

BIOLOGY

NEET

CRASH COURSE

**REPRODUCTION IN ORGANISMS
SEXUAL REPRODUCTION IN
FLOWERING PLANTS**

**SMART ACHIEVERS
JEE | NEET | FOUNDATION**

587, Nitikhand-1, Indirapuram, Gzb.

7292077839 / 7292047839 | smartachievers.online

A Unit of SMARTACHIEVERS LEARNING Pvt. Ltd., Delhi

REPRODUCTION IN ORGANISMS

1. Reproduction enables a species to live generation after generation.
2. Asexual reproduction is common in simple organisms like fungi, algae and some invertebrates.
3. Offsprings formed in asexual reproduction are identical and are called clones.
4. The most common asexual structures are zoospores in algae and conidia in fungi. Prokaryotes and unicellular organisms reproduce asexually by binary fission or cell division. Asexual reproduction in angiosperms occurs by vegetative propagation i.e., runners, rhizomes, suckers, tubers, offsets.
5. Sexual reproduction is slow and complex process, involving formation and fusion of gametes. Events are categorised as pre-fertilisation (involving gametogenesis and gamete transfer), fertilisation and post-fertilization (zygote formation and embryogenesis).
6. Plants may be monoecious or dioecious. Flowers may be unisexual or bisexual.
7. Gametes are haploid and can be produced by meiosis or mitosis.
8. In seeded plants, pollen grains are the carriers of male gametes.
9. Fertilisation (syngamy) can be internal or external forming a specialised cell called zygote, which forms embryo by embryogenesis.
10. In flowering plants, ovary develops into fruit and ovules into seeds after fertilisation. Embryo in mature seed is the progenitor of next generation.
11. Organisms do not survive for indefinite period of time. They have a definite life-span which varies from few hours to several thousand years. **Death** is an important event of the life-cycle of all organisms.
12. Reproduction is characteristic of all living organisms. It is the process by which an organisms produces more individuals of the same kind.
 - (i) If a species is to survive, it must produce new individuals.
 - (ii) Reproduction is of two types -asexual and sexual.
 - (iii) Production of large number of individuals by a single parent is called asexual reproduction. It does not involve the fusion of gametes and the offsprings have a genetic composition exactly identical to the parents.
 - (iv) Sexual reproduction involves fusion of gametes and the offsprings are genetically different.
13. Asexual reproduction may take place by fission (e.g., Amoeba, bacteria), budding (e.g., yeast), fragmentation (e.g., filamentous algae) and spores (e.g., Mucor, Aspergillus, Chlamydomonas).
 - (i) Vegetative parts of the plant such as bulbs, runners, rhizome, corm, tuber, offsets, roots and leaves also help in the multiplication of plants.
 - (ii) Some artificial methods, such as cutting, layering and grafting are used to exploit commercial application of vegetative multiplication.
 - (iii) One of the biggest disadvantage of asexual reproduction is that it does not produce genetic variations which is very essential for the evolution of a species.

