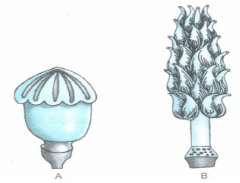
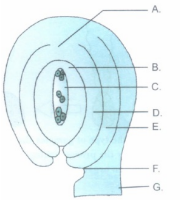
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Questions:

Case Study Questions

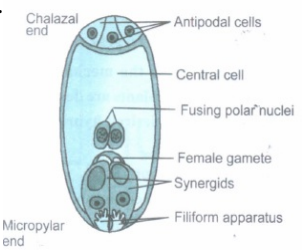
1. 

These pictures show the gynoecium of A. Papaver and B. Michelia.
(a) Write one similarity and one difference between the two.
(b) Name the three parts of a pistil.

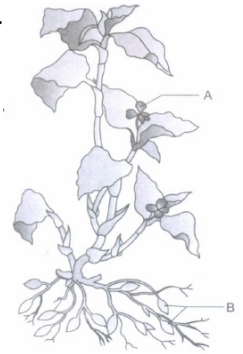
2. 

The diagram of an anatropous ovule is presented above.
(a) Give the technical term for ovule.
(b) Identify and name the part that
(i) attaches the ovule to the placenta
(ii) remains as perisperm in some seeds.
(iii) forms the testa of seed.
(iv) represents the basal part of the ovule.
(v) represents the female gametophyte.

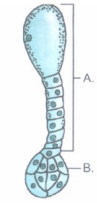
QB365 Study Material QUESTION BANK 365

3. 

A fully developed embryo sac
A fully-developed and mature embryo sac is shown above.
(a) Name the cell from which it has developed.
(b) What is the ploidy level of its nuclei?
(c) What is filiform apparatus? Mention its significance.

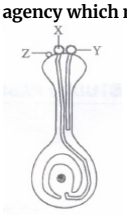
4. 

Identify the types of flowers A and B on the Commelina plant shown above.
(b) Mention the type(s) of pollination that can occur in each of them.

5. 

(a) Identify the parts A and B.
(b) Name (i) the initial cell from which it has developed and (ii) stage of embryo prior to this.
(c) Draw a labelled diagram ofthe stage of embryo succeding this.

6. Read the following and answer any four questions from (i) to (v) given below:
Cross pollination is the transfer-of pollen grains from the anther of a one flower to the stigma of a genetically different flower. It is performed with the help of an external agency which may be abiotic (e.g., wind, water) or biotic (e.g., insects, birds, bats, snails). The diagram shows the carpel of an insect pollinated flower.



(i) What is the most likely reason for non germination of pollen grain Z?
(a) Pollen grains X and Y were brought to the stigma earlier, therefore, their germination inhibited the germination of pollen grain Z.
(b) Pollen grain Z was brought to the flower by wind, while pollen grains X and Y were broughtto the flower by insect
(c) Pollen grain Z lacks protrusions that allow it to adhere properly onto the stigma surface
(d) Pollen grain Z comes from a flower of an incompatible species
(ii) Which of the following best describes the function of the pollen tube?
(a) It acts as a conduit to transport male gametes from the anther to the ovule
(b) It acts as a conduit to transport male gametes from the stigma to the ovule.
(c) It contains key nutrients that serve to nourish the newly-formed zygote
(d) It digests the tissues of the stigma, style and ovary.
(iii) Pollination of a flower in which the pollen is carried by an insect is called

(a) anemophily	(b) ornithophily	(c) entomophily	(d) malacophily.

(iv) Refer to the given characteristics of some flowers:

A. The stamens hang out of the flower, exposing the anthers to the wind.	B. The pollen grains are tiny and light	C. The flower has a sweet scent.	D. The flower petals are brightly coloured.

How many of the above characteristics are of insect-pollinated flower?

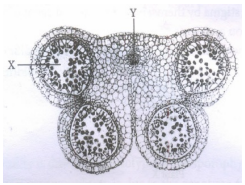
(a) One	(b) Two	(c) Three	(d) Four

(v) Pollenkitt is generally found in

(a) anemophilous flowers	(b) entomophilous flowers	(c) ornithophilous flowers	(d) malacophilous flowers.

