Exercise-1

✍ **Marked Questions are Revision Questions.**

ONLY ONE OPTION CORRECT TYPE

SECTION - A # SEXUAL REPRODUCTION: INTRODUCTION

1. "Flower is a modified shoot" according to-
(1) Theophrastus (2) Pliny (3) Goethe (4) Dioscorides

2. Functions of sepals in a flower are -
(1) Photosynthesis (2) Protection (3) Both (1) and (2) (4) Sporogenesis

3.✍ The plants which flower only once in their life-
(1) Monocarpic (2) Polycarpic (3) Amphicarpic (4) None

SECTION - B # MALE REPRODUCTIVE PART

1. The total nuclei in mature male gametophyte of an angiosperm are
(1) 2 (2) 3 (3) 4 (4) 5

2. Compound pollengrains are found in
(1) *Calotropis* (2) *Cyperus* (3) *Typha* (4) None

3.✍ Pollinium can be seen in
(1) *Calotropis* (2) *Coelogynae* (3) *Asclepias* (4) All the above

4.✍ Sculpturing on the surface of pollen grain is due to the activity of
(1) Foot layer and tactum (2) Tactum
(3) Tactum and sporopollenin (4) Footlayer and Baculate layer.

5. Hay fever (Allergy) is caused due to pollen grains of
(1) *Amaranthus* (2) *Sorghum* (3) *Ambrosia* (4) All the above.

6. Chromosome number in pollen grain is 6. What shall be it's number in leaf tip cells.
(1) 6 (2) 12 (3) 24 (4) 3

7.✍ There is an abundant occurrence of fossilised pollen grains since it is resistant due to-
(1) Lignocellulose (2) Sporopollenin (3) Pectocellulose (4) Pectolignin

8. How many pollen mother cells will form 1000 pollen grains?
(1) 200 (2) 250 (3) 300 (4) 100

9. Monothecous anthers present in-
(1) Malvaceae (2) Leguminosae (3) Solanaceae (4) Compositae

10.✍ Dimorphic tapetum is present in-
(1) *Typha* (2) *Portulaca*
(3) *Alectra thomsonii* (4) *Poa*

11. In a pollen grain, larger nucleus is-

(1) Generative nucleus (2) Vegetative nucleus

(3) Polar nucleus (4) none of these

12. If sporangia are developed from a single initial cell, the development of sporangia is designated as

(1) Eusporangiate (2) Leptosporangiate

(3) Monosporangiate (4) Monocarpic

13. 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

14. '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

15. All the cells of anther are diploid except

(1) Endothecial cells (3) Microspore mother cells

(2) Epidermal cells (4) Pollen grains

16. Anther of *Arceuthobium* plant is

(1) Tetra sporangiate (2) Bisporangiate

(3) Monosporangiate (4) Above (1) and (2) both

17. Linear pollen tetrad is found in

(1) *Butomopsis* (2) *Polygonum*

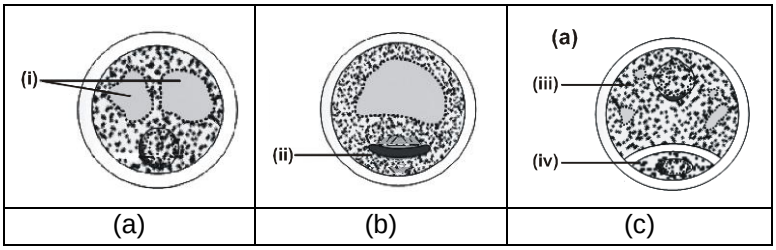
(3) *Magnolia* (4) *Halophila*

18. Sporopollenin provides resistance to the pollen grain it is chemically

(1) Protein (2) Fatty substance

(3) Hetropolysaccharide 4) Homopolysaccharide

19. #



(a) (b) (c)

In the above diagrams identify i, ii, iii and iv and select the suitable options.

(1) i - Vacuole; ii - symmetrical spindle, iii - Vegetative cell; iv - generative cell

(2) i - Cytoplasm; ii - Asymmetrical spindle, iii - Generative cell; iv - Vegetative cell

(3) i - Nuclei; ii - Symmetrical spindle, iii - Tube cell; iv - Vegetative cell

(4) i - Vacuole; ii -Asymmetrical spindle, iii - Vegetative cell; iv - generative cell

20. Choose incorrect statement.
(1) In western countries, a large number of pollen products in the form of tablets and syrups are available in market.
(2) Some cereals such as rice and wheat, pollen grains lost viability within one year of their release.
(3) It is possible to store pollen grains of a large number of species for year in liquid nitrogen (–196°C).
(4) Store pollen grains can be used in crop breeding programme.