SEXUAL REPRODUCTION IN FLOWERING PLANTS

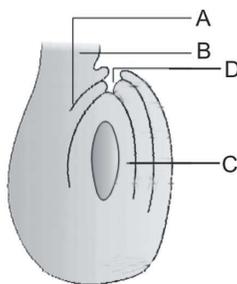
1. The site of sexual reproduction in angiosperms are flowers.
2. Androecium consisting of stamens (male reproductive structure) and gynoecium consisting of pistils (female reproductive structure).
3. Typical anther is bilobed, dithecal and tetrasporangiate.
4. Epidermis, endothecium, middle layers and tapetum make anther wall and sporogenous tissue lying in the centre of microsporangium undergo meiosis to form microspore tetrad, which individually mature as pollen grains representing male gametophytic generation.
5. Pollen grains have two-layered wall, outer exine made of sporopollenin having germ pores and inner intine which is pectocellulosic.
6. Pollen grains may be two-celled (with vegetative and generative cell) or three-celled (vegetative cell + 2 male gametes) at the time of shedding.
7. Pistil has stigma, style and ovary. Ovary contains ovules. Ovules have a stalk called funicle, protective integument(s) and an opening called micropyle. Central tissue is nucellus in which archesporium differentiates, into megaspore mother cell which divides meiotically to form megaspores. Functional megaspore forms the 7-celled and 8-nucleated embryo sac (the female gametophyte) having egg apparatus, antipodals and polar nuclei.
8. Pollinating agents are either abiotic (wind/water) or biotic (animals).
9. Pollen-pistil interaction and compatible pollination result in pollen tube formation and growth of tube through style and entry into ovules, finally discharge of two male gametes in one of the synergids. Syngamy and triple fusion result in diploid zygote and triploid primary endosperm nucleus respectively.
10. Zygote develops into embryo and primary endosperm cell forms endosperm. Endosperm formation precedes embryo development.
11. The developing embryo passes through stages like proembryo, globular and heart-shaped stage and matures. Dicot embryo has two cotyledons and an embryonal axis with epicotyl and hypocotyl. Monocots have single cotyledon.
12. After fertilisation, ovary develops into fruit and ovules develop into seeds.
13. In some angiosperms, like grasses, seed formation without fertilisation called apomixis is found, which is advantageous in horticulture and agriculture.
14. Polyembryony is seen in some angiosperms.

EXERCISE

- Q.1 Which of the following regenerates with the help of layering
(1) Cactus (2) Rose (3) Mango (4) Jasmine
- Q.2 Stem cutting are commonly used for propagation of
(1) Banana (2) Rose (3) Mango (4) Cotton
- Q.3 Scion is the term used in relation to-
(1) Embryology (2) Grafting (3) Agamospermy (4) Emasculation
- Q.4 The most common method of Vegetative propagation described by ancient gardeners is-
(1) Layering (2) Gootee (3) Grafting (4) Ground layering
- Q.5 Clone is a group of individuals got through-
(1) Self pollination (2) Cross pollination
(3) Vegetative propagation (4) Hybridisation
- Q.6 A piece of Potato tuber will form a new plant if it has-
(1) Branches (2) stored food (3) Roots (4) Scales / eyes
- Q.7 Girdling cannot be performed in Sugarcane because its-
(1) Vascular bundles are scattered (2) Phloem is internal to xylem
(3) Sugarcane plants are delicate (4) Inability to bear injury
- Q.8 Bulbils occur is-
(1) Cycas (2) Agave (3) Dioscorea (4) All the above
- Q.9 Pomegranate shows.
(1) Air layering (2) Budding (3) Ground layering (4) None
- Q.10 Anthesis is
(1) opening of flower bud (2) pollen mother cell under going meiosis
(3) Dehiscence of Anther (4) Stigma becomes receptive
- Q.11 The site of meiotic division in higher plants is
(1) Vegetative buds (2) Root tip cells (3) Stomatal cells (4) Spore mother cells
- Q.12 Embryology is -
(1) Development of embryo only (2) Mode of gametophyte formation
(3) Sporogenesis and fertilization (4) Sporogenesis, fertilization and embryogenesis
- Q.13 Functions of sepals in a flower are -
(1) Photosynthesis (2) Protection (3) Both (1) and (2) (4) Sporogenesis
- Q.14 When calyx and corolla are undifferentiated then this structure is known as-
(1) Parianth (2) Calyptra (3) Both (4) None
- Q.15 The plants which flower only once in their life-
(1) Monocarpic (2) Polycarpic (3) Amphicarpic (4) None
- Q.16 The total nuclei in mature male gametophyte of an angiosperm are
(1) 2 (2) 3 (3) 4 (4) 5
- Q.17 Which layer of anther has fibrous thickening.
(1) Tapetum (2) Middle layer (3) Epidermis (4) Endothecium
- Q.18 Which of the following one protect the pollen grain from damaging effects of U.V. Radiations.
(1) Tapetum (2) Endothecium (3) Sporopollenin (4) Pollen kitt