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7. Read the following and answer any four questions from (i) to (v) given below:
Many adaptations are found in flowers to achieve certain kind of pollination. The pollination achieved by insects is known as entomophily. The given diagram shows the cross-section of an anther of an insect pollinated flower.



(i) Which of the following is/are the function(s) of structure Y?
A. To carry waste products away from the anther.
B. To supply oxygen to the cells of the anther.
C. To transport food and mineral salts to the anther.
D. To supply water to the anther.

(a) C only	(b) C and D only	(c) A, Band D only	(d) A,B,C and D

(ii) Which of the following most accurately describes the structures found in compartment X?
(a) They contain two haploid nuclei resulting from meiosis
(b) They contain two haploid nuclei resulting from mitosis
(c) They contain two haploid male gametes resulting from mitosis
(d) They contain a vegetative nucleus and pollen tube nucleus
(iii) Which of the following is a distinctive characteristic of insect-pollinated flower?
(a) All of them have nectar guides on their flowers
(b) They produce sugary fruit
(c) Their pollen grains tend to have rough surfaces
(d) They produce abundant quantities of pollen to
make up for pollen grains that might be removed by the wind
(iv) Which of the following are likely characteristics of the structures found in X and stamens of this plant?

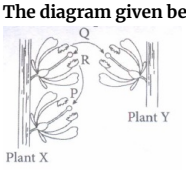
Structure of X	Stamens
(a) Abundant and light	Pendulous
(b) Rough surfaces	Non-pendulous
(c) Light and sticky	Pendulous
(d) Coarse and sticky	Protrude outside the flower

(v) Spiny or sticky pollen grains and large, attractively coloured flowers are associated with

(a) hydrophily	(b) entomophily	(c) ornithophily	(d) anemophily

8. Read the following and answer any four questions from (i) to (v) given below:
In angiosperms, the pollen grains are being transferred from the anther to the stigma and is termed pollination. This phenomenon was first discovered by Camerarius (1694) in the end of seventeenth century. Pollen grains are immobile. They cannot reach the stigma by themselves. An external agent is required for this. The pollination is

mainly of two types-self pollination and cross pollination.
The diagram given below shows two plants of the same species showing different types of pollination.



(i) What is transferred between the plants in the process indicated by arrow P?

(a) Ova	(b) Pollen	(c) Nutrients	(d) Seeds

(ii) Which of the following statements is correct regarding processes P,Q and R?
(a) Processes P, Q and R introduce genetic variability in the offspring of sexually reproducing plants X andY.
(b) Wind serves as agent for process Q if plants X and Y belong to Genus Salvia.
(c) Flowers of plants X and Y need to produce odour and nectar for completion of processes P and Q if they-are entomophilous.
(d) If plants X and Y belong to Genus Cannabis, then their flowers need to produce sticky and heavy pollens in very small amount for accomplishment of process Q.
(iii) Identify the processes P,Q and R.

P	Q	R
(a) Geitonogamy	Xenogamy	Autogamy
(b) Allogamy	Chasmogamy	Cleistogamy
(c) Autogamy	Geitonogamy	Xenogamy
(d) Geitonogamy	Allogamy	Autogamy

(iv) In Catharanthus, the growth of style brings the stigma in contact of ripe anthers present on the mouth of corolla tube. This is an example of

(a) homogamy	(b) cleistogamy	(c) geitonogamy	(d) xenogamy.

(v) Which of the given processes represents a type of pollination that would result in greater adaptability of the particular species to potential environmental changes?

(a) P	(b) Q	(c) R	(d) All of these

9. Read the following and answer any four questions from (i) to (v) given below:
Pollen-pistil interaction is the group of events that occur from the time of pollen deposition over the stigma to the time of pollen tube entry into ovule. It is a dynamic process which has checks at several places for promotion or inhibition of pollen growth. Pollen-pistil interaction is a safety measure to ensure that illegitimate crossings do not occur. Compatibility and incompatibility of the pollen-pistil is determined by special proteins. The compatible pollens are able to absorb water and nutrients from the surface of the stigma. They germinate and produce pollen tubes. Pollen tubes grow into the style. Their growth and path through the style are also determined by specific chemicals.
(i) Which of the following parts of gynoecium determines the compatible nature of pollen?

