

MONOCOTS AND DICOTS

1

Soybean is a dicotyledonous plant.

State two features which are **only** found in dicotyledonous plants.

1.
2. [2]

MARKING SCHEME:

(ii)	<p>network / AW, of veins / one (large) central vein ; broad leaves ; two, cotyledons / seed leaves ; flower parts in multiples of, 4 / 5 ;</p> <p>central / main, root ; vascular bundles regularly arranged ; has (true) secondary growth ;</p>	<p>[max 2]</p>	<p>A reverse arguments I large leaves R parts A 'not in 3s' A vascular bundles not irregularly arranged</p>
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Expert solution:

The two features that are only found in dicotyledonous plants are network of veins and broad leaves.

Note:

- 1) Also accepted are: two cotyledons/central root/vascular bundles/secondary growth/flower parts in multiples of 4/5]
- 2) List of accepted features is: large leaves/ flower parts not in 3's/ vascular bundles not irregularly shaped.
- 3) Just the words " 4/5/parts" are rejected

2.

Fig. 1.1 shows a flowering shoot of tiger lily, *Lilium tigrinum*.



Fig. 1.1

The tiger lily plant is a monocotyledon.

List two features, **visible in Fig. 1.1**, that show it is a monocotyledon.

- 1 [2]
- 2 [2]

MARKSCHEME:

parallel veins / AW ; narrow / AW, leaves ; flower parts in, 3s / 6s ;	max 2	A non-branching veins / no mid-rib A long and thin A for any named part R one cotyledon
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Expert solution:

The two features that show that the tiger lily is a monocotyledon are parallel veins and narrow leaves

Note:

1)Also accepted is flower parts in 3's /6's

2)Also accepted answers are: non-branching veins/long and thin leaves

3)Rejected answer is : One cotyledon

3 Flowering plants are classified into two groups, the monocotyledons and the eudicotyledons (dicotyledons).

(a) Complete Table 1.1 to show differences between these two groups.

Table 1.1

	monocotyledons	eudicotyledons
number of cotyledons in seed		
pattern of veins in leaf		
number of flower parts e.g. petals		

[4]

MARKING SCHEME:

	monocotyledons	eudicotyledons
number of cotyledons in seed	1;	2;
pattern of veins in leaf	parallel veins;	network of veins/branching veins;
number of flower parts e.g. petals	3/6;	5/4;

Expert solution:

The above mark scheme is self explanatory. so I have not typed the same thing again.

4 *Sorghum bicolor* is a cereal crop important in many dry areas of the world.

Fig. 4.1 shows some plants of *S. bicolor* growing in a field in China.



Fig. 4.1

(a) *S. bicolor* is a monocotyledon.

State **two** features that are used to identify plants as monocotyledons.

- 1
- 2 [2]

MARKING SCHEME:

(a)	narrow leaves ; parallel/unbranched, <u>veins</u> on leaves ; sheath / no petiole ; flower parts in multiples of 3 ; one cotyledon (in the seed) ; fibrous roots ; scattered vascular bundles ; no, cambium / woody tissue ;	[max 2]	Ignore long and thin unqualified
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Expert solution:

The two features that identify plants as monocotyledons are narrow leaves/parallel veins]