21. Ubish bodies found in tapetal cells help in formation of
(1) Pollenkit and pollinia (2) Exine
(3) Sporopollenin (4) Intine and pollenkit

22. Largest pollen grain is found in-
(1) *Halophila* (2) *Myosotis* (3) *Mirabilis* (4) *Lodoicea*

23. Number of prothalial cells in male gametophyte of Angiospermic plant is
(1) 0 (2) 2 (3) 3 (4) 1

SECTION - C # FEMALE REPRODUCTIVE PART

1. Which of the following is diploid
(1) Egg (2) Synergids (3) Antipodal cells (4) Secondary nucleus

2. An orthrotropous 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

3. The normal or polygonum type of embryo sac is
(1) Monosporic and eight nucleate (2) Tetrasporic and six nucleate
(3) Monosporic and four nucleate (4) Bisporic and eight nucleate

4. The function of endothelium is
(1) It protects ovule from toxic substances (2) It helps in fertilization
(3) It provides nutrition to embryosac (4) It takes part in deshiscence of Anther

5. Placental or funicular outgrowth present at the micropylar end that directs the passage of pollen tube in to the ovule is
(1) Aril (2) Caruncle (3) Obturator (4) Raphe

6. 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

7. Ovule turns at more than 360º angle is due to excessive growth of funicle in
(1) Campylotropous ovule (2) Anatropous ovule
(3) Orthotropous ovule (4) Circinotropous ovule

8. In which of the following plant, the number of ovules in an ovary may be more than one in
(1) Wheat (2) Paddy (3) Papaya (4) Mango

9. Polar nuclei are located in-
(1) Pollen tube (2) Embryo sac (3) Ovule (4) Thalamus

10. The ovule of *capsella* is-

(1) Bitegmic (2) Unitegmic (3) Ategmic (4) Polytegmic

11. In the embryo sac of *Oenothera* no. of antipodal cells are-

(1) Three (2) One (3) Two (4) None

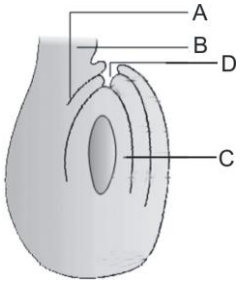
12. Caruncle is derived from-

(1) Peduncle (2) Cotyledon (3) Integument (4) none of these

13. Group of lignified cells above the vascular supply of funiculus, which acts as barrier for the growing embryo sac into the base is called-

(1) Nucellar beak (2) Epistase (3) Hypostase (4) Perisperm

14.# The given figure shows a typical anatropous ovule. What do A, B, C and 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

15. In Angiosperms, the functional megaspore of a linear tetrad is the -

(1) First nearest to the micropyle (2) Second from the micropyle

(3) Third from the micropyle (4) Fourth from the micropyle

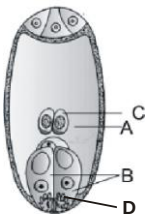
16. The megasporangium of the angiosperms on maturation gives rise to-

(1) Fruit (2) Seed (3) Embryo (4) Cotyledon

17. Bisporic type of embryo sac is found in-

(1) *Polygonum* (2) *Oenothera* (3) *Adoxa* (4) *Allium*

18.# The given figure shows a mature embryo sac. What do A, B, C and D represents.



(1) A →Embryosac, B →Synergids, C →Central cell, D →Micropylar end

(2) A →Central cell, B →Synergids, C→Polar nuclei, D→Micropylar end

(3) A →Synergids, B →Polar nuclei, C →Central cell, D →Filiform apparatus

(4) A →Central cell, B →Synergids, C→Polar nuclei, D →Filiform apparatus

19. The site of meiotic division in higher plants is
(1) Vegetative buds (2) Root tip cells (3) Stomatal cells (4) Spore mother cells

20. How many cells are present in the female gametophyte of *Capsella* before fertilization?
(1) 3 (2) 6 (3) 7 (4) Many

SECTION - D # POLLINATION

1. Flowers never open in
(1) Chasmogamy (2) Herkogamy (3) Cleistogamy (4) None

2. Pollination by lever mechanism is found in
(1) *Ficus* (2) *Calotropis* (3) *Salvia* (4) *Yucca*

3. Hypohydrophily occurs in
(1) *Vallisneria* (2) *Elodea* (3) Alisma (4) *Hydrilla*

4. Stigma is always rough and sticky in-
(1) Entomophilous flowers (2) Anemophilous flowers
(3) Hydrophilous flowers (4) All types of flowers

5. Fragrant flowers with well developed nectaries are an adaptation for-
(1) Zoophily (2) Anemophily (3) Entomophily (4) Hydrophily

6. Myrmacophily is pollination by-
(1) Ants (2) Moths (3) Birds (4) Bats

7. Pollination by snails and slugs is-
(1) Ornithophily (2) Chiropterophily (3) Entomophily (4) Malacophily

8. Some flowers possess pleasant odour and attractive colours for-
(1) Entomophily (2) Hydrophily (3) Anemophily (4) All of above

9. From among the situations given below, choose the one that prevents both autogamy and geitonogamy.
(1) Monoecious plant bearing unisexual flowers
(2) Dioecious plant bearing only male or female flowers
(3) Monoecious plant with bisexual flowers
(4) Dioecious plant with bisexual flowers

10. Anthesis is
(1) Opening of flower bud (2) pollen mother cell under going meiosis
(3) Dehiscence of Anther (4) Stigma becomes receptive

SECTION - E # FERTILIZATION AND EMBRYOGENESIS, SEED AND POLYEMBRYONY

1. How many Nucleus participate in double fertilization of *Capsella*
(1) 2 (2) 5 (3) 3 (4) 4

2. Development of fruit with out fertilization is
(1) Parthenocarpy (2) Parthenogenesis (3) Sporogamy (4) Autogamy

3. Zygote of *Capsella bursapastoris* divides through
(1) Longitudinal division (2) Equal transverse division
(3) Unequal transverse division (4) Oblique division