(a) Stigma	(b) Style	(c) Ovary	(d) Thalamus

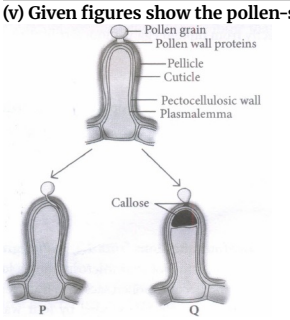
(ii) In Trifolium, which type of self-incompatibility is found?

(a) Gametophytic self-incompatibility (GSI)	(b) Sporophytic self-incompatibility (SSI)	(c) Both GSI and SSI	(d) None of these

(iii) Select the incorrect statement.
(a) In Asteraceae, incompatibility is due to the genotype of the sporophytic stigmatic tissues
(b) In members of Brassicaceae, incompatibility is due to the genotype of the pollen
(c) Nature has imposed self-incompatibility to avoid highly homozygous individuals which have a very low survival value
(d) None of these
(iv) Which of the following are examples of self incompatibility?

(a) Tobacco	(b) Potato	(c) Crucifers	(d) All of these

(v) Given figures show the pollen-stigma interaction, where pollen wall proteins are released onto the pellicle of stigmatic papillae, where recognition reaction occurs.



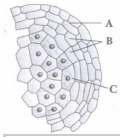
Which of the following statements drawn from given figures is incorrect?
(a) P indicates compatible reaction in which the pollen tube penetrates the cuticle and grows down the papilla.
(b) Development of callose plug between the plasma membrane and pectocellulosic layer of stigmatic papillae results in the incompatibility reaction in Q.
(c) A callose plug which appears at the tip of pollen in Q, is dissolved by callase enzyme secreted by stigma resulting in compatibility reaction.
(d) Deposition of callose can be employed as a reliable bioassay to detect compatibility or incompatibility reactions of pollen and stigma

10. Read the following and answer any four questions from (i) to (v) given below:
The anther is a four-sided structure consisting of four microsporangia located at the corners two in each lobe. The microsporangia develop further and become pollen sacs. In a transverse section, a typical microsporangium appears near circular in outline. It is generally surrounded by four wall layers-the epidermis, endothecium, middle layers and the tapetum.
(i) A dithecous anther consists of (A) microsporangia, (B) in each lobe. Select the option that correctly fills the blanks

A	B
(a) four	two
(b) two	one
(c) two	two
(d) four	one

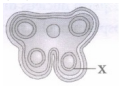
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(ii) The given diagram shows microsporangium of a mature anther. Identify A, Band C.



(a) A-Middle layer	B-Endothecium	C-Tapetum
(b) A-Endothecium	B-Tapetum	C- Middle layer
(c) A-Endothecium	B-Middle layer	C-Tapetum
(d) A-Tapetum	B-Middle layer	C- Endothecium

(iii) The function oflabelled part X is



(a) dehiscence	(b) mechanical	(c) nutrition	(d) protection

(iv) Select the incorrect statement

(a) Microsporangium is generally surrounded by four wall layers-epidermis, endothecium, middle layers and tapetum

(b) Outer three layers perform functions of protection and dehiscence of anthers.

(c) Cells of tapetum possess dense cytoplasm and generally have more than one nucleus.

(d) Cells of tapetum undergo meiosis and produce microspore tetrads.

(v) Which function of tapetum is correct?

(a) Helps in pollen wall formation

(b) Transportation of nutrients to inner side of anther.

(c) Synthesis of callase enzyme for separation of microspore tetrads.

(d) All of these

11. Read the following and answer any four questions from (i) to (v) given below:

Embryo develops at the micropylar end of the embryo sac where the zygote is situated. Most zygotes divided only after certain amount of endosperm is formed. The early stages of embryo development are similar in both monocotyledons and dicotyledons. The zygote gives rise to the proembryo and subsequently to the globular heart-shaped and mature embryo. A typical dicotyledonous embryo consists of an embryonal axis and two cotyledons. Embryo of monocotyledons possess only one cotyledon.

