INTI INTERNATIONAL UNIVERSITY

FOUNDATION IN SCIENCE (CFSI)
BIO1204: BIOLOGY 2
FINAL EXAMINATION: JANUARY 2016 SESSION

Instructions: This paper consists of **FIVE (5)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

(a) Fill in **Table 1.1** to show the differences between smooth muscle and skeletal muscle.

Table 1.1

Features	Smooth muscle	Skeletal muscle
Shape	(1)	(2)
Nucleus	(3)	(4)
Striations	(5)	(6)
Movement controlled	(7)	(8)

(8 marks)

(b) Discuss the features of the small intestine that increase its internal surface area. Why is this important?

(4 marks)

(c) State **ONE (1)** function of parietal cells and chief cells in digestion respectively.

(2 marks)

(d) **Fig 1.1** shows **THREE (3)** stages in the cardiac cycle.

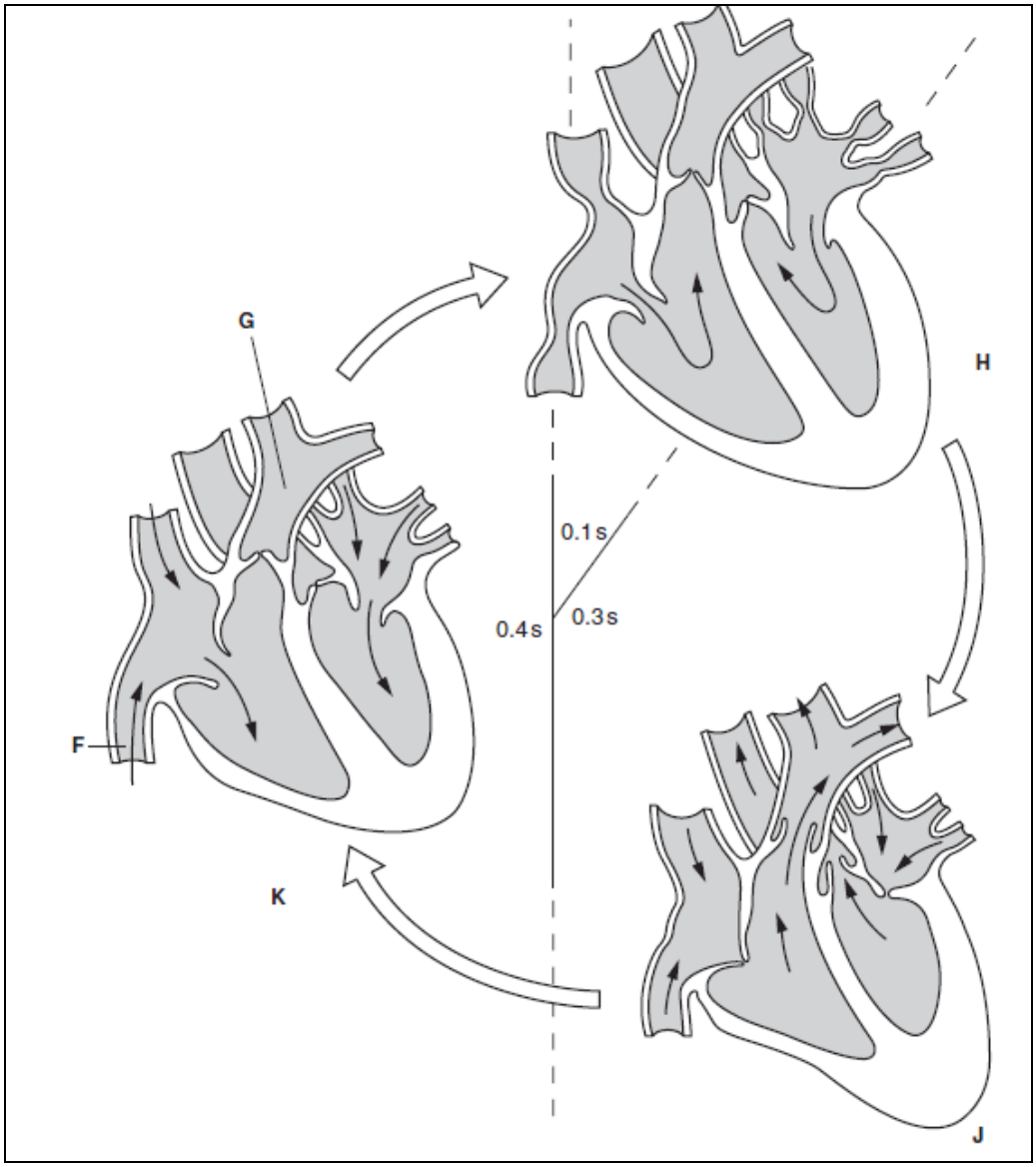

Fig. 1.1

(i) Base on **Fig. 1.1**, how many heart beat per minute?

(1 mark)

(ii) Explain why the walls of the atria have thinner muscle than the walls of the ventricles.

