

# WEST AFRICAN EXAMINATIONS COUNCIL NIGERIA

#### **Senior School Certificate Examination**

June 1993

#### **BIOLOGY 2**

2 hours 5 minutes

Do not open this booklet until you are told to do so. While you are waiting, read the following instructions carefully.

This paper consists of two sections. Answer Section A on your Objective Test answer sheet and Section B in your answer book. Section A will last for 50 minutes after which the answer sheets will be collected. Do **not** start Section B until you are told to do so. Section B will last for  $1\frac{1}{4}$  hours.

#### SECTION A

50 minutes

#### **OBJECTIVE TEST**

[60 marks]

- 1. Use HB pencil throughout.
- 2. If you have got a blank answer sheet, complete the top section of it as follows.
  - (a) In the space marked *Name*, write in capital letters your **surname** followed by your **other names**.
- (b) In the spaces marked Examination, Year, Subject and Paper, write 'S.S.C.E.', '1993 June', 'BIOLOGY' and '2', respectively.
- (c) In the box marked *Index Number*, write down your **index number** vertically in the spaces on the left-hand side. There are numbered spaces in line with each digit. Shade carefully the space with the same number as each digit.
- (d) In the box marked Subject Code, write down the digits 451024 in the spaces on the left-hand side. Shade the corresponding numbered spaces in the same way as for your index number.
  - (e) In the box marked Sex, shade the space marked M if you are male, or F if you are female.
- 3. If you have got a pre-printed answer sheet, check that the details are correctly printed, as described in 2 above. In the boxes marked *Index Number*, *Subject Code* and *Sex*, **reshade** each of the shaded spaces.
- 4. An example is given below. This is for a male candidate, whose name is Kehinde Adeolu KOLADE, whose **index number** is 41230068 and who is offering *Biology* 2.

# WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLO	CK LETTERS	,		lo <sub>n</sub> v	v.
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Subject:	Surname	Other Names			Peper: 2
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INDEX NUMBER																		
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If candidate is absent

shade this space:

### :00 :10 :20 :30 📫 :50 :60 :70 :80 :90 02 01 02 03 04 4 4 6 06 07 08 09 03 🖚 523 633 643 653 663 673 683 693 •• c1 2 c2 2 c3 2 c4 2 c5 2 c6 2 c7 2 c8 2 c9 cOp c1p 🗫 c3p c4p c5p c6p c7p c8p c9p c 0 > c 1 > c 2 > c 3 > 🖚 c 5 > c 6 > c 7 > c 8 > c 9 >

SUBJECT CODE

Indicate your sex by shading the space marked M (for Male) and F (for Female) in this box

INSTRUCTIONS TO CANDIDATES

- Use grade HB pencil throughout.

  Answer each question by choosing one letter and shading it like this: CA3 CB3 CC3 - CE3
- Erase completely any answers you wish to change.
- Leave extra spaces blank if the answer spaces provided are more than you need Do not make any markings across the heavy black marks at the right hand edge of

Answer all the questions.

Each question is followed by five options lettered A to E. Find out the correct option for each question and shade in pencil on your answer sheet the answer space which bears the same letter as the option you have chosen. Give only one answer to each question. An example is given below.

The cells that su	rround the	stoma	are	called
-------------------	------------	-------	-----	--------

- A. stomatal cells.
- B. parenchyma cells.
- C. epidermal cells.
- D. substomatal cells.
- E. guard cells.

The correct answer is guard cells, which is lettered E, and therefore answer space E would be shaded.

(A) (B) (C) (D)

Think carefully before you shade the answer spaces; erase completely any answers you wish to change.

Do all rough work on this question paper.

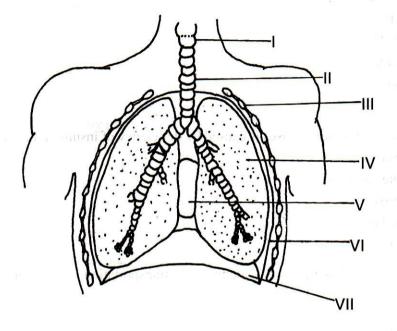
Now answer the following questions.