(i) True embryo develops as a result of fusion of

(a) two polar nuclei of embryo sac	(b) an egg cell and a male gamete	(c) synergid and male gamete	(d) a male gamete and antipodals

(ii) Refer to the given diagram of the embryo of an angiospermous plant with parts labelled P, Q and R. Select the correct statement(s) regarding this.



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(i) Part 'P' supplies nutrition to the developing embryo.

(ii) Part 'Q' is the protective sheath of radicle and root cap.

(iii) Part 'R' is the protective sheath of shoot apex and leaf primordia.

(iv) The embryo shown in the diagram is present in members of Family Poaceae.

(a) (iv) only	(b) (ii) and (iii) only	(c) (i) and (iv) only	(d) (i), (ii), (iii) and (iv)

(iii) Which of the given statements are true?

(i) During the development of a dicot embryo, heart-shaped embryo is followed by globular embryo.

(ii) The part of embryonal axis above-the level of cotyledons is epicotyl, while the part below the level of cotyledons is hypocotyl.

(iii) Monocot seeds possess a single cotyledon represented by scutellum.

(a) (i) and (ii)	(b) (ii) and (iii)	(c) (i) and (iii)	(d) (i), (ii) and (iii)

(iv) Consider the following parts of an embryonal axis of a dicot seed.

(i) Hypocotyl (ii) Epicotyl (iii) Radicle (iv) Plumule

In which of the following the above parts are correctly arranged from top to base?

(a) (iii) → (i) → (ii) → (iv).	(b) (ii) → (i) → (iii) → (iv)	(c) (iv)→ (ii) → (i) → (iii)	(d) (iii) → (iv) → (ii) → (i)

(v) In grass family, the cotyledon is called

(a) epiblast	(b) plumule	(c) scutellum	(d) perisperm

12. Read the following and answer any four questions from (v) to (v) given below:

A typical angiospermic ovule is a small structure attached to the placenta by means of a stalk called funicle. The body of the ovule fuses with funicle in the region called hilum. Each ovule has one or two protective envelopes called integuments. Integuments encircle the nucellus except at the tip where a small opening called the micropyle is formed. Mature ovules are classified on the basis of funiculus. It can be orthotropous, anatropous, hemitropous, campylotropous, etc.

(i) The body of the ovule consists of a mass of parenchymatous cells called

(a) integuments	(b) nucellus	(c) hilum	(d) funiculus

(ii) Refer to the given figure and select the correct statement regarding it.



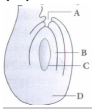
(a) This type of ovule is found in cactus.

(b) The micropyle comes to lie close to the funiculus due to unilateral growth of ovule.

(c) It is most common type of ovule found in the members of Chenopodiaceae

(d) It is half inverted ovule.

(iii) Identify the parts labelled as A, B, Cand D in the given figure and select the correct option



A	B	C	D
(a) Chalaza	Female gametophyte	Embryo sac	Micropyle
(b) Chalaza	Nucellus	Embryo sac	Micropyle
(c) Micropyle	Egg	Embryo sac	Chalaza
(d) Micropyle	Nucellus	Embryo sac	Chalaza

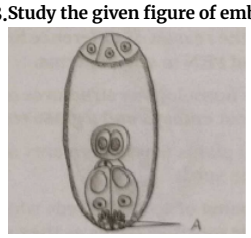
(iv) Mature ovules are classified on the basis of funiculus. If micropyle lie close to the funiculus, the ovule is termed as

(a) orthotropous	(b) anatropous	(c) hemitropous	(d) campylotropous

(v) In Asphodelus, ovule is

(a) unitegmic	(b) tritegmic	(c) bitegmic	(d) ategmic

13. Study the given figure of embryo sac in angiosperms and answer the questions that follows



(1) The formation of embryo sac is called

(a) megasporogenesis	(b) microgametogenesis
(c) megagametogenesis	(d) microsporogenesis

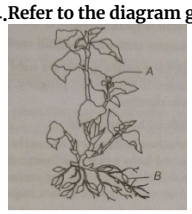
(ii) The arrangement of the nuclei in a normal embryo sac in the dicot