4. How many meiosis are required for the formation of 100 grains of wheat?
(1) 100 (2) 200 (3) 150 (4) 125

5. Double fertilization was discovered by Nawaschin in
(1) *Polygonum, Magnolia* (2) *Lilium, Polygonum*
(3) *Fritillaria, Lilium* (4) *Fritillaria, Pepromea*

6. Mature endosperm with irregularity and unevenness in its surface is called Ruminate endosperm. It is found in
(1) Betalnut (2) Maize (3) Coconut (4) Date palm

7. *Casuarina* shows
(1) Porogamy (2) Mesogamy (3) Chalazogamy (4) Acrogamy

8. Which statement is true?
(1) The formation of fruit without fertilization is called parthenocarpy.
(2) The membranous coating of radicle in monocot seed is called coleorhiza.
(3) The development of new individual plant without meiosis and gametic fusion is called Apomixis.
(4) All the above.

9. The phenomenon of pollen tube entering the ovule laterally through integuments is called
(1) Mesogamy (2) Porogamy (3) Chalazogamy (4) None of these

10. Pollen tube enters in embryo sac through
(1) egg cell (2) synergid (3) Antipodal cell (4) Degenerated synergid

11. The effect of pollen grain on colour of endosperm is called
(1) Position effect (2) Warburg effect (3) Metaxenia (4) Xenia

12. Which of the following secrete chemical substances for attracting pollen tube towards micropyle of ovule
(1) Obturator (2) Synergid (3) Filiform apparatus (4) Antipodal cells

13. Syngamy is
(1) Fusion of two cells (2) Fusion of two nuclei
(3) Fusion of two gametes (4) Fusion of two gametic nuclei

14. The fusion product of polar nuclei and male gamete is-
(1) Secondary nucleus (2) Triple fusion
(3) Primary endosperm nucleus (4) Zygote

15. How many meiotic divisions are essential for formation of 100 seeds in cyperaceae family-
(1) 100 (2) 125 (3) 150 (4) 200

16. In angiosperms normally after fertilization
(1) The zygote divides earlier than the primary endosperm nucleus
(2) The primary endosperm nucleus divides earlier than the zygote
(3) Both the zygote and primary endosperm nucleus divide simultaneously
(4) Both the zygote and primary endosperm nucleus undergo a resting period

17. If the number of haploid chromosomes in Gymnosperm is 12, then what will be the number of chromosomes in root and endosperm -
(1) 12, 12 (2) 12, 24 (3) 24, 12 (4) 24, 36

18. In the embryo of a typical dicot and a grass, true homologous structures are:
(1) Coleorhiza and coleoptile (2) Coleoptile and scutellum
(3) Cotyledons and scutellum (4) Hypocotyl and radicle

19. In the flower, if the megaspores forms without meiosis and if one of the megaspores develops into an embryosac, its nuclei would be:
(1) Haploid (2) Diploid
(3) A few haploid and a few diploid (4) With varying ploidy.

20. Which one of the following pairs of plant structure has haploid number of chromosomes?
(1) Nucellus and antipodal cells (2) Egg nucleus and secondary nucleus
(3) Megaspore mother cell and antipodal cell (4) Egg cell and antipodal cell

21. In albuminous seeds the food is stored in
(1) Cotyledons (2) Endosperm (3) Plumule (4) Testa

22. Match the column

Column-I	**Column-II**
(a) Prepotency	(i) shield shaped cotyledon of monocots.
(b) Scutellum	(ii) *Pinus*
(c) Translator mechanism	(iii) opening of floral bud
(d) Cleavage polyembryony	(iv) *Calotropis*
(e) Anthesis	(v) Apple

(1) (a) ii, (b) i, (c) iv, (d) v, (e) iii (2) (a) v, (b) i, (c) iv, (d) iii, (e) ii
(3) (a) iii, (b) v, (c) iv, (d) ii, (e) i (4) (a) v, (b) i, (c) iv, (d) ii, (e) iii

23. Embryology is -
(1) Development of embryo only (2) Mode of gametophyte formation
(3) Sporogenesis and fertilization (4) Sporogenesis, fertilization and embryogenesis

24. If Diploid embryo is directly formed by megaspore mother cell it is called
(1) Non recurrent agamospermy (2) adventive embryony
(3) Diplospory (4) Parthenogenesis

25. Which of the following statement is true.
(1) Pollen tube shows thigmotropic movement before entry in embryo sac.
(2) Perispermic seed is found in castor.
(3) Sporopollein is proteinaceous substance.
(4) Development of Anther is leptosporangiate type.