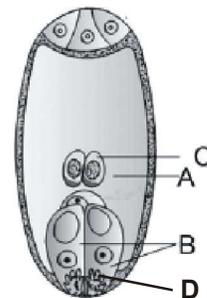
- Q.19 The nourishment of developing pollen grains is performed by
 (1) Endothecium (2) Microspore Mother cell
 (3) Tapetum (4) Pollen tube
- Q.20 Sculpturing on the surface of pollen grain is due to the activity of
 (1) Foot layer and tectum (2) Baculate layer and tectum
 (3) Tectum and sporopollenin (4) Footlayer and Baculate layer.
- Q.21 Hay fever (Allergy) is caused due to pollen grains of
 (1) Amaranthus (2) Sorghum (3) Ambrosia (4) All the above.
- Q.22 Mature male gametophyte of Angiosperm is
 (1) 13 celled (2) 4 celled (3) 5 celled (4) 3 celled
- Q.23 Male gametes are formed by
 (1) Tube nucleus (2) Generative cell (3) Tapetum (4) None
- Q.24 Male gametophyte of angiosperms is shed at-
 (1) Four celled pollen grain (2) Two celled pollen grain
 (3) Microspore mother cell (4) Anther
- Q.25 How many pollen mother cells will form 1000 pollen grains-
 (1) 200 (2) 250 (3) 300 (4) 100
- Q.26 In a pollen grain, larger nucleus is-
 (1) Generative nucleus (2) Vegetative nucleus
 (3) Polar nucleus (4) None of these
- Q.27 Endothecium, middle layer and tapetum in anther are derived from-
 (1) Primary sporogenous layer (2) Primary parietal layer
 (3) Both (4) None of the above
- Q.28 'Callase' enzyme which dissolve callose of tetrad of microspores to separate 4 microspores is provided by -
 (1) Pollen grains (2) Middle layer (3) Tapetum (4) Endothecium
- Q.29 All the cells of anther are diploid except
 (1) Endothelial cells (3) Microspore mother cells
 (2) Epidermal cells (4) Pollen grains
- Q.30 Linear pollen tetrad is found in
 (1) Butomopsis (2) Polygonum (3) Magnolia (4) Halophila
- Q.31 Sporopollenin provides resistance to the pollen grain it is chemically
 (1) Protein (2) Fatty substance
 (3) Heteropolysaccharide (4) Homopolysaccharide
- Q.32 Which of the following is diploid
 (1) Egg (2) Synergids (3) Antipodal cells (4) Secondary nucleus
- Q.33 Perisperm is
 (1) Outer part of endosperm (2) Destroyed synergid
 (3) Destroyed secondary nucleus (4) remain of nucellus
- Q.34 The point where funicle joint with ovule is known as
 (1) Chalaza (2) Hilum (3) Microphyle (4) Integument

- Q.35 An orthotropous ovule is one, in which micropyle and chalaza are
 (1) At right angles to funicle (2) Parallel to the funicle
 (3) In straight line of funicle (4) Parallel along with ovule
- Q.36 Curvature of ovule is more and embryo sac becomes horse shoe shaped in
 (1) Hemitropous ovule (2) Campylotropous ovule
 (3) Anatropous ovule (4) Amphitropous ovule
- Q.37 If the male plant is tetraploid and female plant is diploid. What will be the ploidy level of endosperm after fertilization.
 (1) $3n$ (2) $4n$ (3) $5n$ (4) $6n$
- Q.38 How many megaspore mother cells are required for formation of an egg
 (1) 1 (2) 2 (3) 3 (4) 4
- Q.39 A root cell of an angiospermic plant has $2n = 24$ chromosomes. What will no of chromosomes in nucellus cell
 (1) 12 (2) 36 (3) 24 (4) 18
- Q.40 Ovule turns at more than 360° angle is due to excessive growth of funicle in
 (1) Campylotropous ovule (2) Anatropous ovule
 (3) Orthotropous ovule (4) Circinotropous ovule
- Q.41 Female gametophyte (Embryo sac) of Angiosperm is
 (1) 8 celled, 7 nucleated (2) 7 celled, 8 nucleated
 (3) 7 celled, 7 nucleated (4) 8 celled, 8 nucleated
- Q.42 Filiform apparatus is the feature of-
 (1) Egg (2) Synergids (3) Antipodal (4) None of these
- Q.43 The given figure shows a typical anatropous ovule. What do A, B, C & D represents.



