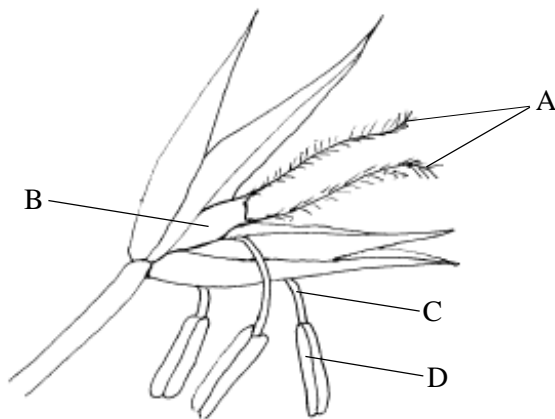


Read through the following passage about reproduction in flowering plants and then complete it by filling the spaces with the most appropriate word or words.

The male reproductive organs in the flower are known as and the female reproductive organs are known as Where male and female organs are on separate plants, the species is said to be When male and female organs are on the same flower they may mature at different times. If the male organ matures before the female the condition is known as The transfer of pollen from the of a flower to the of a flower on a different plant of the same species is called This type of pollination favours an increase in which may be of evolutionary value. An example of a plant which has a male and female flowers on separate plants is

The diagram below shows a flower of a typical member of the grass family.



(a) Name the parts A to D.

A: B:

C: D:

[4]

(b)(i) Name the agent which pollinates this flower.

.....

[1]

(ii) State three features shown in the diagram which support your answer.

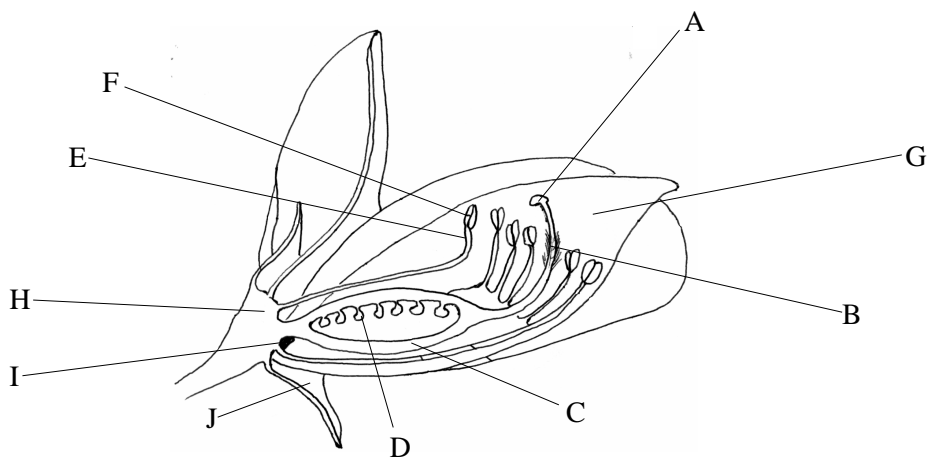
1:

2:

3:

[3]

The drawing below shows a vertical section through the flower of a plant from the family Papilionaceae.



(a) (i) Identify structures A to J.

A: B: C:

D: E: F:

G: H: I:

J: [10]

(ii) In which of the above structures does meiosis occur?

..... [1]

(b) Describe how structures A, B, G and I are involved in cross pollination.

A:

.....

B:

.....

G:

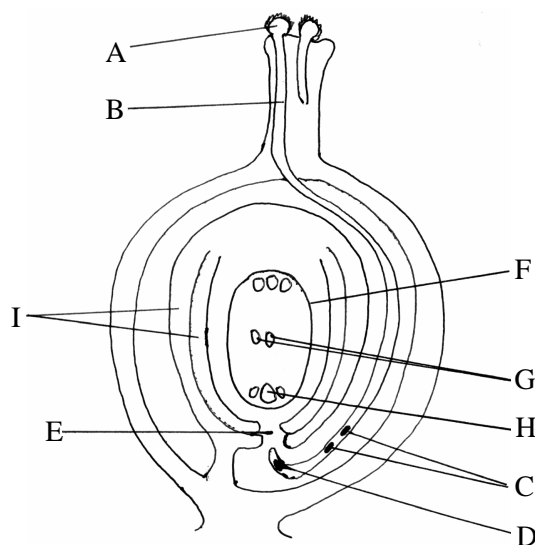
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I:

..... [4]

QUESTIONSHEET 4

The diagram below shows part of a flower which is undergoing fertilisation.