(2 marks)

(iii) Complete **Table 1.2** to show what is happening to the following parts of the **left** side of the heart at each of the stages, **H**, **J** and **K** as shown in **Fig. 1.1**.

Table 1.2

Stage	Left atrium	Left ventricle	AV valve	Aortic valve
H	contracts to force blood into left ventricle	(A)…… ……	Open	Closed
J	(B)…… ……	(C)…… ……	Closed	(D)……..
K	(E)…… ……	relaxes and fills with blood from left atrium	Open	(F)……

(6 marks)

(e) State **TWO (2)** differences between artery and vein in term of structure.

(2 marks)

Question 2

(a) **Fig. 2.1** shows three different T lymphocytes and the events occur during an immune response to an antigen.

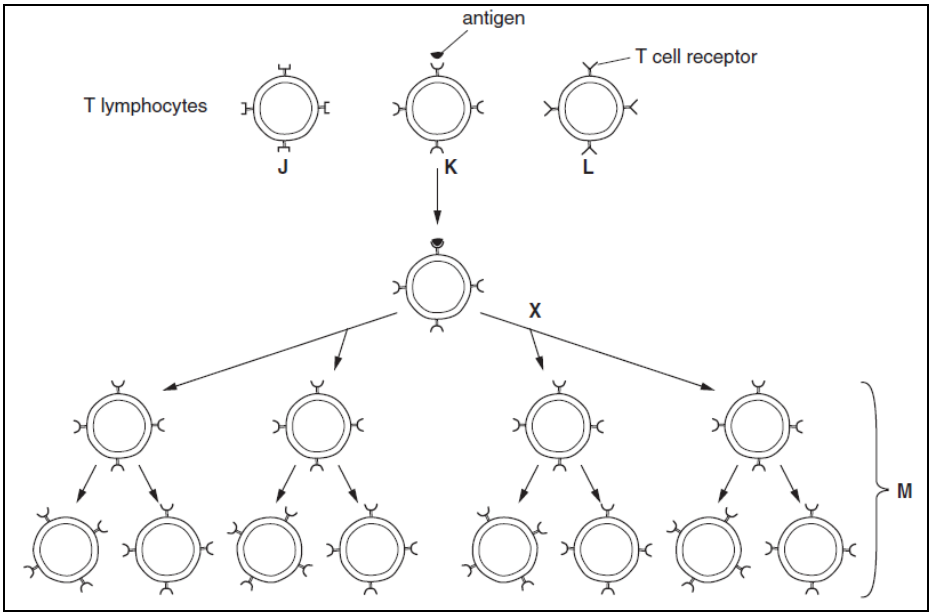

Fig. 2.1

(i) Explain why T lymphocyte K has responded to the antigen during the immune response but not T lymphocytes J and L.

(2 marks)

(ii) State the term used to describe the phenomenon in (i) above.