(a) 3+2+3	(b) 2+3+3
(c) 3+3+2	(d) 2+4+2

(iii) The antipodal nuclei in a typical angiospermic embryo sac is found towards
(a) micropylar end
(b) in the middle (polar) region
(c) chalazal end
(d) on the lateral sides
(iv) What does the labelled part A do during the entrance of pollen tube into ovule?
(a) It brings about opening of the pollen tube
(b) It guides pollen tube from the synergid to egg
(c) It helps in the entry of pollen tube into the synergid
(d) It prevents entry of more than one pollen tube into the embryo sac
(v) The central cell forms PEC after

(a) syngamy	(b) double fusion
(c) triple fusion	(d) None of the above

14. Refer to the diagram given below and answer the following questions.



(i) Identify A.
(ii) State any one property of flowers mentioned in (i).
(iii) How do flowers denoted by A and B differ in carrying out pollination?
(iv) Give one example each of A and B.
(v) In which category (with/without exposed sex organs) will common pansy be placed?

Assertion and reason

15. The diagram given below shows a phenomenon known as epihydrophily (Pollination occurring over the water surface). Refer to the given diagram and comment upon the appropriateness of Assertion and Reason.

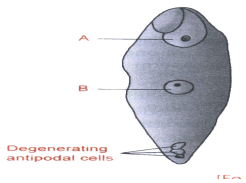


Assertion (A) :Hydrophily is an uncommon mode of pollination exhibited by aquatic plants.

Reason (R) : Pollens are distributed through water bodies to other plants.
(a) If both A and R are true and R is correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

5 Marks

16. (a) Name the structures which the parts 'A' and 'B' shown in the diagram below respectively develop into.
(b) Explain the process of development which 'B' undergoes in albuminous and exalbuminous seeds. Give one example of each of these seeds.

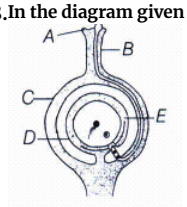


3 Marks

17. (a) Identify the figure.
(b) Name the initial cell from which this structure has developed.
(c) Draw the next mature stage and label the parts.

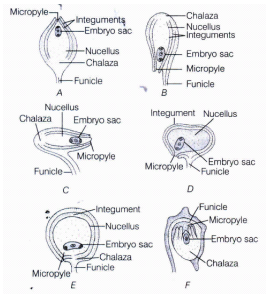


18. In the diagram given below, identify the parts of the flower and mention the post-fertilisation changes shown in the parts



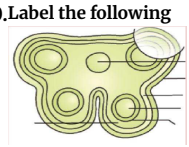
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19. On the basis of relative position of funicle, chalaza and micropyle, the ovules can be classified into following six types. Identify the type of ovule from the diagrams given below and name them.

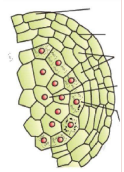


2 Marks

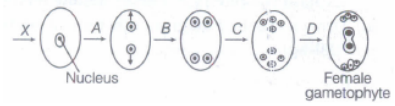
20. Label the following



21. Lable the following.



22. Fill in the following labels with the type of process occurring at each step.



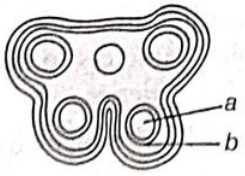
23. Complete the following flow chart: Pollen mother cell→ Pollen tetrad →



24. Indicate the stage (1, 2 or 3) where meiosis occurs in the flow chart:

Megaspore mother cell $\xrightarrow{(1)}$ Megaspores $\xrightarrow{(2)}$ Embryo sac $\xrightarrow{(3)}$ Egg.

25. In the TS of a mature anther given below, identify 'a' and 'b' and mention their functions.



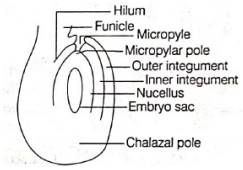
Multiple Choice Question

26. Which condition of gynoecium (pistil) is shown in the figures (i) and (ii) ?



(a) (i) Multicarpellary apocarpous, (ii) Multicarpellary syncarpous
(b) (i) Multicarpellary syncarpous, (ii) Multicarpellary apocarpous
(c) (i) Bicarpellary apocarpous, (ii) Bicarpellary syncarpous
(d) (i) Bicarpellary syncarpous, (ii) Bicarpellary apocarpous

27. In the figure of anatropous ovule given below, choose the correct option for the characteristic distribution of cells within the typical embryo sac.