26. Polysiphonous pollen tube is a feature of
(1) Cruciferae (2) Asteraceae (3) Cucurbitaceae (4) Liliaceae

27. Perisperm is
(1) Outer part of endosperm (2) Destroyed synergid
(3) Destroyed secondary nucleus (4) remain of nucellus

28. The effect of pollen grain on the outside of endosperm is called.
(1) Xenia (2) Metaxenia (3) Nemac phenmenon (4) None

29. 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

30. Which structure develops into seed -
(1) Ovary (2) Ovule (3) Egg (4) Zygote

MISCELLANEOUS QUESTIONS

1. Which of the following are fleshy fruits.
(1) Guava, Orange (2) Mango, Mustard (3) Ground nut, Orange (4) All of them

2. How many meiosis are required to produce 50 seeds of tobacco?
(1) 62 (2) 62.5 (3) 63 (4) 50

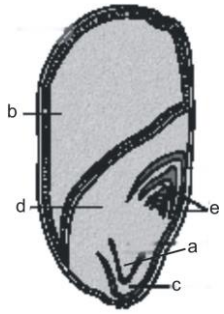
3. A true seed is
(1) Fertilized ovule (2) Fertilized ovule with embryo
(3) Unfertilized ovule (4) Fertilized ovary

4. Choose correct statements
(a) Seed typically consists of seed coat(s), cotyledon(s) and embryo axis.
(b) Cotyledons of embryo are simple strucures, generally thick and swollen due to storage of food reserve.
(c) Albuminous seeds have no residual endosperm e.g. pea, groundnut.
(d) Micropyle facilitates entry of O_2 and water into the seed during germination.
(1) a, b (2) b, c (3) a, b, c (4) a, b, d

5. Choose correct statement
(a) Recent record of 2000 year old viable seed is of the date palm, *Phoenix dactylifera* discovered during the archelogical excavation of king herod's palace near dead sea.
(b) Apomixis–special mechanism to produce seed with fertilization.
(c) Flower is modified leaf
(d) Seed have better adaptive strategies for dispersal to new habitats and help the species to colonise in other area.
(1) a and b (2) a, b, c (3) only a (4) a and d

6. The position of embryonal axis between plumule and cotyledons is called
(1) Hypocotyl (2) Epicotyl (3) Coleorhiza (4) Coleoptile

7.#



In the above diagram, identify the correct Labelling and 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

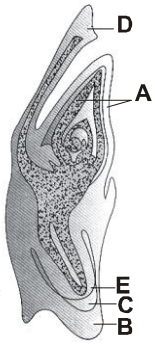
8. Match the column

Column-I	**Column-II**
(a) Helobial endosperm	(i) *Cucurbita*
(b) Hypophysis	(ii) *Areca*
(c) Ruminate endosperm	(iii) removal of anther from floral bud
(d) Emasculation	(iv) Radicle
(e) Mesogamy	(v) *Asphodelus*

(1) a - ii ; b - v ; c - i ; d - iii ; e - iv (2) a - v ; b - iv ; c - ii ; d - iii ; e - i

(3) a - i ; b - v ; c - iv ; d - ii ; e - iii (4) a - v ; b - iv ; c - ii ; d - i ; e - iii

9.#



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	ii	iv
(3)	ii	vii	vi	i	v
(4)	iii	vi	vii	i	iv

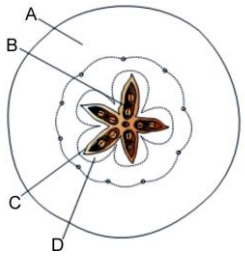
10. The micropyle in a seed helps in the entry of-

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

11. The tegmen of the seed develops from-

(1) Perisperm (2) Funicle (3) Inner integument (4) Outer integument

12.# The given figure shows false fruits of apple. What do A, B, C and D represents.



(1) A →Endosperm, B →Thalamus, C → Seed, D →Mesocarp

(2) A →Thalamus, B →Seed, C → Endocarp, D →Achene

(3) A →Thalamus, B →Seed, C → Endocarp, D →Mesocarp

(4) None of these

13. Match **column I** with **column II**

Column I	**Column II**
(A) Albuminous seed	(i) Pea, ground nut
(B) Non albuminous seed	(ii) Wheat, barley
(C) Apomixis	(iii) Banana
(D) Parthenocarpic fruit	(iv) Asteraceae and grasses

(1) A →(i), B →(iv), C →(iii), D → (ii)

(2) A →(ii), B →(i), C →(iv), D →(iii)

(3) A →(ii), B →(iv), C →(i), D →(iii)

(4) A →(ii), B →(iv), C →(iii), D →(i)

14. Choose wrong pair

(1)	Monocarpillary	(i) The gynoecium consists of a single pistil
(2)	Apocarpous	(ii) There are more than one separate pistil
(3)	Funicle	(iii) Stalk by which ovule attach with placenta.
(4)	Scutellum	(iv) It is stiuated towards both side (Dorsal and ventral of embryo axis)

15. Given below the following statements

A. Pollen grains are spherical and measures 25 – 50 μm in diameter.

B. At germpore sporopollenin is absent

C. Pollen grain consumption increase performance of athletes and race horses

D. Pollen grains are shed in two celled stage in more than 60% angiospermic plants

How many statements are wrong –

(1) 3 (2) 2 (3) 1 (4) 0

16. What will be the ploidy of nucellus, endosperm, female gametophyte and antipodal cells.

(1) 2n, 3n, n, n (2) n, 3n, 2n, n

(3) 2n, 3n, 2n, n (4) 3n, 2n, n, n

17. Mark the incorrect statements-

A. Dioecy prevents both autogamy and geitonogamy

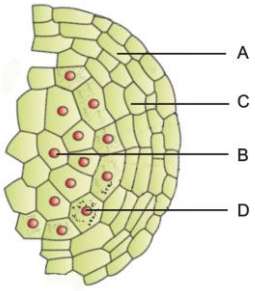
B. Self incompatibility prevents inbreeding