(a) (i) Name the parts A to I.

A: B: C:

D: E: F:

G: H: I:

[9]

(ii) Flowering plants undergo 'double fertilisation'. Explain the meaning of this.

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[2]

(b) The zygote will develop into an embryo by mitosis. Name the parts of the embryo plant.

.....

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.....

[3]

Distinguish between each of the following pairs.

(a) Fruit and seed.

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.....

.....

[4]

(b) Monoecious plants and dioecious plants.

.....

.....

.....

.....

[4]

(c) Protandry and protogyny.

.....

.....

.....

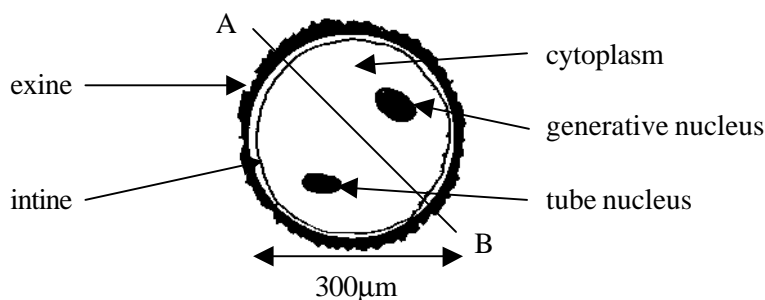
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[4]

(a) Define the term 'cross pollination'.

.....
 [2]

(b) The drawing below shows the microscopic structure of a pollen grain from an insect pollinated flower.



(i) State the functions of the generative nucleus and the tube nucleus.

generative nucleus:

 tube nucleus:
 [2]

(ii) What types of cell division were involved in the formation of these nuclei?

..... [1]

(iii) Suggest one function for the exine in this type of pollen.

..... [1]

(iv) Suggest two ways in which the pollen of a wind pollinated flower might differ from this pollen.

1.
2. [2]

(c) (i) Using the cross line AB determine the magnification of the pollen grain in the drawing. Show your working.

Answer: [2]

(ii) Describe the structure of the pollen tube which would grow out from this pollen grain.

.....

 [3]

Suggest explanations for each of the following:

- (a) Seeds often contain a large food store which weighs them down.

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..... [3]

- (b) Fruits often contain a sugar rich food store.

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..... [3]

- (c) Gibberellins are important to germinating seeds.

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..... [3]

- (d) The composition of prehistoric vegetations can be determined by studying pollen grains in peat.

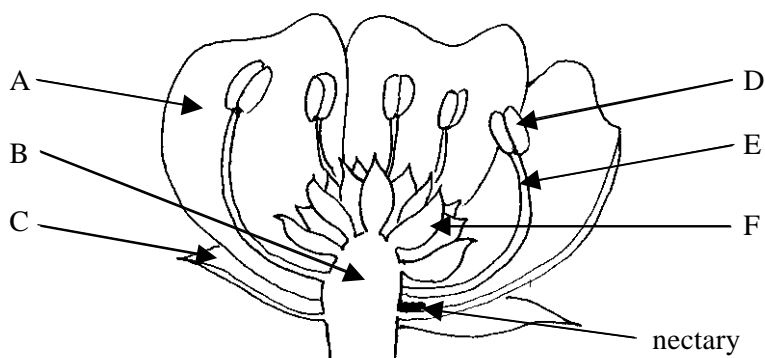
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..... [3]

The drawing below shows the structure of a flower of Creeping Buttercup (*Ranunculus repens*) cut in half-flower section.



(a) (i) Name structures A to F.

A: B: C:

D: E: F: [6]

(ii) This flower is radially symmetrical (actinomorphic). What does this mean?

.....
..... [1]

(iii) Suggest three advantages of such radial symmetry.

1.
2.
3. [3]

(iv) What are the importances of nectar?

.....
.....
..... [2]

(b) (i) State precisely two sites in the flower where the process of meiosis occurs.