- (1) A-Hilum, B-Funicle, C-Nucellus, D-Micropyle
 (2) A-Hilum, B-Outer integument, C-Nucellus, D-Micropyle
 (3) A-Hilum, B-Outer integument, C-Embryosac, D-Micropyle
 (4) None of these

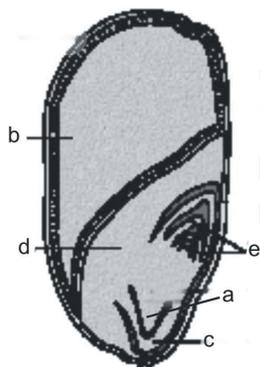
- Q.44 The given figure shows a mature embryo sac. What do A, B, C & D represents.
 (1) A-Embryosac, B-Synergids, C-Central cell, D-Micropylar end
 (2) A-Central cell, B-Synergids, C-Central cell, D-Micropylar end
 (3) A-Central cell, B-Polar nuclei, C-Central cell, D-Filiform apparatus
 (4) A-Central cell, B-Synergids, C-Polar nuclei, D-Filiform apparatus



- Q.45 If pollination takes place between the two flowers of same plant, It is known as
 (1) Xenogamy (2) Cleistogamy (3) Geitonogamy (4) Herkogamy
- Q.46 Hypohydrophyly occurs in
 (1) Vallisneria (2) Elodea (3) Ceratophyllum (4) Hydrilla

- Q.47 Cleistogamous flowers are present in-
 (1) Salvia (2) Commelina (3) Viola (4) 2 & 3 both
- Q.48 Myrmecophily is pollination by-
 (1) Ants (2) Moths (3) Birds (4) Bats
- Q.49 In bisexual flowers when the gynoecium matures earlier than the androecium, it is called
 (1) Protandry (2) Protogyny (3) Dichogamy (4) Autogamy
- Q.50 How many Nucleus participate in double fertilization of capsella
 (1) 2 (2) 5 (3) 3 (4) 4
- Q.51 Pollen tube discharges male gametes in
 (1) Central cell (2) Degenerated Synergid
 (3) Egg cell (4) Antipodal cell
- Q.52 Development of fruit with out fertilization is
 (1) Parthenocarp (2) Parthenogenesis (3) Sporogamy (4) Autogamy
- Q.53 Siphonogamy is feature of
 (1) Bryophytes (2) pteridophyte
 (3) Gymnosperm and Angiosperm (4) Algae
- Q.54 The phenomenon of pollen tube entering the ovule laterally through integuments is called
 (1) Mesogamy (2) Porogamy (3) Chalazogamy (4) None of these
- Q.55 Number of reduction divisions required to produce 100 seeds
 (1) 100 (2) 125 (3) 200 (4) 250

Q.56



In the above diagram, Identify the correct Labelling & select the correct option

- (1) a - Embryo axis, b - Endosperm, c - Coleorhiza, d - scutellum, e - coleoptile
 (2) a - Radicle, b - Aleuron layer, c - Coleorhiza, d - Endosperm, e - Plumula
 (3) a - Radicle, b - Endosperm, c - Coleorhiza, d - scutellum, e - Plumule
 (4) a - Embryo axis, b - Aleuron layer, c - Root-cap, d - Endosperm, e - Coleoptile

Q.57 Identify the parts labelled A,B,C,D,E from the list (i- vii) and select the correct options.

Components

(i) Scutellum

(ii) Shoot apex

(iii) Coleoptile

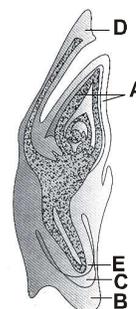
(iv) Radicle

(v) Epiblast

(vi) Coleorhiza

(vii) Root cap.