C. Geitonogamy is ecological cross pollination but genetically it is similar to autogamy

D. Both xenogamy and Geitonogamy decrease inbreeding depression

(1) B (2) C (3) A (4) D

18.# In the given figure A, B, C, D are –



(1) A – epidermis , B – microspore mother cell, C – endothecium, D – tapetum

(2) A – endothecium , B – microspore mother cell, C – middle layer, D – tapetum

(3) A – epidermis , B – microspore mother cell, C – middle layer, D – tapetum

(4) A – endothecium , B – megaspore mother cell, C – endothecium, D – middle layer

19. The correct sequence of embryo formation is-

(a) heart shaped, globular, mature embryo, proembryo

(b) proembryo, mature embryo, globular, heart shaped

(c) globular, proembryo, heart shaped, mature embryo

(d) proembryo, globular, heart shaped, mature embryo

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

20. How many statements are correct –

(a) Transfer of pollen grains from the anther to the stigma of another flower of the same plant is known as Geitonogamy.

(b) Pollination by water is quite rare in flowering plants and is limited to about 30 genera.

(c) Majority of insect pollinated flowers are large, colourful, fragrant and rich in nectar.

(d) Pollination guarantee the transfer of the right type of pollen. (Compatible pollen of the same species as the stigma)

(1) One (2) Two (3) Three (4) Four

21. A typical angiospermic anther is

(1) Bilobed, Monothecous, Tetrasporangiate

(2) Bilobed, Bisporangiate, Dithecous.

(3) Bilobed, Dithecous, Tetrasporangiate

(4) Unilobed, Dithecous, Tetransporangiate

22. All events from pollen deposition on the stigma until pollen tubes enter the ovule are together referred to as …….A……, which is ……B…….. process. Here A and B are respectively.
(1) A-Embryo sac interaction, B-Dynamic process
(2) A-Pollination, B-Static process
(3) A-pollen pistil interaction, B-static process
(4) A-pollen-pistil interaction, B-Dynamic process

23. Endosperm may either be completely consumed by the developing embryo in plant ……..'A'…… before seed maturation or it may persist in mature seed in plant ……'B'……...
A and B plants are respectively.
(1) A-castor, B-pea (2) A-coconut, B-Groundnut
(3) A-pea, B-Groundnut (4) A-Beans, B-castor

24. A typical dicolyledons embryos, consist of an embryonal axis and two cotyledons. The portion of embryonal axis above the level of cotyledons is the ……A…… and which terminates with the ……B……
A and B are respectively.
(1) Hypocotyl and Plumule (2) Hypocotyl and Radicle
(3) Epicotyl and Radicle (4) Epicotyl and Plumule

25. A typical microsporangium of angiosperm is surrounded by four wall layers.
I. Epidermis
II. Tapetum
III. Middle layer
IV. Endothecium
The correct sequence from outer to inner side is
(1) II, III, IV, I (2) I, IV, III, II (3) I, II, III, IV (4) IV, III, II, I

26. Perisperm is found in
(1) Beet (2) Black pepper (3) 1 and 2 both (4) In all angiosperms

27. Chasmocleistogamous flowers is/are found in
(a) Viola (common pansy)
(b) Oxalis
(c) Commelina
(1) a only (2) b and c only (3) a and c only (4) a, b, c

28. In _____ of angiosperm pollen grains are shed at 2 celled stage
(1) less than 60% (2) over 60% (3) less than 40% (4) over 90%

29. Anemophilous flowers have
(1) Sessile stigma (2) Small smooth stigma
(3) Coloured flower (4) Large feathery stigma

30. In monocot grafting is almost impossible because they lack
(1) Cambium (2) Ground tissue (3) Vascular bundle (4) Parenchymatous cells

31. The sausage tree (kigelia pinnate) is pollinated by
(1) Bat (2) Bird (3) Wind (4) Water

32. Tapetum is a part of
(1) Male gametophyte (2) Female gametophyte
(3) Ovary wall (4) Anther wall

33. The arrangement of megaspores in a tetrad in an angiosperm is
(1) Decussate (2) Tetrahedral (3) Linear (4) Isobilateral

34. Egg apparatus consists of
(1) Egg (2) Egg and Polar nuclei
(3) Egg and Synergids (4) Egg and Antipodal cells

35. What is the liquid part of green coconut?
(1) Endosperm (2) Female gametophyte
(3) Nucellus (4) Embryo

36. Pollen grains are
(1) Male gamete (2) Male gametopohyte
(3) Non-functional megaspore (4) Nucelus

37. Seed coat is formed by
(1) Integument (2) Nucellus (3) fruit wall (4) None

38. Wind pollinated flowers are
(1) Small, scented and colourless (2) Small, nonscented and colourless
(3) Big, scented and coloured (4) Big, nonscented and colourless