1.
2. [2]

(ii) This species of buttercup can also reproduce asexually by means of stolons (creepers). Suggest how this takes place.

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.....
..... [3]

The table below refers to comparative features of wind and insect pollinated flowers. Complete the table by writing the relevant details in the empty boxes. (The number of marks available is shown in the boxes).

Floral parts	Characteristic features	
	Insect pollinated	wind pollinated
Calyx (Sepals)	[1]	[2]
Corolla (Petals)	[3]	[2]
Androecium (Stamens)	[2]	[2]
Pollen	[2]	[2]
Gynaecium (Carpels)	[2]	[2]

(a) In a species of flowering plant the chromosome number of each cell of the embryonic stem(plumule) was 18.
State the chromosome numbers of:

- (i) the pollen tube nucleus.
- (ii) a pollen mother cell.
- (iii) an endosperm cell.
- (iv) the generative nucleus.
- (v) the embryo sac mother cell.
- (vi) a cotyledon cell.

[6]

(b) Describe the process of fertilisation in a flowering plant, from the time the pollen lands on the stigma.

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[8]

The following statements refer to some aspects of reproduction in flowering plants. Indicate whether each statement is **true** or **false** and in each case explain your answer.

(a) Double fertilisation increases genetic variation.

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[3]

(b) Many species of plants have seeds which require a cold period before they can germinate.

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[3]

(c) Ethene stimulates fruit growth.

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[3]

(d) Pollen grains are positively chemotaxic.

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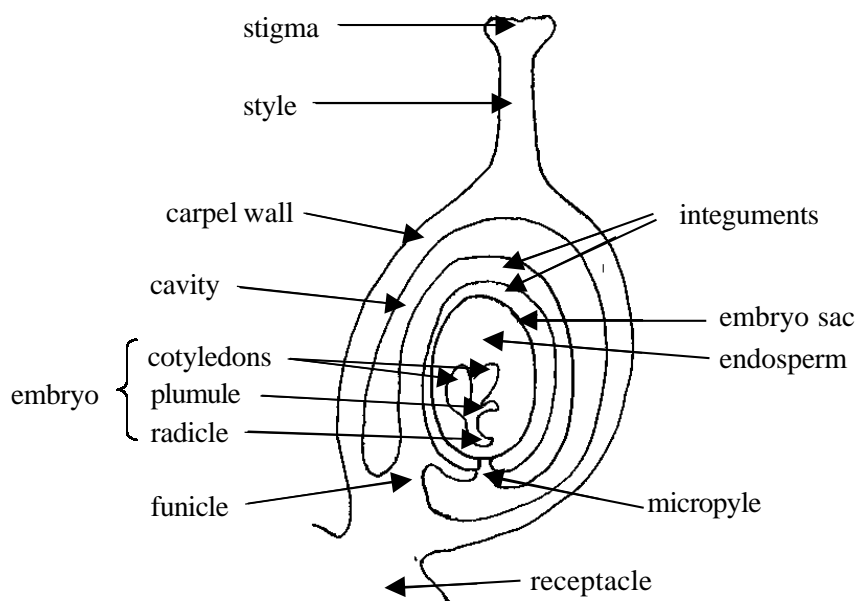
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[3]

The drawing below shows a fertilised carpel cut in vertical section.



(a) State the fate of the following parts after fertilisation:

- (i) the carpel wall.
- (ii) the integuments.
- (iii) the endosperm.
- (iv) the plumule.
- (v) the radicle.
- (vi) the stigma and style.

[6]

(b) Why does a seed only have one scar whereas a fruit has two scars?

.....

.....

[2]

- (c) An apple can contain 10 ovules but some of these ovules may not become fertilised and so do not develop into seeds. Fruit growers suspect that the apple flowers must be visited several times by pollinating bees before all ovules become fertilised and become seeds. Apples that do not have all their seeds developed tend to weigh less and have a lower sugar content than apples in which all 10 seeds are developed.

Suggest how you would obtain data to investigate the hypotheses:

- (i) that the apple flowers need several visits by pollinating bees to ensure that all their ovules develop into seeds.

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[5]

- (ii) that the weight of the apples when ripe is dependent on the number of seeds set (developed) in the apples.

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[3]