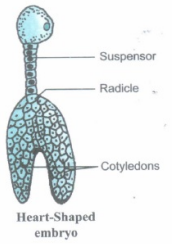
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Answers Key:

Case Study Questions

1. (a) Similarity
   (i) Both are multicarpellary.
   Difference
   (i) A. Papaver is syncarpous - all the carpels have fused together.
   (ii) B. Michelia is apocarpous - the carpels are free.
   (b) Ovary, style and stigma are the three parts of a pistil.
2. (a) Megasporangium
   (b) (i) G. Funicle
   (ii) B. Nucellus
   (iii) E. Outer integument
   (iv) A. Chalaza
   (v) C. Embryo sac.
3. (a) Megaspore
   (b) Haploid
   (c) (i) Filiform apparatus refers to the special cellular thickenings in the synergids, towards micropylar tip.
   (ii) They play an important role in guiding the pollen tube to enter one of the synergids.
4. (a) A - Chasmogamous flower
   B - Cleistogamous flower
   (b) A - Autogamy, geitonogamy and xenogamy
   B - Autogamy only.
5. (a) A - Suspensor
   B - Globular embryo
   (b) (i) Zygote
   (ii) Proembryo



6. **(i) (d):** Pollen grains can only germinate if the pollen grain and style tissues are compatible, i.e., of the same or closely related species. Pollen grains X and Y must have come from a compatible species.
   (ii) (b)
   (iii) (c) : Entomophily is the type of pollination that takes place through the agency of insects. The insectloving flower possesses various adaptations by which they attract insects and use them as carrier of pollen grains for the purpose of cross pollination.
   (iv) (b) : Insect-pollinated flowers produce nectar, which attract the pollinators for feeding. Some flowers produce edible pollen grains. Flowers are fragrant and emit scent and odour. These are brightly coloured. The pollen grains are spiny, heavy and surrounded by a yellow sticky substance called pollenkitt.
   (v) (b) : Insect-pollinated flowers produce nectar, which attract the pollinators for feeding. Some flowers produce edible pollen grains. Flowers are fragrant and emit scent and odour. These are brightly coloured. The pollen grains are spiny, heavy and surrounded by a yellow sticky substance called pollenkitt.
7. **(i) (b):** Y is a vascular bundle comprising xylem that transports water and mineral salts to the anther, and phloem that transports sugars to the anther.
   (ii) (b): X contains pollen grains. Pollen grain contains two haploid nuclei resulting from mitosis, a generative nucleus and pollen tube/vegetative nucleus.
   (iii) (c): Rough surfaces on pollen grains help them to cling onto the surface of insect pollinators.
   (iv) (b): Insect-pollinated plants tend to have pollen with rough surfaces to allow them to cling more readily onto the body of insect pollinators. Their stamens are unlikely to be pendulous nor protrude outside the flower, since the pollen is not intended to be released into the air and carried away by the wind.
   (v) (b): Entomophily type of pollination takes place through the agency of insects. The entomophilous flowers are brightly coloured and fragmented to attract the insects. Their pollen grains are sticky or spiny to easily get attached with the body of pollinators. When the insects visit the flowers, their body gets dusted with pollen grains, and when they fly and visit other flowers, they brush against the stigma which being sticky, at once receives the pollen grains from their body. Thus, cross-pollination is achieved.
8. **(i) (b)**
   (ii) (c) : In the given figure, processes P, Q and R represent geitonogamy (self pollination), xenogamy (cross pollination) and autogamy (self pollination), respectively. Pollinating agents are required for accomplishment of processes P and Q but no agent is required for process R. Out of P, Q and R, only Q is responsible for introducing genetic variability as it is cross pollination between different plants of same species. Salvia is insect pollinated whereas Cannabis is wind pollinated plant.
   (iii) (a) : In the given figure, processes P, Q and R represent geitonogamy (self pollination), xenogamy (cross pollination) and autogamy (self pollination), respectively. Pollinating agents are required for accomplishment of processes P and Q but no agent is required for process R. Out of P, Q and R, only Q is

responsible for introducing genetic variability as it is cross pollination between different plants of same species. Salvia is insect pollinated whereas Cannabis is wind pollinated plant.

(iv) (a) : Homogamy occur in chasmogamous or open flowers where anthers and stigmas are brought together by growth, bending or folding.

(v) (b)

9. **(i) (a) :** Stigma is the terminal receptive part of the pistil which functions as landing platform for the pollen grains. It also determines the compatibility of the pollen grains.

(ii) (a)

(iii) (b) : In members of Brassicaceae, incompatibility is due to the genotype of the sporophytic stigmatic tissues.

(iv) (d)

(v) (c): The most distinct response of the stigma to an incompatible pollen is the development of callose plug between the plasma membrane and pectocellulosic layer of the stigmatic papillae, just below the point of contact with the pollen; a callose plug also appears at the tip of the pollen tube. With the appearance of the callose-plug, the growth of the pollen tube ceases. The deposition of callose in the stigmatic cells can be employed as a reliable bioassay to detect incompatible pollen particularly where the rejection occurs on the stigma. This bioassay has served as a useful aid in providing direct evidence for the involvement of exine-borne proteins in incompatibility reaction.

10. **(i) (a) :** A typical angiosperm anther is bilobed with each lobe having two theca, i.e., dithecous and a dithecous anther is tetrasporangiate having four microsporangia, two in each lobe.

ii) (c)

(iii) (c) : The tapetal layer is of great physiological significance as all the food material entering into the sporogenous tissue diffuses through this layer. Ultimately the cells of tapetal layer disorganise. Thus, tapetum makes a nutritive layer for the developing microspores or pollen grains.