39. Virus free culture is got from
(1) Primary root (2) Pith of stem (3) apical cells (4) Lamina cells.

40. Radicle end of embryo is towards
(1) Hilum (2) Chalaza (3) Funicle (4) Micropyle

41. In a moncot, endosperm cells have 24 chromosomes. What shall be the chromosome number in embryo?
(1) 24 (2) 16 (3) 12 (4) 8

42. Ovule integument gets transformed into
(1) Seed (2) Seed coat (3) Fruit wall (4) Cotyledons

43. In 82% of angiosperm families, ovule is
(1) Anatropous (2) Orthotropous (3) Amphitropous (4) Circinotropous

44. Tapetal cells of stamens are
(1) Diploid, uninucleate (2) Tetraploid, binucleate
(3) Hexaploid, tetranucleate (4) Polyploid, multinucleate

45. Vegetative fertilization, which involves formation of endosperm, is fusion of
(1) One male gamete with diploid secondary nucleus
(2) Two vegetative cells
(3) Two male gametes
(4) Female gamete with secondary nucleus.

46. Largest cell of the ovule is
(1) Megaspore mother cell (2) Antipodal cell
(3) Central cell (4) Size of cells variable

47. Device for self pollination is
(1) Heterostyly (2) Dicliny (3) Unisexuality (4) None of the above

48. Rarely in angiosperms, the pollen tube develops further in embryo sac. The abnormality is called
(1) Metaxenia (2) Nemec phenomenon
(3) Xenia (4) Mesogamy

49. In flowering plants, meiosis takes place during
(1) Pollen grain formation (2) Seed formation
(3) Gamete formation (4) Seed germination

50. Which of the following statements is true with reference to cross pollination
(1) It most often results in higher yield of plants
(2) It occurs only in unisexual flowers
(3) It can fail to occur due to distance
(4) It requires production of large number of pollen grains

51. Pollen grains are produced in
(1) Ovary (2) Pollen sac (3) Filament (4) Stigma

52. For self pollination, a flower should be
(1) Asexual (2) Monosexual (3) Unisexual (4) Bisexual

53. Part which is grafted on the stump of another plant is called
(1) Graft (2) Bulbil (3) Scion (4) Stock

54. Grafting is not successful in monocots but is successful in dicots because they have
(1) Vascular bundles arranged in a ring
(2) Cambium for secondary growth
(3) Vessels with elements arranged end to end
(4) Cork cambium

55. Match the columns

Columns-I	**Columns-II**
a. Zoophily	1. Pollination by birds
b. Ornithophily	2. Pollination by insects
c. Entomophily	3. Pollination by bats
d. Chiropterophily	4. Pollination by animals.

(1) (a) — (3), (b) — (2), (c) — (1), (d) — (4) (2) (a) — (1), (b) — (2), (c) — (3), (d) — (4)
(3) (a) — (4), (b) — (1), (c) — (2), (d) — (3) (4) (a) — (4), (b) — (2), (c) — (1), (d) — (3)

56. In angiosperms, endosperm is formed by
(1) Division of fused polar nuclei
(2) Free nuclear division of magespore
(3) Division of fused synergids and male gamete
(4) Division of fused polar nuclei and male gamete

57. What would be number of chromosomes in aleurone layer if megaspore mother cell contains 10 chromosomes?
(1) 10 (2) 20 (3) 15 (4) None of hte above

58. During development of male gametophyte from pollen mother cell, there occurs
(1) Two meiotic divisions and one mitotic division
(2) Two mitotic divisions
(3) One meiotic and two mitotic division
(4) One meiotic cell dvision and one mitotic cell division

59. Male gametes are formed by
(1) Pollen cell (2) Generative cell (3) Pollen tube cell (4) Pollen mother cell

60. Embryo sac develops from megaspore mother cell through
(1) 1 meiosis and 2 mitosis (2) 1 meiosis and 3 mitosis
(3) 1 meiosis and two mitosis (4) 1 meiosis and 2 mitosis.

61. Versatile anthers are connected with
(1) Entomophily (2) Malacophily (3) Ornithophily (4) Anemophily

62. Eight nucleate embryosacs are
(1) Always monosporic
(2) Always bisporic
(3) Always tetrasporic
(4) Sometimes monosporic, sometimes, bisporic and sometimes tetrasporic.

63. Double fertilization leading to initiation of endosperm in angiosperms requires
(1) Fusion of one polar nucleus and second male gamete only
(2) Fusion of two polar nuclei and second male gamete only
(3) Fusion of 4 or more polar nuclei and second male gamete only
(4) All the above type of fusions in different types of angiosperms.