- | | A | B | C | D | E |
|-----|-----|-----|-----|----|-----|
| (1) | iii | v | i | vi | vii |
| (2) | iii | vi | vii | i | iv |
| (3) | i | vii | vi | i | v |
| (4) | iii | vi | vii | i | iv |



Q.58 The micropyle in a seed helps in the entry of-

- (1) Water (2) Pollen tube (3) Male gamete (4) None

AIIMS Special

Instructions for following questions (Q.59 to Q.119).

- (1) If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1).
- (2) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
- (3) If Assertion is true statement but Reason is false, then mark (3).
- (4) If both Assertion and Reason are false statements, then mark (4).

REPRODUCTION IN ORGANISMS

- Q.59 **Assertion :** At the end of Juvenility, the organism develops the capacity to reproduce.
Reason : It represents the time period between the first and next flowering in plants.
- Q.60 **Assertion :** Reproduction is a biological process of giving rise to young ones.
Reason : Reproduction increases population and maintains the continuity of species.
- Q.61 **Assertion :** Endogamy is common in majority of animals.
Reason : Fusing gametes are quite different and develop from the same individuals.
- Q.62 **Assertion :** The higher organisms must evolve a special mechanism for gamete transfer.
Reason : Male and female gametes are formed in different individuals.
- Q.63 **Assertion :** Air layering will not produce a composite plant.
Reason : Stock and scion are fused to form a composite plant during approach grafting.
- Q.64 **Assertion :** Maximum life span Is the characteristic of population.
Reason : It is the maximum time period upto which a population has survived.
- Q.65 **Assertion :** Reproduction is means of self perpetuation of a race.
Reason : It introduces variations essential for adaptability and struggle for existence.
- Q.66 **Assertion :** Asexual reproduction is a rapid mode of reproduction.
Reason : It plays an important role in evolution.
- Q.67 **Assertion :** Animals are either unisexual or bisexual.
Reason : Most of bisexual animals reproduce by cross fertilization.
- Q.68 **Assertion :** Development of embryo from the zygote is known as embryogenesis.
Reason : Embryogenesis involves cell division and cell differentiation.
- Q.69 **Assertion :** Vegetative reproduction occurs in Dalbergia through tubers.
Reason : Tubers develop adventitious buds which sprout to form new plants.
- Q.70 **Assertion :** Grafting is possible only in dicots.
Reason : Dicots have eustelic type of vascular strand.
- Q.71 **Assertion :** Insects visit flowers to gather honey.
Reason : Dicots have eustelic type of vascular strand.
- Q.72 **Assertion :** Parthenogenesis is a kind of variation of sexual reproduction.
Reason : In Parthenogenesis, a young one develops from an ovum but without fertilization.
- Q.73 **Assertion :** All members of bee society are diploid except the drones.
Reason : Drones are produced parthenogenetically.

- Q.74 **Assertion :** Clones are a group organisms of identical genotype, produced by same kind of sexual reproduction and same sexual processes.
Reason : These are prepared by group of cells descended from many cells or by inbreeding of an completely heterozygous line.
- Q.75 **Assertion :** Old age is not a illness. It is a continuous of life with decreasing capacity for adaptation.
Reason : Cessation of mitosis is a normal genetically programmed event.
- Q.76 **Assertion :** The honey bee queen copulates only once in her life time.
Reason : The honey bee queen lays fertilized as well as unfertilized eggs.
- Q.77 **Assertion :** Ginger has a prostate-growing rhizome.
Reason : Shoot growth is not affected by gravity.
- Q.78 **Assertion :** Death is regarded as the most important regulatory process on earth.
Reason : It avoids over crowding caused by continuous reproduction.
- Q.79 **Assertion :** Grafting is not usually possible in monocots.
Reason : Successful grafting requires that cambia of both stock and scion fuse to form new vascular tissues.
- Q.80 **Assertion :** In angiosperms, the ovule develops into a seed after fertilization.
Reason : Fertilization is not essential for the development of fruit.
- Q.81 **Assertion :** Viviparous animals give better protection to their offsprings.
Reason : They lay their egg in safer places in the environment.