- 1. The organ which is sensitive to light in Euglena is the and I solve a solge of tall the
  - A. gullet.
  - B. chloroplast.
  - C. eye spot. abad? high dans the would ni soonge be to drug on a more than the
  - D. contractile vacuole.
  - E. flagellum.
- 2. Which of the following is a similarity between a typical animal cell and a typical plant cell? Presence of
- A. cellulose cell wall
  - B. chlorophyll
  - C. centrally-placed nucleus
  - D. cell membrane
  - E. large vacuole
  - 3. The first scientist to describe the cell was
    - A. Theodor Schwann.
    - B. Felix Dujardin.
    - C. Robert Hooke.
    - D. Charles Darwin.
    - E. Matthias Schleiden.

marked of the and F flore

- **4.** In which of the following parts of a cell is the chromosome found?
  - Nucleus A.
  - B. Golgi body
  - C. Cytoplasm
  - D. Cell membrane
  - Cell wall E.

Use the diagram below to answer Questions 5 to 8.



and the second of respiratory surface. it is a second the respiratory surface.

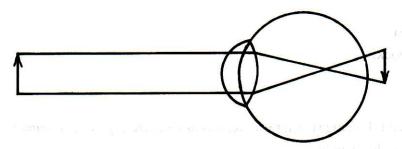
- 5. The part labelled VII is the
  - pleural cavity.
  - B. lung.
- Which o.C. rib.
  - D. diaphragm.
  - E. intercostal muscle.
  - 6. The part labelled I is the
    - epiglottis. A.
    - larynx. B.
    - C. oesophagus. isina moralullasiylum ni sacag lo agnadaxa luhkaarauk a iikka na
    - D.
    - bronchus. E.

7. Exchange of gases takes place in the air sacs contained in the part labelled

	A.	I.		
	B.	II.	Jum 60	
	C.	IV.		
	D.	V.	ender the	, CI
	E.	VI.		
8. moveme	D nt of	during the process of breathing, volume and pressure the parts labelled	changes occur as a	result of the
	A.	I and II.		
	B.	II and IV.		
	C.	III and VII.		
	D.	IV and V.		
	E.	VI and VII.		
9.	Whi	ich of the following diseases is caused by deficiency of in	isulin in the body?	
	A.	Malaria		
	B.	Diabetes mellitus	in /	
	C.	Hepatitis	2	
	D.	Gonorrhoea	191	
	E.	Cholera	(%)	
10. organism	ıs?	ch of the following is the medium of transportation	n of nutrients within	unicellular
	A. B.			
		Serum Protonlogm	the and one	
	C.	Protoplasm		
	D.	Plasma		
	E.	Lymph	dri	
11.	Whi	ch of the following blood vessels carries oxygenated blo	od into the heart?	
	A.	Pulmonary vein		A
	В.	Anterior vena cava		in s
	C.	Pulmonary artery	off and ballors, mag s	
	D.	Aorta	epiglotus.	
	E.	Posterior vena cava	larynx.	
12. following	The g exc	conditions that ensure successful exchange of gases in neept		s include the
	A.	concentration gradient across the respiratory surface.	bronchus.	-1
	B.	presence of thin membrane as the respiratory surface.		
	C.	fast transportation of absorbed gases.		
	D.	presence of large surface area of the respiratory organ.		
	E.	presence of small, dry surface area of the respiratory org	gan.	

13.	The	respiratory organ found in the cockroach is the	riscowi negati an	
	A.	air sac.		
	В.	trachea.		
	C.	lung book.	entre control programme a control programme and a programme an	
	D.	lung.		
	E.	gill.	on, we would	
14.	Whi	ich of the following structures functions as an excretory syste	em found in flat worn	ns?
	A.	Contractile vacuole		
	B.	Nephridium	on a visit of the second and a	118
	C.	Flame cell	in a summand f	
	D.	Malpighian tubule		
	E.	Kidney		
15.	Whi	ich of the following organs is associated with deamination of		
	A.	Lung		
	B.	Stomach Transport of the Australia Victoria and	paralle particulares	
	C.	Kidney	15171313	
	D.	Liver	80 974	
	E.	Heart	en herbridge	
16.	Ultr	afiltration in the kidney takes place in the		
	A.	loop of Henle.		
	B.	renal veint a centiship behaviour exhibited by animation laner	thick of the followin	
	C.	Bowman's capsule.	A. Fairma	
	D.	pelvis.		
	E.	pyramid.	- geomalous 1	
17. Which o	Who f the	en an axon is at rest, the concentration of ions on either side following is correct about the concentrations of ions on either	of the membrane are	different.
		There is an excess of potassium ions inside the axon and an		
	B.	The inside of the axon becomes positively charged whecharged.	hile the outside is	negatively
	C.	There is an excess of sodium ions on the inner side of the ax	xon.	1
	D.	Chloride and potassium ions begin to move across the mem		
	E.	Calcium ions accumulate on the inner side of the axon.	mic arteria. C	
18.	The	groups of sensory cells found on the upper surface of the tor	ngue are called	
	A.	o comisms reduces nitrates in the soil to gaseou.salluqma	de contra	
	B.	taste buds.		
	C.	nerve cells.		i
	D.	somatic cens.		
	E.	tactile cells.		