64. Anemophilous type of pollination is found in
(1) Coconut (2) *Salvia* (3) Bottle brush (4) *Vallisneria*

65. Entry of pollen tube through micropyle is
(1) Chalazogamy (2) mesogamy (3) Porogamy (4) Pseudogamy

66. Plants with poor root system are propagated through
(1) Layering (2) Leaf cutting (3) Stem cutting (4) Grafting

67. Nutritive layer of anther wall is
(1) Epidermis (2) Endothecium (3) tapetum (4) Archesporium

68. Suspensor of embryo is formed by
(1) Basal cell (2) Apical cell (3) Terminal cell (4) Hypophysis

69. In the monocotyledonous seeds the endosperm is seperated from the embryo by a distinct layer known as
(1) Testa (2) Tegmen (3) Aleurone layer (4) Scutellum

70. Choose the mismatched option
(1) Wind-*Cannabis*-anemophily (2) Water-*Zostera*-hydrophily
(3) Insects–*Salvia*-entomophily (4) Birds-*Adansonia*-ornithophily

71. The seed which have separate endosperm
(1) maize (2) Onion (3) Rice (4) Bean

72. For production of haploids, we culture
(1) Shoot tip (2) anther (3) root tip (4) None of these

73. What does the filiform apparatus do at the entrance into ovule?
(1) It helps in the entry of pollen tube into a synergid
(2) It prevents entry of more than one pollen tube into the embryo sac
(3) It brings about opening of the pollen tube
(4) It guides pollen tube from a synergid to egg

74. A plant cell has potential to develop into a full plant. This is called
(1) totipotency (2) gene cloning (3) tissue culture (4) regeneration

75. Xenia refers to effect of pollen on
(1) stem (2) taste of fruit (3) vascular tissue (4) endosperm

76. 200 seeds are produced from how many fruits of maize
(1) 200 (2) 100 (3) 50 (4) 5

77. An orthotropous ovule has micropyle and chalaza
(1) parallel to funicle (2) parellel alongwith ovule
(3) at right angle to funicle (4) in straight line with funicle

78. Perisperm is
(1) outer part to embryo sac (2) degenerate synergid
(3) degenerate secondary nucleus (4) remains of nucellus

79. Stem cutting is employed in the propagation of-
(1) Banana (2) Mango (3) Sugarcane (4) Cotton

80. The most common method of Vegetative propagation described by ancient gardeners is-
(1) Layering (2) Gootee (3) Grafting (4) Ground layering

81. Bulbils occur is-
(1) *Cycas* (2) *Agave* (3) *Dioscorea* (4) All the above

82. In a grafted plant, stock has 48 chromosomes while scion has 24 chromosomes. The chromosome number for root cells and eggs are-
(1) 48 and 24 (2) 24 and 24 (3) 24 and 12 (4) 48 and 12

83. In vegetative propagation by tubers, which of following remains constant through generations-
(1) Morphology (2) Vigour only
(3) Vigour and morphology only (4) Morphology, vigour and disease resistance

Exercise-2

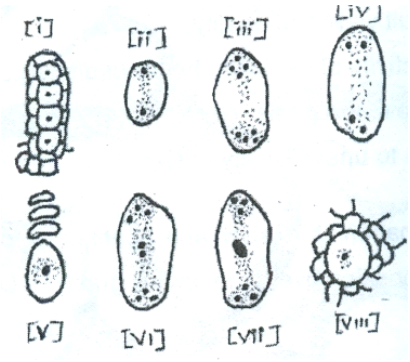
1. Which of the following characteristics of a flower would attract humming birds for pollination but not bees **(NSEB -2010)**

(i) Fragrant flowers (ii) Great amount of nectar
(iii) Long tubular flowers (iv) Deep-seated nectary
(v) Petals forming a lip for resting (vi) Yellow petals
(1) (i), (ii) and (v) only (2) (i), (iii) and (iv) only (3) (ii), (iv) and (vi) only (4) (i) and (ii) only

2. Filiform apparatus found during development in angiosperms is a thickening on the **(NSEB -2010)**
(1) antipodals (2) polar nuclei (3) egg (4) synergids

3. Which of the following is the correct combination of merits of an inflorescence? **(NSEB -2011)**
i. Flowers can be unisexual
ii. Increased efficiency of polllination
iii. Ensuring self pollination and fertility
iv. Attract pollinators easily
(1) i,ii and iv (2) ii,iii and iv (3) ii and iii (4) ii and iv

4.# Arrange the embryo-sac development stages of angiosperms in correct order: **(INBO- 2012)**



(1) v → i → iv → ii → iii → vii → vi → viii
(2) viii → v → ii → iv → iii → vii → vi → i
(3) i → ii → iv → v → viii → iii → vii → vi
(4) viii → i → v → ii → iv → iii → vi → vii

Exercise-3

PART - I : NEET / AIPMT QUESTION (PREVIOUS YEARS)

1. Which is the characteristics for Ornithophily **(AIPMT-1999)**
(1) Scented flowers
(2) Bright red coloured flowers and inflorescence
(3) White coloured funnel shaped large corolla
(4) Yellow flower with nectaries at the base of the corolla tube

2. Double fertilization involves **(AIPMT-2000)**

(1) Fusion of secondary nucleus with both male gametes.

(2) Fusion of secondary nucleus with one male gamete.

(3) Fusion of one nucleus withone male gamete.