(iv) (d)

(v) (d) : Tapetum secretes Ubisch bodies which get covered with sporopollenin and so increase thickness of exine of pollen grain wall. Tapetum provides nourishment to developing microspores. It also secretes callase enzyme which dissolves callose substances by which four pollens of a pollen tetrad are united, hence separating microspores or pollens of a tetrad.

11. **(i) (b) :** In double fertilisation, out of the two male gametes one fuses with egg or oosphere to perform generative fertilisation. Generative fertilisation is also called syngamy or true fertilisation. It gives rise to a diploid zygote or oospore.

(ii) (c)

(iii) (b) : During the development of dicot embryo, initially the dicot embryo is globular and undifferentiated. Early embryo with radial symmetry is called pro embryo. It is transformed into embryo with the development of radicle, plumule and cotyledons. Two cotyledons differentiate from the sides with a faint plumule in the centre. At this time the embryo becomes heart-shaped.

(iv) (c)

(v) (c): In the grass family, the cotyledon is called scutellum that is situated towards one side (lateral) of the embryonal axis.

QB TM 365 Study Material
QUESTION BANK 365

12. **(i) (b)**

(ii) (a) : The given figure is of circinotropous ovule where funiculus coiled around the ovule. It is found in the Family Cactaceae.

(iii) (d) : Given figure represents an anatropous ovule where A, B, C and D represent micropyle, nucellus, embryo sac and chalaza respectively.

(iv) (b) : Depending upon the configuration and orientation of the body of ovule in relation to funiculus, there are six types of ovule - orthotropous (atropous, erect), anatropous (inverted), hemitropous (half inverted), campylotropous (body curved), amphitropous (both body and embryo sac curved) and circinotropous (funiculus coiled around the ovule). Anatropous or inverted ovule is the most common type of ovule found in angiosperms (in 80% of angiosperm families). Here, body of the ovule gets inverted and micropyle is on lower side. Further micropyle and funiculus lie side by side and micropyle is close to hilum.

(v) (b)

13. (i) **(c)**
(ii) **(a)**
(ii) **(c)**
(iv) **(c)**
(v) **(c)**

14. (i) 'A' represent chasmogamous flowers.
(ii) These are open flowers with exposed sex organs.
(iii) A (chasmogamous flowers) promote both cross pollination and self-pollination whereas B (cleistogamous flowers) promote self pollination only.
(iv) A-Catharanthus, B-Oxalis
(v) Common pansy, (Viola) is categorised under cleistogamous flowers.

Assertion and reason

15. (b) If both A and R are true, but R is not the correct explanation of A

5 Marks

16. (a) A develops into the embryo.
B develops into the endosperm.
(b) 1. The endosperm development starts from the primary endosperm cell containing the primary endosperm nucleus.
2. In the most common type of endosperm development, the primary endosperm nucleus undergoes successive free nuclear divisions to give rise to a number of free nuclei; at this stage, it is called free nuclear endosperm.
3. Subsequently wall formation takes place from the periphery and proceeds towards the centre and the endosperm becomes cellular.
4. This type of endosperm development is seen in coconut; the water of the tender coconut represents the free nuclear endosperm with thousands of nuclei in it and the white kernel around it represents the cellular endosperm.
5. In albuminous seeds, some amount of endosperm persists in the mature seed, as the developing' embryo does not consume it fully, e.g. wheat/maize.
6. In exalbuminous seeds, the endosperm is completely consumed by the developing embryo before seed maturation, e.g. groundnut and pea.

3 Marks

17.

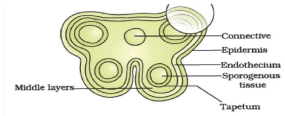
(a) Globular embryo of a dicot plant.
(b) Zygote

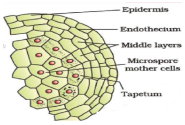
18.

Parts	Post-fertilisation change
A-Stigma B-Style	Both degenerate
C-Ovary	Fruit
D-Ovule	Seed
E-Integuments	Seed coat

19. A-Orthotropous ovule
B-Anatropous ovule
C-Hemianatropous
D-Campylotropous ovule
E-Amphitropous ovule
F-Circinotropous ovule

2 Marks

20. 

21. 

22. X-Meiosis (reduction division), A-Mitosis
B-Mitosis, C-Mitosis,
D-Cells reorganised as polar nuclei, antipodals and egg apparatus.

23. Generative cell.

24. At stage (1) meiosis occurs.

25. In the given figure a is sporogenous tissue and b is tapetum.
(i) Sporogenous tissue has cells which are potential Pollen Mother Cell (PMC) or microspore mother cell and give rise to microspore tetrad.
(ii) Tapetum nourishes the developing microspores or pollen grains.

QB 365 Study Material
QUESTION BANK 365

Multiple Choice Question

26. (b) (i) Multicarpellary syncarpous,
(ii) Multicarpellary apocarpous

27. (b)

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

28. (c)

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

29. (c) X is cotyledon, Y is suspensor and Z is radicle

30. (c) X-Suspensor (2n), Y-Cotyledon (2n), Z-Radicle (2n), U-Plumule (2n)

31. (b) (ii) and (iii)

32. (b) A- Degenerating synergids, B- Zygote, C-PEN, D-Degenerating antipodals