(1 mark)

(iii) Name the type of nuclear division that occurs at **X**

(1 mark)

(iv) Describe the role of helper T lymphocytes in fighting an infectious disease.

(4 marks)

(b) Blood sample of Kenny and Jenny were tested to determine the blood type. **Table 2.1** shows the result of the test.

Table 2.1

Patient	Anti-A serum	Anti-B serum	Anti-D serum
Kenny	No Agglutination	No agglutination	Agglutination
Jenny	Agglutination	Agglutination	No agglutination

(i) Identify the blood type for Kenny and Jenny including rhesus type.

(1 mark)

(ii) To whom should Kenny **NOT** give blood to? Why?

(3 marks)

(c) **Fig. 2.2** is a diagram that shows the events that occur between **TWO (2)** neurons at a synapse.

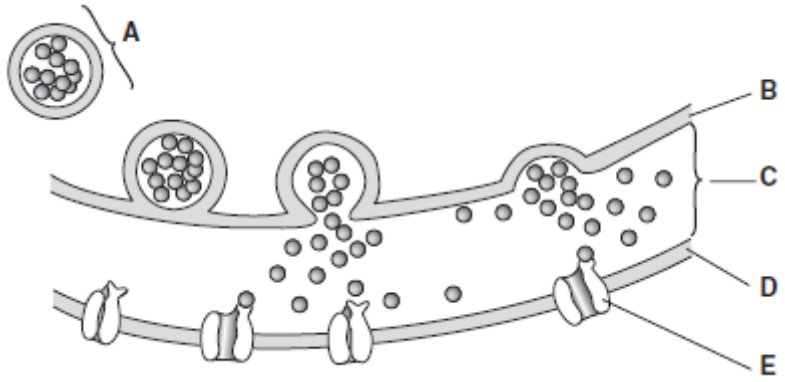

Fig. 2.2

(i) Name A, B, C, and E.

(4 marks)

(ii) Explain how neurons communicate with each other.

(6 marks)

(iii) State **THREE (3)** differences between nervous and hormonal communication in mammals.

(3 marks)

Question 3

(a) **Fig. 3.1** is a diagram of a section through the proximal convoluted tubule of a kidney nephron showing details of cell structure, as seen with the electron microscope. Explain **THREE (3)** ways in which the cells of the proximal convoluted tubule are adapted for selective reabsorption.

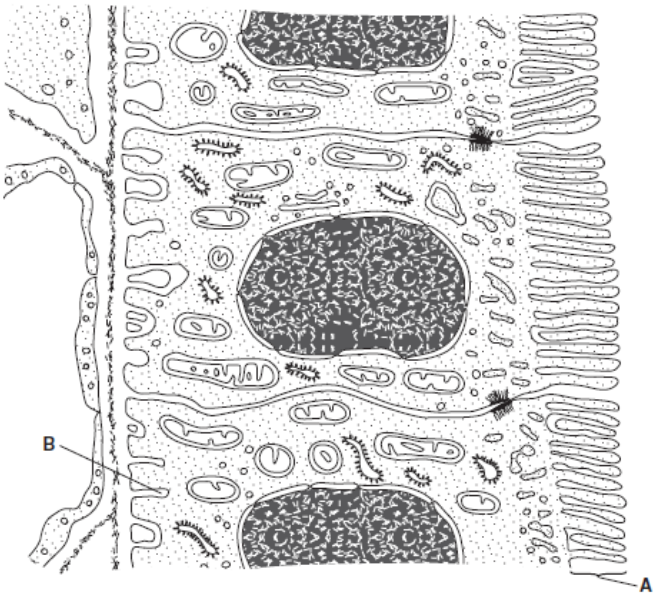

Fig. 3.1

(6 marks)

(b) During the process of the excretion of nitrogenous waste in mammals, blood passes from the renal artery into networks of capillaries called glomeruli. **Fig. 3.2** shows the capillaries and the Bowman's capsule cells.