SEXUAL REPRODUCTION IN FLOWERING PLANTS

- Q.82 **Assertion :** All the pollen grains of a microsporangium are held together and form pollinium.
Reason : Pollinium is very suitable for anemophily.
- Q.83 **Assertion :** The endosperm represents the triploid condition.
Reason : It is formed due to fusion of triploid nuclei.
- Q.84 **Assertion :** Allele of pollen happens to be one of the two alleles of pistil, the pollen fails to form pollen tube.
Reason : The incompatibility is due to the genotype of the pollen producing plant.
- Q.85 **Assertion :** The pollen grains of dicots are tricolpate.
Reason : It has 3 distinct lens shaped apertures.
- Q.86 **Assertion :** Main body of an ovule is called nucellus.
Reason : The nucellus is well developed in polypetalae.
- Q.87 **Assertion :** Some of the Angiospermic plants are propagated only by vegetative propagation.
Reason : They have lost the capacity of seed formation.
- Q.88 **Assertion :** Clone is formed by amphimixis.
Reason : In amphimixis, new plants are formed without fertilization and meiosis.
- Q.89 **Assertion :** In apomixis, plants are formed in new genetic sequence.
Reason : In apomixis two of genetical similar type of organisms fuse together.
- Q.90 **Assertion :** Diplospory is also known as diploid parthenogenesis.
Reason : In this, embryo is formed from the diploid egg cell without fertilization.
- Q.91 **Assertion :** The plants in which amoeboid type of tapetum is found, middle layer of anther immediately degenerates.
Reason : Entire food of middle layer is absorbed by tapetum.

- Q.92 **Assertion :** Grafting is possible only in dicot plants.
Reason : In these plants vascular cambium is absent.
- Q.93 **Assertion :** When formation of embryo takes place inside the ovule nucellus or integuments then it is called "adventive embryony"
Reason : In adventive embryo, formation of embryo occurs at place other than the mother place.
- Q.94 **Assertion :** seedless fruits are formed in parthenocarpy.
Reason : In this process fruits are formed without fertilization.
- Q.95 **Assertion :** The plants in which glandular tapetum is found, formation of exine of pollen grains takes place in these plants.
Reason : Ubisch bodies formed only in glandular tapetum which participate in the formation of exine.
- Q.96 **Assertion :** Occurrence of two male gametes is the constant feature of male gametophyte of angiosperms.
Reason : Only in-vitro development takes place of male gametophyte of angiosperms.
- Q.97 **Assertion :** In Legume plants, naturally self pollination takes place.
Reason : Both the types of reproductive organs are present inside the keel and it always remains closed.
- Q.98 **Assertion :** Xenia is the effect of pollen grains on the structure of endosperm.
Reason : Xenia effect is produced in the seed of Maize due to heterofertilization.
- Q.99 **Assertion :** Night flowering plants are entomophilous.
Reason : Flowers of these plants are odour less.
- Q.100 **Assertion :** Pollination in Ophrys plant take place by pseudo copulation
Reason : Mimicry is found in flowers of this plant
- Q.101 **Assertion :** Symbiosis is found in between Pronuba moth and Yucca plant.
Reason : Life cycle of both completely depended on each other.
- Q.102 **Assertion :** Pollen grains are preserved for a long time in fossil form.
Reason : Sporopollenin is the chief component of exine of pollen grains
- Q.103 **Assertion :** Double fertilization is the universal feature of all plants.
Reason : In this fusion of only male gametes and secondary nucleus take place
- Q.104 **Assertion :** Cross-pollination is usually takes place in unisexual plants.
Reason : Cleistogamy promotes cross-pollination
- Q.105 **Assertion :** Synergids of embryo sac also help in fertilization in Angiosperms.
Reason : Obturators of synergids attract the pollen tube.
- Q.106 **Assertion :** Sexual reproduction takes place with the participation of two different type of gametes.
Reason : Sexual reproduction is also known as apomixis.
- Q.107 **Assertion :** Periplasmodium is formed by glandular tapetum.
Reason : Periplasmodium participate in the formation of exine of pollen grains.
- Q.108 **Assertion :** Nuclear type of endosperm is found in Coconut.
Reason : Endosperm of Coconut is formed by free nuclear divisions of primary endosperm nucleus.
- Q.109 **Assertion :** In Angiosperm, endosperm is generally triploid
Reason : In Oenothera plant always diploid endosperm is formed.
- Q.110 **Assertion :** After development of embryo, an ovule modifies into seed.
Reason : Seeds are also formed during the normal sexual reproduction without fertilization.