(a)

Number of cells at chalazal end	Number of cells at micropylar end	Number of nuclei left in central cell
3	2	3

(b)

Number of cells at chalazal end	Number of cells at micropylar end	Number of nuclei left in central cell
3	3	2

(c)

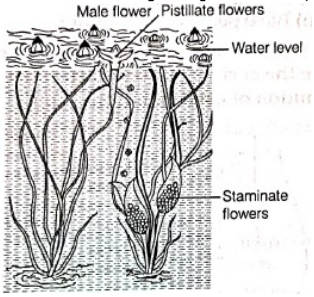
Number of cells at chalazal end	Number of cells at micropylar end	Number of nuclei left in central cell
2	3	3

(d)

Number of cells at chalazal end	Number of cells at micropylar end	Number of nuclei left in central cell
2	2	4

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28. In the dioecious aquatic plant shown, identify the characteristics of the male flowers that reach the female flowers for pollination.



(a)

Size of the flower	Colour of the flower	Characteristic features of pollen grain
Small	Brightly coloured	Light weight and non-sticky

(b)

Size of the flower	Colour of the flower	Characteristic features of pollen grain
Large	Colourless	Large and sticky

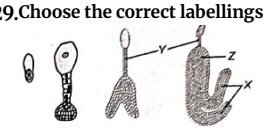
(c)

Size of the flower	Colour of the flower	Characteristic features of pollen grain
Small	White	Small, covered with mucilage

(d)

Size of the flower	Colour of the flower	Characteristic features of pollen grain
Large	Colourless	Non-sticky

29. Choose the correct labellings for the parts X, Y and Z in the given figure of the stages in embryo development in a dicot.



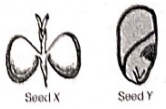
(a) X is suspensor, Y is radicle and Z is cotyledon
(b) X is radicle, Y is cotyledon and Z is suspensor
(c) X is cotyledon, Y is suspensor and Z is radicle
(d) X is zygote, Y is radicle and Z is cotyledon

30. Select the option that shows the correctly identified U, X, Y and Z in a developing dicot embryo.



(a) X-Plumule (2n), Y-Suspensor (n), Z-Cotyledon (2n), U-Radicle (2n)
(b) X-Plumule (2n), Y-Suspensor (2n), Z-Radicle (2n), U-Cotyledon (2n)
(c) X-Suspensor (2n), Y-Cotyledon (2n), Z-Radicle (2n), U-Plumule (2n)
(d) X-Cotyledon (2n), Y-Radicle (n), Z-Plumule (n), U-Suspensor (n)

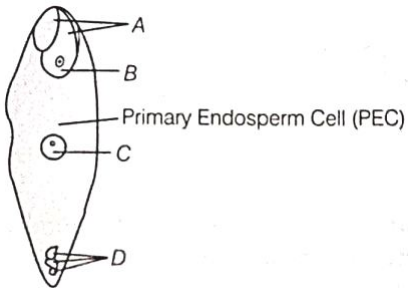
31. Which of the following statements are true related to seed X and Y ?



(i) Seed X is dicot and endospermic or albuminous.
(ii) Seed X is dicot and non-endospermic or non-albuminous.
(ii) Seed Y is monocot and endospermic or albuminous.
(iv) Seed Y is monocot and non-endospermic or non-albuminous.
Choose the correct option with respect to the nature of the seed.

(a) (i) and (iii) (b) (ii) and (iii) (c) (i) and (iv) (d) (ii) and (iv)

32. Identify the correct labellings in the figure of a fertilised embryo sac of an angiosperm given below.



(a) A-Zygote, B-Degenerating synergids, C-Degenerating antipodals, D-PEN
(b) A- Degenerating synergids, B- Zygote, C-PEN, D-Degenerating antipodals
(c) A-Degenerating antipodals, B-PEN, C-Degenerating synergids, D-Zygote
(d) A-Degenerating synergids, B-Zygote, C-Degenerating antipodals, D-PEN

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