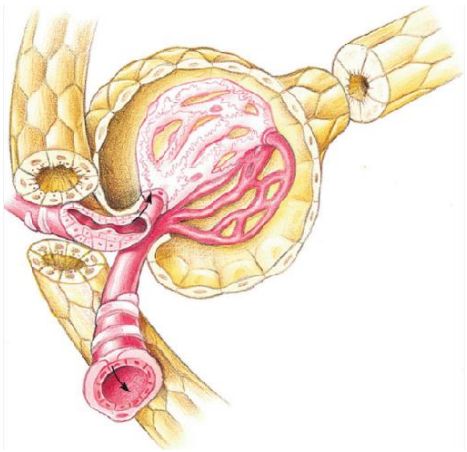

Fig. 3.2

(i) Name the fluid that collects in the capsular space.

(1 mark)

(ii) Name the process which occur in glomerulus to form the fluid in (i).

(1 mark)

(iii) Describe **TWO (2)** ways how the composition of the fluid in (i) differs from blood plasma.

(2 marks)

(c) Complete **Table 3.1** to show the differences follicle stimulating hormone (FSH) and progesterone.

Table 3.1

Hormone	Site of secretion	Target tissue(s)	Action of the hormone during the human menstrual cycle.
FSH	**(I)**	**(II)**	**(III)**
Progesterone	**(IV)**	**(V)**	**(VI)**

(6 marks)

(d) Explain negative feedback in controlling blood glucose level.

(6 marks)

(e) State **TWO (2)** hormones that contribute to short-term stress response and **ONE (1)** example of the response.

(3 marks)

Question 4

(a) **Fig. 4.1** shows **FOUR (4)** structures of angiosperm.