Use the diagram below to answer Questions 19 and 20.



- 19. What type of eye defect is illustrated in the diagram above?
  - Hypermetropia A.
  - B. Myopia
  - C. Cataract
  - D. Astigmatism
  - E. Glaucoma
- **20.** This defect can be corrected by the use of
  - A. convex lens.
  - В. concave lens.
  - C. cylindrical lens.
  - D. surgical operation.
  - E. biconcave lens.
- 21. Which of the following is **not** a courtship behaviour exhibited by animals?
  - A. Pairing
  - B. Display
  - C. Seasonal migration
  - D.
  - 3. When an axon is at rest, the modernment of ions a reither said of the interior of the conference of the concentrations of tons on either smallsirotirrat E.
- 22. Which of the following mineral salts is a trace element?
  - A. Zinc
  - B. Carbon
  - C. Eldered and a street of the second of the se
  - D. Potassium
  - E. Calcium
- 23. Which of the following organisms reduces nitrates in the soil to gaseous nitrogen?

a excess of sodium ions on the inner side and executive

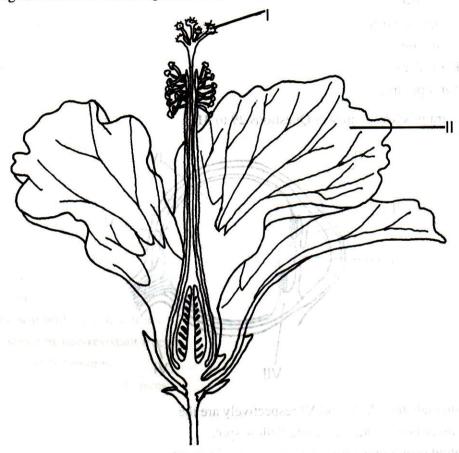
Calculations as sumulate on the inner side of the re-

- A. Euglena
- B. Protozoon
- C. Denitrifying bacterium
- D. Parasitic mould
- E. Nitrifying bacterium

24. The process whereby microorganisms can convert atmospheric nitrogen into nitrogenous compound is known as

- A. nitrogen cycle.
- B. nitrogen fixation.
- C. denitrification.
- D. putrefaction.
- E. decomposition.

Use the diagram below to answer Questions 25 to 27.



- 25. What is the function of the part labelled II?
  - A. Attraction of insects
  - B. Secretion of nectar
  - C. Protection of the stigma
  - D. Formation of fruit wall make he starting the starting age are going the training and leading the starting and starting and starting are starting as a starting and starting are starting as a starting and starting are starting as a star
  - E. Attachment of flower to the shoot
- 26. The function of the part labelled I is to
  - A. receive pollen grains.
  - B. produce nectar.
  - C. store the pollen grains.
  - D. store the ovules.
  - E. produce the male gametes.

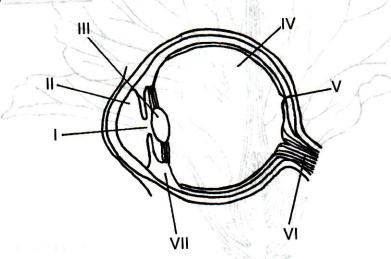
27. How would you describe the position of the ovary in relation to the receptacle?

- Superior A.
- Inferior B.
- Semi-inferior C.
- Gamosepalous D.
- Polysepalous E.

28. What type of relationship exists between a tapeworm and an infected mammal?

- **Symbiosis**
- Commensalism B.
- Predation C.
- **Parasitism** D.
- Saprophytism E.

Use the diagram below to answer Questions 29 to 31.