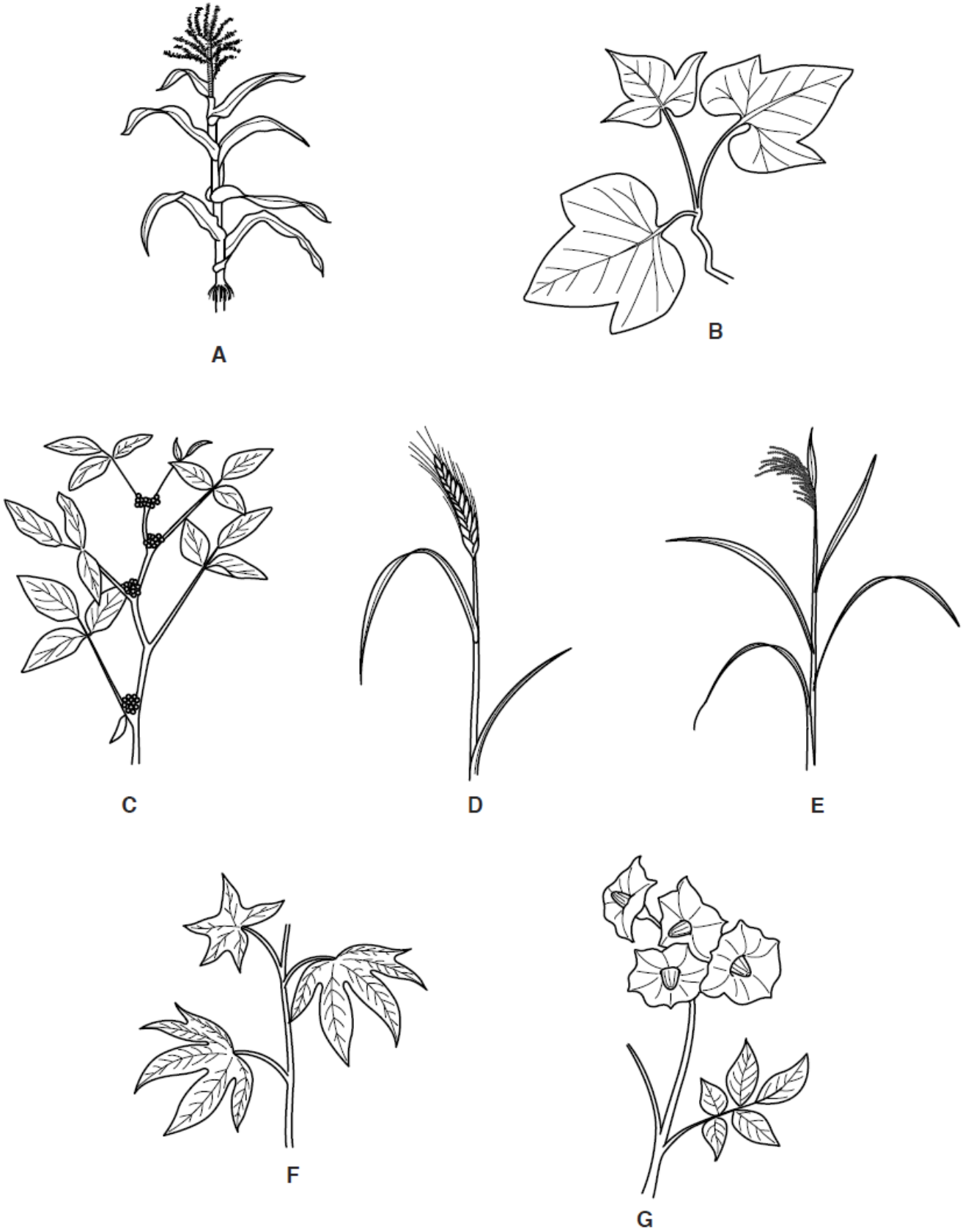
Note:

1) Also accepted answers are: flower parts in multiples of 3's/ one cotyledon in the seed/fibrous roots/scattered vascular bundles/no cambium

2) Long and thin leaves is ignored in the markscheme.

[***** Note that in the earlier markscheme, the words long and thin leaves was accepted, but is rejected here. Also this markscheme accepts one cotyledon in the seed, but another previous one rejects it. Hence it is advised to write only the suggested vocabulary and not the vocabulary that says "A" before it.. Also always take the most common accepted answers from the markschemes as they are the safest answers]

5 (a) Fig. 1.1 shows seven plant species that are important crops.



not drawn to scale

Fig. 1.1

Use the key to identify each species. Write the letter of each species (**A** to **G**) in the correct box beside the key. One has been done for you.

Key

1 (a)	branched veins on leaves	go to 2	
(b)	parallel veins (not branched) on leaves	go to 3	
2 (a)	leaves divided into leaflets (look like small individual leaves)	go to 4	
(b)	leaves not divided into leaflets	go to 5	
3 (a)	flowers grouped tightly together at the top of the stalk	<i>Triticum aestivum</i>	
(b)	flowers grouped loosely together at the top of the stalk	go to 6	
4 (a)	large flowers located at top of stem	<i>Solanum tuberosum</i>	
(b)	small flowers located along the stem	<i>Glycine max</i>	
5 (a)	leaves have five lobes	<i>Manihot esculenta</i>	F
(b)	leaves have three lobes	<i>Ipomoea batatas</i>	
6 (a)	flowers above youngest leaf	<i>Zea mays</i>	
(b)	flowers bend down below youngest leaf	<i>Oryza sativa</i>	

[3]

- (b) The pattern of the veins on the leaves was used in the key to separate the monocotyledonous crop plants and eudicotyledonous (dicotyledonous) crop plants shown in Fig. 1.1.

State **one** other feature that could be used to identify monocotyledonous plants from eudicotyledonous plants.

..... [1]

MARKING SCHEME:

(a)	<i>Triticum aestivum</i>	D	max [3]	5/6 right = 3 3/4 right = 2 1/2 right = 1 0 right = 0
	<i>Solanum tuberosum</i>	G		
	<i>Glycine max</i>	C		
	<i>Manihot esculenta</i>	F		
	<i>Ipomoea batatas</i>	B		
	<i>Zea mays</i>	A		
	<i>Oryza sativa</i>	E		
(b)	<i>general features:</i>	<i>monocotyledon features:</i>	max [1]	<i>Mark answers in context of either general features (first column) or referring to monocotyledonous plants (second column)</i>
	<ol style="list-style-type: none"> 1 leaf, width / shape ; 2 leaf connection to stem / AW ; 3 number of (named) flower parts ; 4 number of, cotyledons / seed 5 leaves ; 6 type of root ; 7 pattern of vascular bundles ; 8 presence/absence of cambium / AW ; 	<ol style="list-style-type: none"> narrow leaves ; sheath / no petiole ; flower parts in multiples of 3 ; one cotyledon / seed leaf ; fibrous roots ; scattered vascular bundles ; no, cambium / woody tissue ; 		

Expert solution:

While this is a key based question and like I said learn your concepts well to answer such questions.