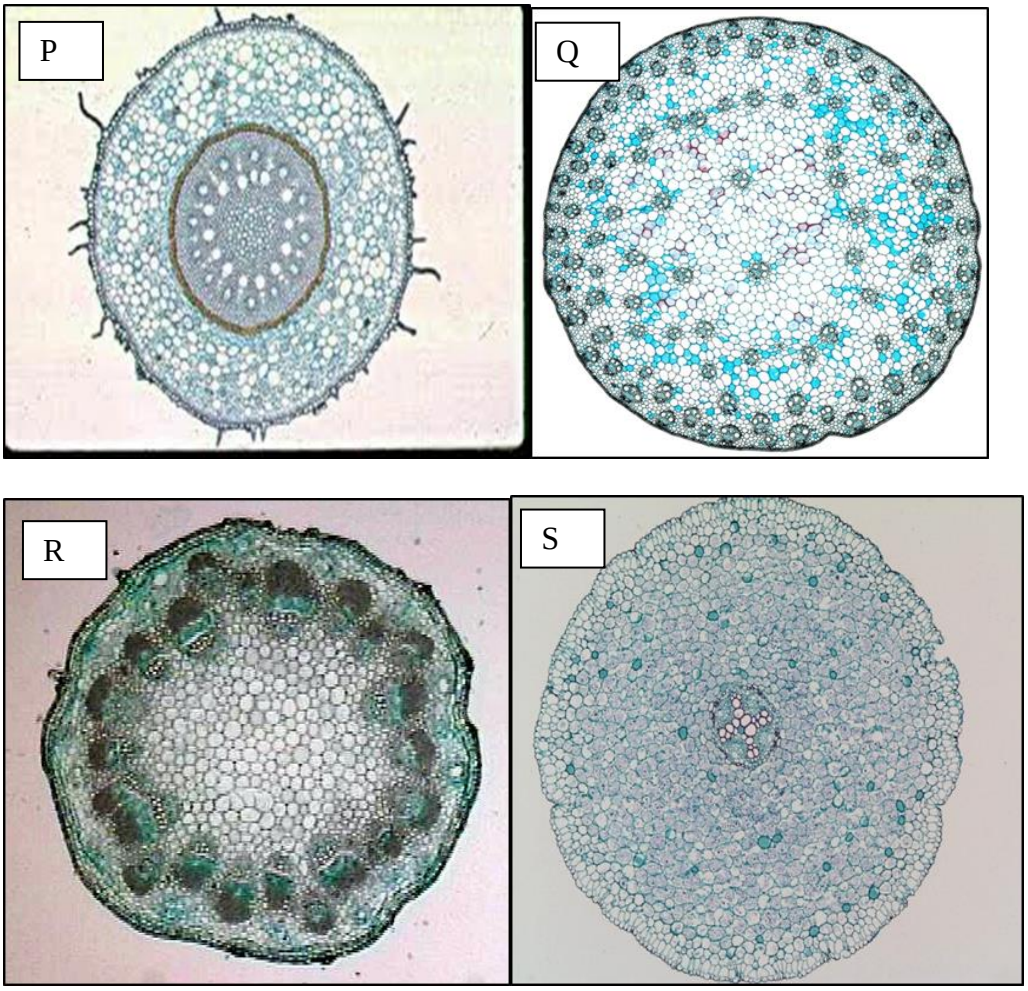

Fig. 4.1

(i) Identify which diagram represent the following:

(I) Monocot root
(II) Dicot root
(III) Monocot stem
(IV) Dicot stem

(4 marks)

(ii) **Fig 4.2** shows some tissues of diagram S. Identify tissue labeled E, F, G and H. State **ONE (1)** function of tissue E, F and H.

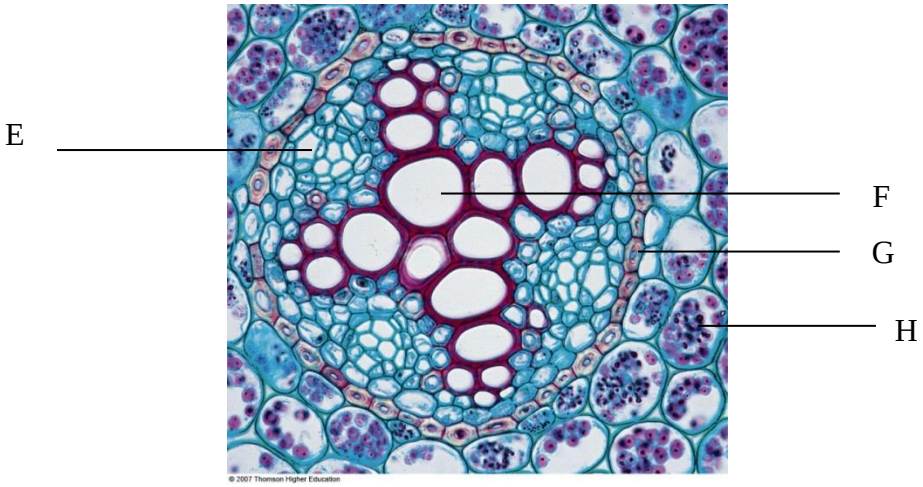

Fig. 4.2

(5 marks)

b) Samples of plants species X were exposed to a range of light and dark treatments as shown in **Fig. 4.3**. Shaded bars represent the period of darkness and unshaded bars represent the period of light. The diagram below shows the result of each treatment on flowering.