29. The parts labelled IV, V, and VI respectively are the

- ciliary body, optic nerve and yellow spot.
- blind spot, optic nerve and suspensory ligament. B.
- vitreous humour, yellow spot and optic nerve. C.
- blind spot, optic nerve and pupil. D.

Secretion of nectar yellow spot, retina and choroid layer. Protection of the stigma E.

25. What is the function of the part

do the three-line of the part labelled his to

Attraction of insects

30. The light ray entering the eye goes through the following route in the noise modern of Attachment of flower to the shoot

- $II \to III \to I \to IV \to V.$
- $II \rightarrow I \rightarrow VII \rightarrow III \rightarrow V.$ В.
- $II \to I \to III \to IV \to V.$
- D.  $V \rightarrow IV \rightarrow III \rightarrow I \rightarrow II$ .
- E.  $I \rightarrow VII \rightarrow III \rightarrow IV \rightarrow V$ .

31. Which of the following structures are adjusted in focus	ussing the image of a distant or near object
on the retina?	

- A. I and II
- B. II and III
- C. III and VII
- D. IV and V
- E. V and VII

# 32. Which of the following best describes a marine habitat? A large body of water

- A. which has no distinctive colour or taste
- B. with high concentration of salt
- C. with little suspended materials
- D. with no water weeds
- E. which sustains no animal life

#### 33. The following are features of the tropical rain forest except

- A. abundant water supply.
- B. loose and moist soil.
- C. short trees growing beneath tall trees.
- D. scanty trees with small leaves.
- E. presence of many animals.

# 34. The following are features of Northern Guinea Savanna except

- A. presence of tall trees with thick bark.
- B. bare soil with very few trees.
- C. presence of fire-resistant trees, and a second s
- D. abundant herbivores.
- E. predominance of woody trees.

#### 35. Which of the following explains the term pyramid of numbers?

- A. The number of organisms in a trophic level
- B. The relationship between plants in different trophic levels
- C. The number of saprophytes and parasites in a habitat an application of saprophytes and parasites in a habitat and parasites in
- D. The number of predators in a habitat
- E. Progressive decrease in the number of individuals from lower to higher trophic level

amends should fit wise not been

# 36. In which of the following processes is carbon dioxide not given out?

- A. Respiration in plants
- B. Decay of organisms
- C. Burning of organic matter
- D. Burning of fuels
- E. During photosynthesis

37.	Sea v	water taken in by a living organism ca esses except	n be recycled into	the atmosphere thro	ough all the
	-	transpiration.		Land II	. ^
		digestion.		III bas II	B.
		excretion.		Harry III	C.
	700	respiration.		n VI	D.
		decay.			E
				that cause dusenter	32. 0
		th of the following water pollutants may	at to molecular	s that cause dysenter	A
	200	resticides			8
	В.	Sewage			)
	C.	Industrial wastes		7 Office off 42	T
	D.	Fertilizers		, ministration	
	E.		51.		
39.	Whi	ch of the following is not an adaptation	of plants or animal	s to desert environm	ent?
	A.	Well developed tap root system		mundant v	
	В.	Small leaves with thick epidermis		bose and a	
	C.	Stems with spike-like leaves	ates a chaliforces		
	D.	Metabolic waste in the form of uric acid	d in some animals	NCGHIN III	361
	E.	Broad leaves for storage			
40	A cl	imax community is characterised by	territorin Gu	and a collect	.54. Th
40.	A.	a stable composition of plant and anim	al species.		
	В.	rapid changes in the composition of sp			
	C.	constant changes in appearance of the	habitat.		
	D.	different species occurring at different			
	E.	gradual change in animal population.	L 20	Egyptation (1997)	
41.	Wh	ch of the following is not a characterist	ic of overcrowding	in plant and animal	community?
	A.	Population outstripping available space	eidgous are trophie	parate and rate at the	A.
	В.	Population exceeding available food	The mission of the diff	ad region of the world	.B.
	C.	Competition within the population	ed parasi	2011 2011 2011	
	D.	Increase in primary production	actional a habitat	The number of the	D.
	E.	Population increasing at the same rate	as the birth rate	Progressivens on	В.
42	The	use of predators or parasites to control	pests in the farm is	known as to doing	3(. In v
72.	Α.	predator control.	.1	Respiration in plan	£
	В.	chemical control.		Decay of organism	
	C.	biological control.		Burning of organic	
	D.	animal control.		Burning of fuels	
	E.	parasitic control.	Riss	in mg photosynth	
	٠.	paraditio como:			