- Q.111 **Assertion :** Seeds of monocotyledon plants are called endospermic seeds.
Reason : Generally in seeds of monocotyledons plants food is stored in cotyledons.
- Q.112 **Assertion :** Seed and fruit formation are the advanced feature of Angiosperms.
Reason : Triple fusion is considered as universal feature of Angiosperms.
- Q.113 **Assertion :** Viability of seed is checked by TTC.
Reason : Highest viability of seed is found in Mangroove vegetation.
- Q.114 **Assertion :** Development of anther in Angiosperms take place by more than one archesporials.
Reason : This type of development of anther is called leptosporangiate.
- Q.115 **Assertion :** Gemetophytic phase starts with the formation of pollen grain.
Reason : Study of structure of pollen grains is called palynology.
- Q.116 **Assertion :** In agamospermy, genetic variations are produced in progeny.
Reason : In this process, new progeny is formed by gametic fusion.
- Q.117 **Assertion :** Anemophily includes wastage of pollen grains.
Reason : Anemophilus flowers are neither attractive nor fragrant.
- Q.118 **Assertion :** Pollen tube shows apical growth.
Reason : Growth of pollen tube is controlled by generative nucleus.
- Q.119 **Assertion :** Polygonum type of embryo sac is the most common in Angiosperms.
Reason : Polygonum type of embryo sac is monosporic type.

ANSWER KEY

Q.1	4	Q.2	2	Q.3	2	Q.4	3	Q.5	3	Q.6	4	Q.7	1
Q.8	4	Q.9	1	Q.10	1	Q.11	4	Q.12	4	Q.13	3	Q.14	1
Q.15	1	Q.16	2	Q.17	4	Q.18	4	Q.19	3	Q.20	2	Q.21	4
Q.22	4	Q.23	2	Q.24	2	Q.25	2	Q.26	2	Q.27	2	Q.28	3
Q.29	4	Q.30	4	Q.31	2	Q.32	4	Q.33	4	Q.34	2	Q.35	3
Q.36	4	Q.37	2	Q.38	1	Q.39	3	Q.40	4	Q.41	2	Q.42	2
Q.43	1	Q.44	4	Q.45	3	Q.46	4	Q.47	4	Q.48	1	Q.49	2
Q.50	2	Q.51	2	Q.52	1	Q.53	3	Q.54	1	Q.55	2	Q.56	3
Q.57	4	Q.58	1	Q.59	3	Q.60	2	Q.61	4	Q.62	1	Q.63	2
Q.64	4	Q.65	2	Q.66	3	Q.67	2	Q.68	2	Q.69	4	Q.70	2
Q.71	3	Q.72	1	Q.73	1	Q.74	3	Q.75	3	Q.76	2	Q.77	2
Q.78	1	Q.79	1	Q.80	2	Q.81	3	Q.82	3	Q.83	3	Q.84	1
Q.85	1	Q.86	2	Q.87	1	Q.88	4	Q.89	4	Q.90	1	Q.91	1
Q.92	3	Q.93	2	Q.94	1	Q.95	1	Q.96	3	Q.97	1	Q.98	1
Q.99	3	Q.100	1	Q.101	1	Q.102	1	Q.103	4	Q.104	3	Q.105	3
Q.106	3	Q.107	4	Q.108	1	Q.109	2	Q.110	3	Q.111	3	Q.112	2
Q.113	3	Q.114	3	Q.115	2	Q.116	4	Q.117	2	Q.118	3	Q.119	2