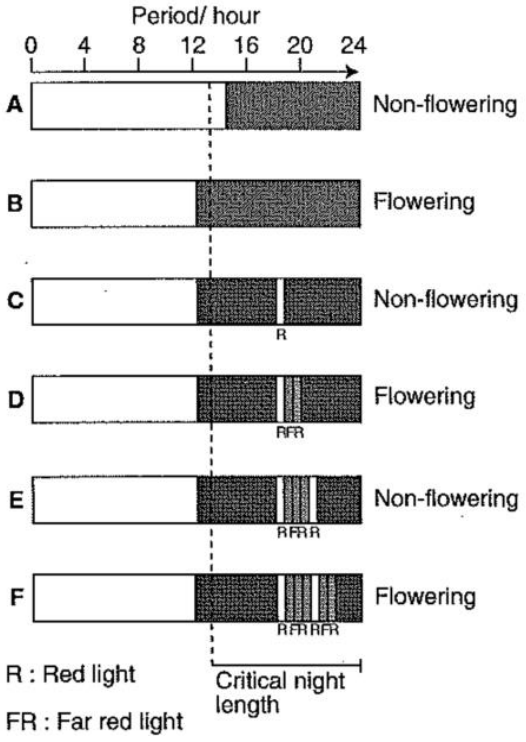

Fig. 4.3

(i) What is meant by 'day-neutral plants'?

(1 mark)

(ii) Based on the results of A and B, state the photoperiodic group this species belongs to. Explain your answer.

(2 marks)

(iii) Refer to treatments C, D, E and F, explain the effects of red and far red lights on the flowering of this plant.

(4 marks)

(c) Farmer practice crop rotation (one year planting nonlegume and the next year planting legume) to make the soil fertile. Explain how legume and increase the nutrients in the soil.

(4 marks)

(d) **Fig. 4.4** shows the cross section of the root and the routes of water from the soil to root xylem.

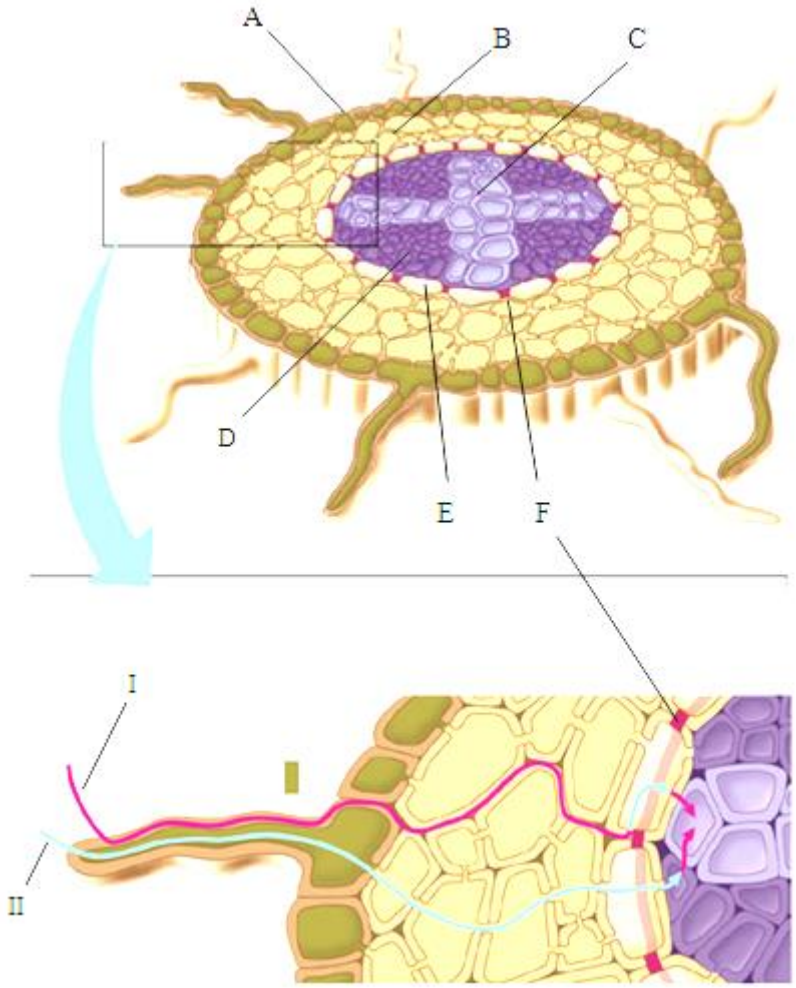

Fig. 4.4

(i) Name the structures labeled with A, B, C, D, E and F.