- 43. Which of the following substances cannot control the growth of harmful microorganisms?
  - A. Antibiotics
  - B. Hypertonic salt solution
  - C. Disinfectants
  - D. Isotonic sugar solution
  - E. Antiseptics
- 44. Which of the following is the underlining principle in the adoption of biological control of pests?
  - A. Knowledge of agricultural practices by the farmer
  - B. Relationship between plants and animals
  - C. The presence of poisonous chemicals in the farm
  - D. The relative population of plants and animals in the farm
  - E. The predator-prey relationship in the ecological community
  - 45. The following agencies are responsible for conservation in Nigeria except
    - A. Forestry Departments.
    - B. Nigerian Conservation Society.
    - C. Game Reserve Authority.
    - D. Nigerian Red Cross Society.
    - E. Ministry of Agriculture and Natural Resources.
  - 46. The largest game reserve in Nigeria is the
    - Kainji Game Reserve in Niger State.
    - B. Zamfara Forest Reserve in Sokoto State.
    - C. Yankari Game Reserve in Bauchi State.
    - D. Borgu Game Reserve in Niger State.
    - E. Oban Hills Game Reserve in Cross River State.
- 47. The table below indicates the result of an experiment during which grains of different colours in two maize cobs were counted.

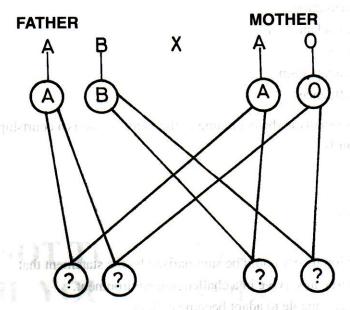
5. Whi	Maize Cob	Colou	rs of Maize C	Grains
B.	Streamille	White	Pink	Red
	Light bole	30	60	30
	Development of	50	99	49

Which of the following ratios agrees with the result?

- A. 9:3:3 radiation.
- B. 1:2:1, ve coloration.
- C. 1:3:1
- D. 2:1:1
- E. 2:3:2

<b>48.</b> One	of the factors that must	be considere	d for safe	blood transfi	usion is a self-like like		r io
	social class of the dono				Antah ancs		
В.	age of the recipient.				Hyperton all w		
C.	rhesus factors of the do	onor and the	ecipient.		Distinction		
D.	nationality of the dono				grandasi		
E.	weight of the recipient	•					
40 One	of the major criticisms	against Men	delian law	s is that they	do not recognise th	nat	
A.			ina of	conoc			
В.			IT was at	x:171   3 21	and to alpha v.		
C.	single factor inheritand complete dominance i	s always pos	sible.	ar and see	a tod dittsuon;		
D.	incomplete dominance i	e is not possil	ole.	porto como en	t e presence of the		
E.	incomplete dominance hybrids exist in living	organisms				3	
	the same ovum and di	fferent cherm	ik and li		following age:	THE	45.
A.	the same ovum and di	ifferent ova	13.				
B.	the same sperm and d				'vigerian ('un see '		
C.	different sperms and the same ovum and the		n				
D.					n Dun Herber		
E.	many ova and many s	2.67771	urai Keso	lipre and Nat	Ministry of Agricul		
51. The	e offspring produced wl	nen pure strai	ins interbr	eed is describ	argest game reserve	The	.61
A.	dominance.				Kninji Game Reser		
В.	phenotype.				'a. "a Forest Res		
C.	allele.				e store consider		
D.	genotype.				Borgu Game Kella		
E.	hybrid.				Obser Hill Co.		C 41-
52. WI	hich of the following of heredity through mar		1:	oon he pres	vented by the appl	icano	on of the
knowledge	of heredity through man	mage counse	iiiig.		obs were counted.		
	Sickle cell anaemia						
В.	Haemophilia Diabetes mellitus	er Gorieus		-110])	her Cob		
C.		Red		White			
D. E.	River blindness			e birthe at			
E.	Kiver officiess		00 000	in thea	11		
			66 (1822)		* 2		
			he result	dtiw es with	the following an an	l fo d	
					:3:3	6	
					: 2:1	1	
					1:8:		
					1:1:		
					P - 5		

53. Study the genetic cross below showing the inheritance of blood groups.



From the cross above, which of the following F<sub>1</sub> offspring does not belong to the father?

poses is and low water retention ability.

