of the Australian population was over 65 years of age ?

_____

(ii) How does the Australian figure for percentage of the population over 65 years compare with that for Japan ?

_____

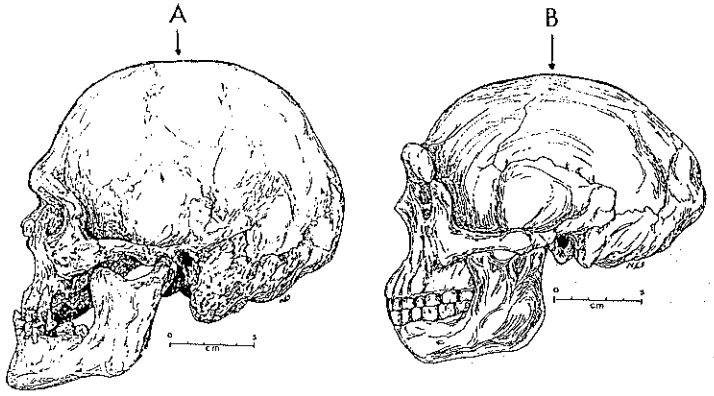
_____

(2 marks)

SEE NEXT PAGE

QUESTION 43

The diagrams below show two fossil skulls (with mandibles). Both diagrams are drawn to the same scale.



(a) Skull **A** was dated at 50 000 years while skull **B** was found to be about 200 000 years old. Which of the skulls could have been dated using the radiocarbon (carbon-14) dating method ? Explain your answer fully.

(3 marks)

SEE NEXT PAGE

QUESTION 43 (continued)

(b) List **FOUR** features, that can be seen on the drawings of the skulls (and mandibles) which indicate that skull **B** is older than skull **A**.

(4 marks)

(c) When skull **A** is described as being 50 000 years old is this a relative date or an absolute date ? In your answer explain the difference between an absolute and a relative date.

(2 marks)

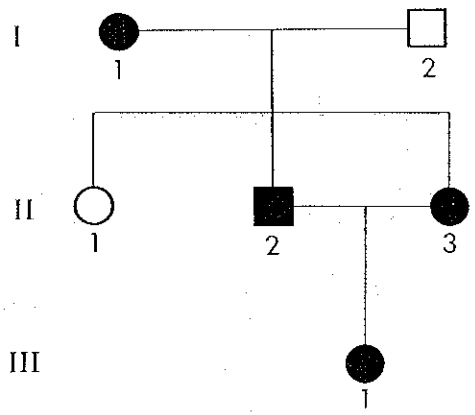
(d) The scientists who found skull **A** also found, in the same sedimentary deposit, some tools made of bone. Explain how fluorine dating could be used to decide whether the skull and the bone tools were of the same age.

(2 marks)

SEE NEXT PAGE

QUESTION 44.

(a) The black hair of guinea pigs is produced by a dominant gene **B** and white hair is produced by its recessive allele **b**. In the pedigree below solid symbols (eg. /) represent black guinea pigs and open symbols (eg. ○/□) represent white guinea pigs.



Complete the information about individuals **I** 1, **II** 1 and **III** 1 in the table below

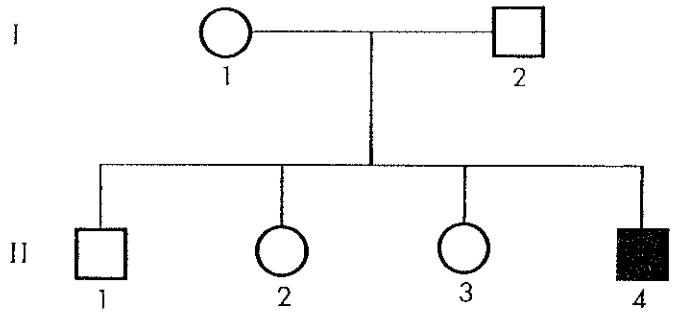
Individuals	Phenotype	Sex	Genotype/s
I 1			
II 1			
III 1			

(4 marks)

SEE NEXT PAGE

QUESTION 44. (continued)

Haemophilia is due to a recessive X-linked gene (**h**) that prolongs blood-clotting time. From the information in the pedigree below, answer the following questions.



(b) What is the **genotype** of **I** 1 ? Explain how you arrived at your answer.

(3 marks)

(c) If the mother of **I** 1 was a haemophiliac, what **phenotype** was the father of **I** 1 ? Explain your reasoning.