(3 marks)

(ii) What is the function of the structure F?

(2 marks)

Question 5

(a) The flatback turtle, *Natator depressus*, is an endangered species that nests on northern Australian beaches. Unlike most marine turtles, flatback turtles spend most of their time in coastal waters. This is where they feed and mate. **Fig. 5.1** shows a flatback turtle.

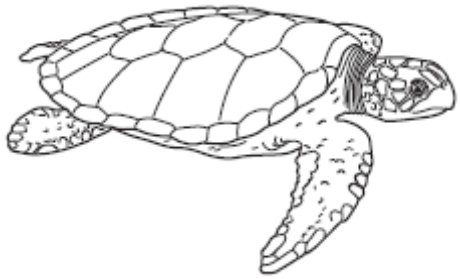

Fig. 5.1

Fig. 5.2 shows the numbers of female flatback turtles nesting on a beach in northern Australia between 1993 and 2002.

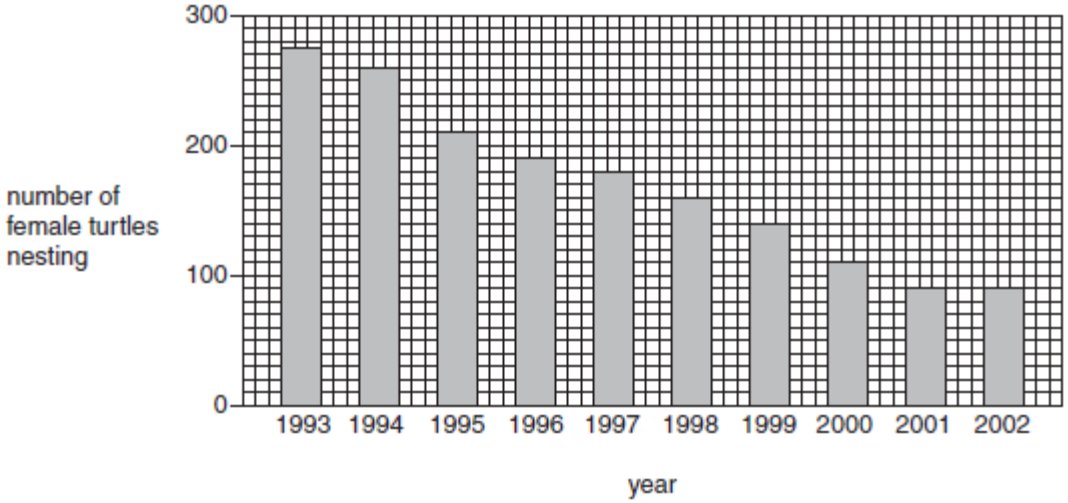

Fig. 5.2

(i) Calculate the mean rate of decrease in the numbers of females nesting between 1993 and 2002. Show all the steps in your calculation.

(2 marks)

(ii) Suggest **FIVE (5)** ways in which the flatback turtle could be protected.

(5 marks)

(b) **Fig. 5.3** shows some feeding relationships in an Arctic ecosystem.