- A. AA
- B. AO
- C. OB
- D. OO
- E. AB
- 54. Which of the following is a function of the chromosome?
  - A. Transmission of hereditary traits
  - B. Protein synthesis
  - C. Excretion
  - D. Energy production
  - E. Manufacture of enzyme
- 55. Which of the following does not illustrate adaptation to the environment?
  - A. Colour changes by chameleon
  - B. Streamline shape of fishes
  - C. Light bones in birds
  - D. Development of big muscles by a weight lifter
  - E. Possession of fins by fishes
- 56. The changing of colour by a chameleon to that of the environment is an example of
  - A. adaptive radiation.
  - B. protective coloration.
  - C. courtship display.
  - D. display of body colour.
  - E. territorial behaviour.

57.	The	division of labour in social insects is an example of	
	A.	structural adaptation.	
	В.	physiological adaptation.	
	C.	commensalism.	
	D.	behavioural adaptation.	
	E.	hormonal influence.	
58		swarming especially at the beginning of the rainy season is a courtship behaviour	shown by
50.	A.	migratory birds.	
	В.	pigeons.	
	C.	crickets.	
	D.	winged termites.	
	E.	bees.	
59.	Lan	narck's evolution theory could be summarised by the statement that	
	A.	only the fittest can survive in a challenging environment.	
	В.	species that are unable to adapt become extinct.	
	C.	new characteristics do not arise in organisms in time of need.	changes in
	D.	organisms.	B.
	E.	in a changing and unstable environment nature rejects the weak.	
60	. The	e property of clay soil that prevents it from supporting thick vegetation is its	
	Α.	possession of chemically weathered granite rocks.	
	В.	inability to retain much water.	
	C.	tendency of becoming waterlogged.	
	D.	porosity and low water retention ability.	
	E.	high capillary spaces between the soil particles.	
	ъ.	neitouber; ¿y sm.	
		A second contraction of the second contracti	.3
		iich of har e'r e loes not illustrate adaptarron to the energy groppe	55. Wh
		Colour challes in a nemeleon	Α.
		Streamline success a second	B.
		Light bones in the same and the	.D
		Development on bag coasel or new manual and	
		Possession of fine to the second	
		changing of colour by	56.
		adaptive radiation.	
		matective coloration.	
		velozib tridzpo	
		splay of body colour.	
		recent behaviour.	

# DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

YOU WILL BE PENALIZED SEVERELY IF YOU ARE FOUND LOOKING AT THE NEXT PAGE BEFORE YOU ARE TOLD TO DO SO.

less bein hearth are importance of merosis and fertilization in the

#### SECTION B

ESSAY

[60 marks]

14 hours

Answer three questions only from this section.

Write your answers in ink in your answer book.

Large labelled diagrams should be used where they make an answer clearer. The names given for chosen species must be English or Scientific and not vernacular.

All questions carry equal marks.

- 1. (a) (i) List two diseases each of plants and animals caused by bacteria.
  - (ii) State three ways in which bacteria are useful.
- (b) State three methods by which mosquitoes can be controlled and state the reason for each method.
  - (c) Describe an experiment to demonstrate the presence of bacteria under the finger nails.
  - **2.** (a) Describe the process of inhalation in man.
    - (b) Describe briefly the process of gaseous exchange in the shoot system of flowering plants.
- (c) Describe an experiment to demonstrate the effect of distilled water on mammalian red blood cell.
  - 3. (a) Give a brief description of the characteristics of the Northern Guinea savanna.
    - (b) Describe how you can estimate the density of a plant species using a quadrat.
  - 4. (a) List four characters which can be transmitted from parent to offspring in man.
    - (b) State two differences between mitosis and meiosis.
    - (c) Explain briefly the importance of meiosis and fertilization in the reproduction of organisms.
- (d) In a monohybrid cross between a pure breeding plant that produces blue flowers and a pure breeding plant that produces white flowers, the  $F_1$  generation produced only blue flowers.

By means of labelled cross diagrams, state the type of flowers you would expect if the  $F_1$  generation is

- (i) self-pollinated;
- (ii) cross-pollinated with a pure breeding plant that produces white flowers. Give reasons for your answers in (d)(i) and (ii).