(2 marks)

SEE NEXT PAGE

QUESTION 45.

Homeostatic mechanisms operating during exercise include those responsible for the regulation of oxygen, carbon dioxide and sugar in the blood.

Insert a word or words (in each of the spaces provided) that **CORRECTLY** complete each of the following sentences. NOTE: 1 mark is allocated for each correct sentence.

1. Breathing rate and depth of breathing are controlled by a respiratory centre located in the _____ of the brain.

2. This respiratory centre receives information about the concentration of oxygen which is detected by _____ which are a group of cells located in the walls of the _____ and _____.

3. Exercise requires more oxygen to be delivered to the muscles by increasing cardiac output. Cardiac output is directly increased by increasing _____ and _____.

4. More blood, and hence oxygen, can also be delivered to the muscle tissue by _____ of blood vessels that supply the muscles.

5. This effect on the blood vessels in the muscles is partly brought about by the accumulation of wastes such as _____ in the muscle tissue.

SEE NEXT PAGE

45. (continued)

6. Blood sugar is in the form of _____.

7. Three hormones that influence the level of blood sugar are:
   (i) _____.
   (ii) _____.
   (iii) _____.

8. Excess sugar in the blood can be stored in the liver and in muscle cells by first converting it to a form called _____.

9. This conversion is stimulated by the hormone _____.

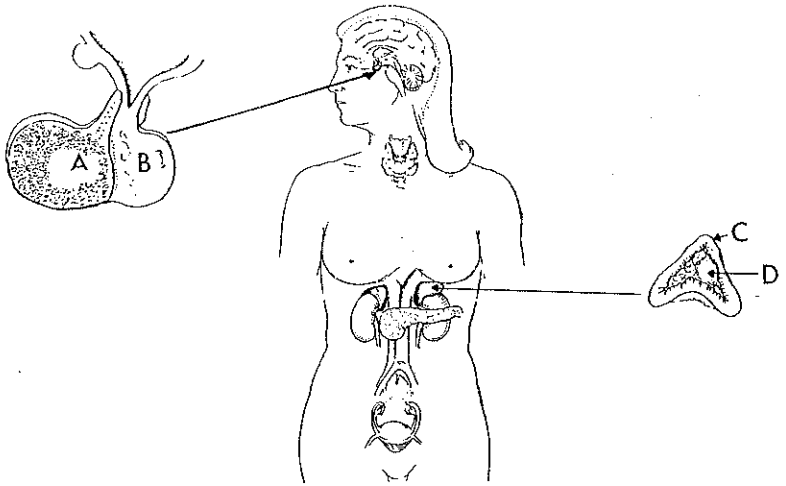
10. When blood sugar is required for body activity such as exercise it can be released from storage in muscle cells by a process called _____ which is stimulated by the hormone _____.

(10 marks)

SEE NEXT PAGE

QUESTION 46

Question 46 refers to the diagram below showing the position of some of the endocrine glands of the body.



In the table below name **ONE** hormone which is secreted from each of the structures labelled **A**, **B**, **C** and **D**.

A. _____

B. _____

C. _____

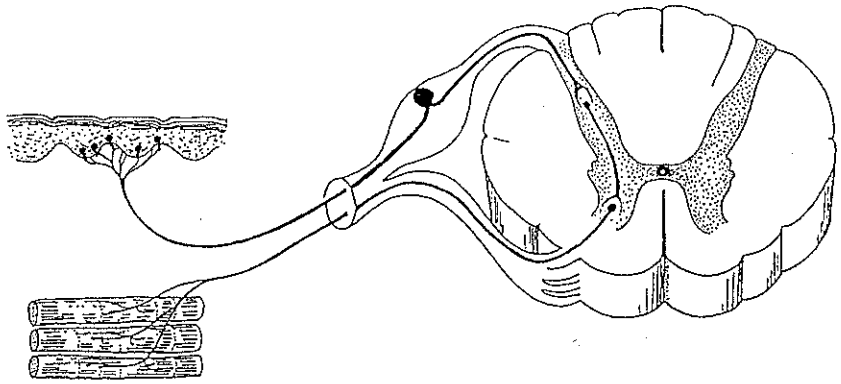
D. _____

(4 marks)

SEE NEXT PAGE

QUESTION 47.

Question 47 refers to the diagram below of a transverse section of the spinal cord.