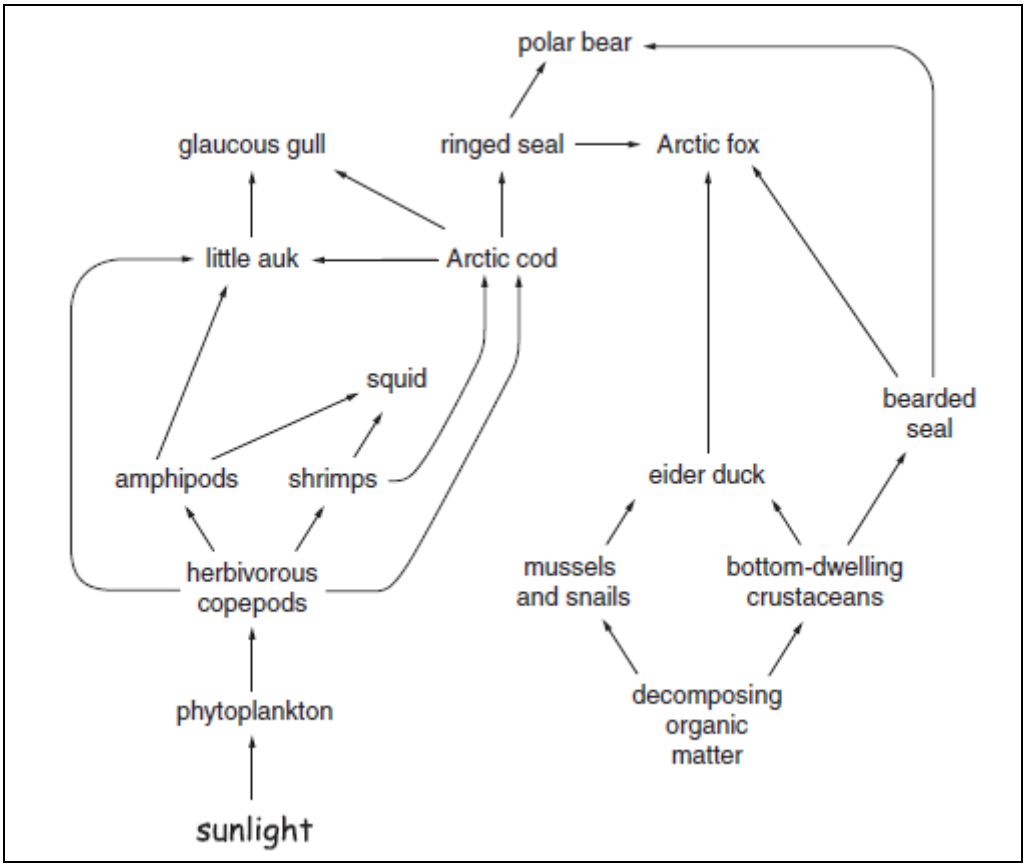

Fig. 5.3

(i) Name **TWO (2)** organisms that are feeding as secondary consumers.

(2 marks)

(ii) Explain why it is difficult to identify some organisms to trophic levels.

(2 marks)

(iii) Why the trophic levels limited to four and five levels only?

(3 marks)

(iv) What is the essential difference in the mode of nutrition between producers and herbivores and carnivores?

(2 marks)

(c) **Fig. 5.4** shows two general patterns of population growth.

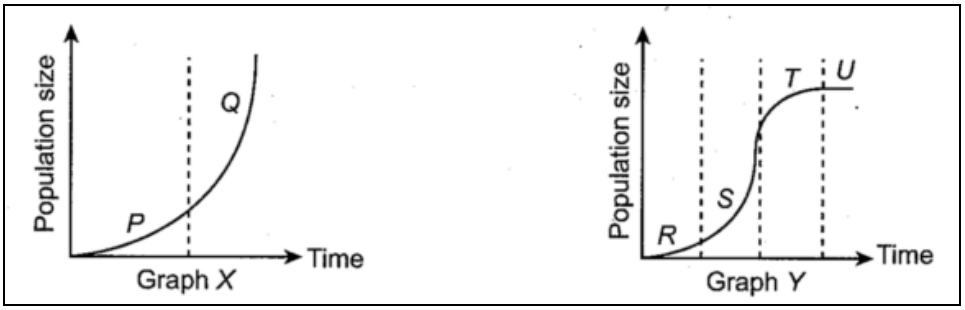

Fig. 5.4

(i) Name the population growth pattern in graphs X and Y.

(2 marks)

(ii) Between the two graphs, which
(a) is density-dependent?
(b) is density-independent?
(c) shows the population growth in the presence of environmental resistance?
(d) shows the current growth of human populations?

(4 marks)

(d) List **THREE (3)** probable effects of global warming.

(3 marks)

-THE END-

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