(b) One feature that could be used to distinguish the monocotyledonous plants from eudicotyledonous plants is leaf shape which is narrow in the case of a monocot.

Note: Other acceptable feature could be any of: flower parts in multiples of 3/ Fibrous roots/one cotyledon/no cambium/scattered vascular bundles/no petiole

6 Quinoa, *Chenopodium quinoa*, is a dicotyledonous plant that produces seeds that resemble those of cereals, such as rice.

(a) State one feature shown by **all** dicotyledonous plants.

.....

.....[1]

MARKING SCHEME:

(a)	two cotyledons ; broad leaves ; leaves with branching veins ; petioles ; flower parts in multiples of four or five / flower parts not in threes ; pollen with three furrows or pores ; stem vascular bundles in a ring ; roots, develop from radicle ; AVP ;	1	A seed leaves A not adventitious e.g. secondary growth often present
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Expert solution:

One feature of a dicot plant is two cotyledons

Note:

1) Also acceptable is any of: broad leaves/ leaves with branching veins/petioles/flower parts in multiples of 4's/5's/pollen with three furrows/stem vascular bundles in a ring/ roots develop from radicle

2) Also accepted is 'seed leaves instead of two cotyledons' and also 'Roots not adventitious]

7 Fig. 6.1 shows a leaf and a flower of *Helleborus orientalis*.

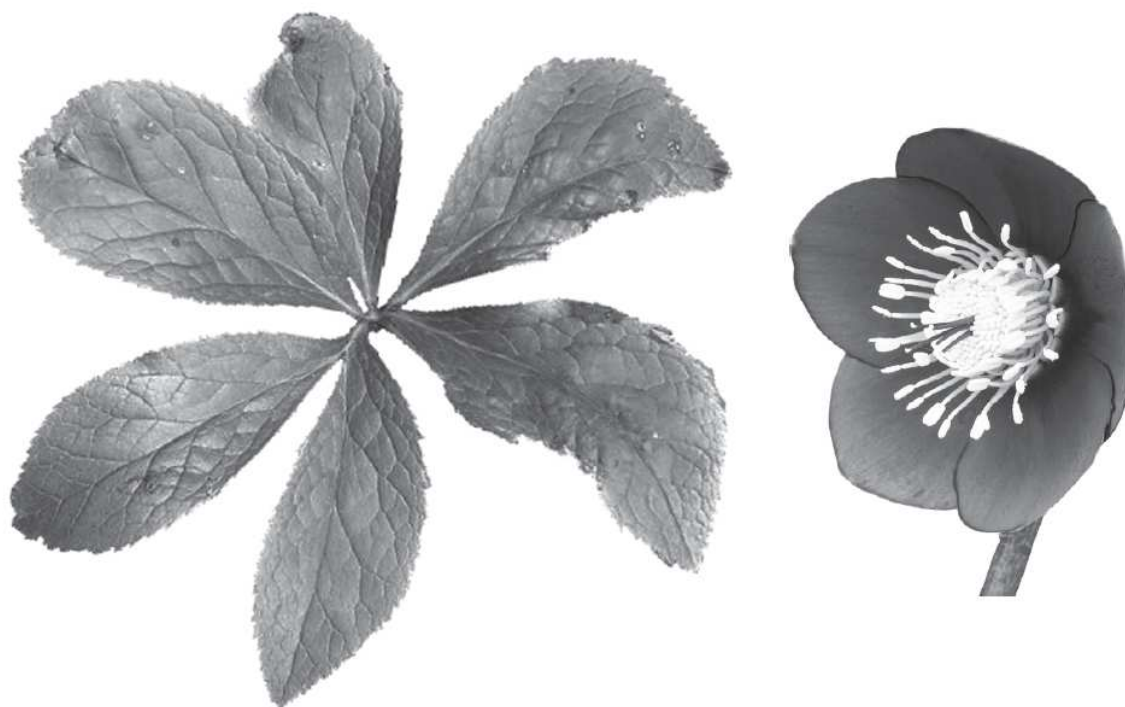


Fig. 6.1

(a) *H. orientalis* is a dicotyledonous plant.

State three features **visible** in Fig. 6.1 that show it is a dicotyledonous plant.

1.
2.
3. [3]

MARKING SCHEME:

(a)	1	broad leaves ;		
	2	network of veins ;		
	3	five petals ;	[3]	

Expert solution: Visible features that show that it is a dicot plant are broad leaves, network of veins and five petals