Using labels **A-J** clearly label **EACH** of the following on the diagram:

A Receptor.
B Effector.
C Cell body of sensory neuron.
D Axon of sensory neuron.
E Grey matter of spinal cord.
F Central canal.
G White matter of spinal cord.
H Axon of motor neuron.
I Cell body of motor neuron.
J Interneuron (connector neuron).

(10 marks)

SEE NEXT PAGE

QUESTION 48

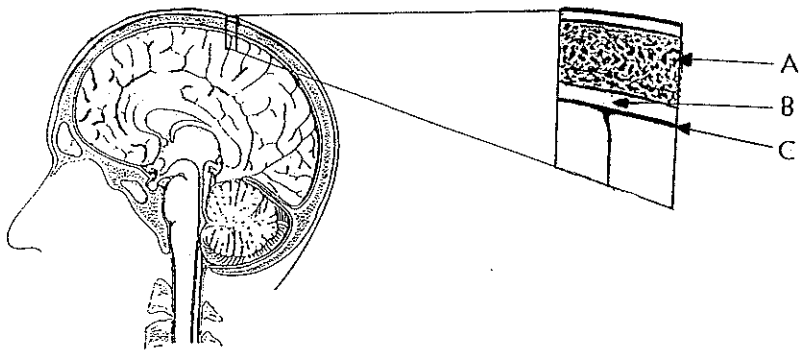
When flying in an aeroplane a passenger can experience pain inside the ear during the descent. This can be worse when the passenger suffers a head cold. Explain, with reference to the two main structures involved, what happens in these circumstances and what serious event could occur to one of the structures in extreme cases.

(5 marks)

SEE NEXT PAGE

QUESTION 49

Identify **A**, **B** and **C** in the diagram below and describe how each contributes to the protection of the brain.



A

B

C

(6 marks)

SEE NEXT PAGE

QUESTION 50.

(a) It is recommended that infants be immunised against polio and diphtheria. What is meant by the term "immunisation" ?

(3 marks)

(b) What is a "vaccine" ?

(2 marks)

(c) Vaccines are of different types depending on how they are produced. Give **ONE** example of a type of vaccine.

(1 mark)

END OF PART II

SEE NEXT PAGE

PART III

Answer **ONE** question from **SECTION A** and **ONE** question from **SECTION B**. Write your answers in the **STANDARD ANSWER BOOK**. Illustrate your answers with diagrams where appropriate. Up to **TWO MARKS** may be deducted for poorly structured answers ie. answers in point form or diagrams not explained in the text of your answer. **DO NOT WRITE YOUR ANSWERS IN PENCIL.**

SECTION A

(ANSWER EITHER QUESTION 51 OR QUESTION 52 - NOT BOTH)

QUESTION 51.

(a) Describe the structure of the nephron including its blood supply. In your description explain how the structure of each part relates to the function that part performs.

(12 marks)

(b) Structures within the inner ear can detect movement of the head. Name these structures and describe how we become conscious that the head has moved in a particular direction.

(8 marks)

OR

QUESTION 52

Humans are surrounded by a large range of potentially infectious agents (pathogens).

(a) The simplest way to avoid infection is to prevent these pathogens from entering body tissues. Explain how each of the external defences that the human body possesses resists infection by pathogens.

(10 marks)

(b) Describe other defence mechanisms that operate if pathogens do penetrate the external defences and enter body tissues.

(10 marks)

SEE NEXT PAGE FOR SECTION B

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SECTION B

(ANSWER EITHER QUESTION 53 OR QUESTION 54 - NOT BOTH)

QUESTION 53.

(a) Describe the **culture** of *Homo erectus.*

(6 marks)

(b) It is believed that the different geographical races of the human species developed from a common ancestor. Discuss how differences in physical characteristics between races developed. Your answer should explain the importance of **EACH** of the following:

Migration
Isolation
Variation
Natural selection
Random genetic drift

(14 marks)

OR

QUESTION 54.

(a) Define demographic transition and explain the factors that contribute to the transition.

(4 marks)

(b) Pollution is a major factor in the degradation of our environment. Choose any **FOUR** of the pollutants listed below and for each discuss the sources of the pollutant, its effect on the environment and specific ways of reducing the damage caused by the pollutant.

Sulfur dioxide
Carbon monoxide
Carbon dioxide
Chlorofluorocarbons (CFCs)
Sewage
Radiation

(16 marks)

END OF QUESTIONS

SHEET FOR ROUGH WORK