(4) Any of the above

3. Anemophily occurs in **(AIPMT-2001)**

(1) *Salvia* (2) Bottle brush (3) Date palm (4) *Vallisneria*

4. What is the direction of micropyle in anatropous ovule **(AIPMT-2002)**

(1) Upward (2) Downward (3) Right (4) left

5. Which type of association is found in between entomophilous flower and pollinating agent **(AIPMT-2002)**

(1) Mutualism (2) Commensalism (3) Co-operation (4) Co-evolution

6. In flowering plants Archesporium gives rise to **(AIPMT-2003)**

(1) Wall of sporangium (2) Both wall and sporgenous cells

(3) Wall and tapetum (4) Tapetum and sporogenous cells

7. A diploid female plant is crossed with tetraploid male. The ploidy of endosperm will be **(AIPMT-2003)**

(1) Tetraploidy (2) Pentaploidy (3) Triploidy (4) Diploidy

8. Secondary nucleus present in the middle of embryo sac is **(AIPMT-2003)**

(1) Tetraploid (2) Triploid (3) Diploid (4) Haploid

9. In oogamy, fertilization occurs between **(AIPMT-2004)**

(1) Small non-motile female gamete and large motile male gamete

(2) Large non-motile female gamete and small motile male gamete

(3) A large non-motile female gamete and a small non-motile male gamete

(4) A large motile female gamete and a small non-motile male gamete

10. In which one part both the plants can be vegetatively propagated by leaf segments **(AIPMT-2005)**

(1) *Agave* and *Kalanchoe* (2) *Bryophyllum* and *Kalanchoe*

(3) *Asparagus* and *Bryophyllum* (4) *Chrysanthemum* and *Agave*

11. In a type of apomixis known as adventitive embryony, embryos develop directly from **(AIPMT-2005)**

(1) Nucellus or integument (2) Zygote

(3) Synergids of antipodals of embryo sac (4) Accessory embryo sace in the ovule.

12. Arangement of nuclei in normal dicot embryo sac is **(AIPMT-2006)**

(1) 3 + 3 +2 (2) 2 + 4 + 2 (3) 3 + 2 + 3 (4) 3 + 3 + 3

13. What would be number of chromosomes in the cells of aleurone layer in plant species have 8 chromosomes in its synergids **(AIPMT-2006)**

(1) 8 (2) 16 (3) 24 (4) 32.

14. Parthenocarpic fruits are produced by **(AIPMT-2006)**

(1) Treating plants with phenyl Mercuric acetate

(2) Treating plants with low concentrations of gibberellic acid and auxin

(3) Removing androecium of flowers before release of pollen grains

(4) Raising plants from vernalised seeds.

15. Which one is surrounded by callose wall **(AIPMT-2007)**

(1) Male gamete (2) Pollen grain

(3) Egg (4) Microspore mother cell.

16. Endosperm is consumed by developing embryo in the seed of **(AIPMT-2008)**

(1) Coconut (2) Pea (3) Maize (4) Castor

17. Unisexuality of flowers prevents **(AIPMT-2008)**

(1) Getionogamy but not xenogamy (2) Autogamy and geitonogamy

(3) Autogamy but not geitonogamy (4) Bot getionogamy and xenogamy

18. Which one of the following is resistant to enzyme action **(AIPMT-2008)**

(1) Pollen exine (2) Leaf cuticle (3) Cork (4) Wood fibre

19. An example of a seed with endosperm, perisperm, and caruncle is: **(AIPMT-2009)**

(1) castor (2) cotton (3) coffee (4) lily

20. Apomictic embryos in *citrus* arise from **(AIPMT-2010)**

(1) Maternal sporophytic tissue in ovule (2) Antipodal cells

(3) Diploid egg (4) Synergids

21. Wind pollinated flowers are **(AIPMT-2010)**

(1) Small, producing large number of dry pollen grains

(2) Large producing abundant nectar and pollen

(3) Small, producing nectar and dry pollen

(4) Small, brightly coloured, producing large number of pollen grains

22. Transfer of pollen grains from the anther to the stigma of another flower of the same plant is called **(AIPMT-2010)**

(1) Geitonogamy (2) Karyogamy (3) Autogamy (4) Xenogamy

23. 'Filiform' apparatus is a characteristic feature of: **(AIPMT-2011)**

(1) Suspensor (2) Egg (3) Synergid (4) Zygote

24. Nucellar polyembryony is reported in species **(AIPMT-2011)**

(1) *Citrus* (2) *Gossypium* (3) *Triticum* (4) *Brassica*

25. In which one of the following pollination is autogamous **(AIPMT-2011)**

(1) Geitonogamy (2) Xenogamy (3) Chasmogamy (4) Cleistogamy

26. Wind pollination is common in: **(AIPMT-2011)**

(1) Legumes (2) Lilies (3) Grasses (4) Orchids

27. Both, autogamy and geitonogamy are prevented in - **(AIPMT pre.-2012)**
(1) Papaya (2) Cucumber (3) Castor (4) Maize

28. An organic substance that can withstand environmental extremes and cannot be degraded by any enzyme is : **(AIPMT pre.-2012)**
(1) Cuticle (2) Sporopollenin (3) Lignin (4) Cellulose

29. The gynoecium consists of many free pistils in flowers of **(AIPMT pre.-2012)**
(1) *Aloe* (2) Tomato (3) *Papaver* (4) *Michelia*

30. Even in absence of pollinating agents seed setting is assured in **(AIPMT pre.-2012)**
(1) *Commellina* (2) *Zostera* (3) *Salvia* (4) Fig

31. Which one of the following statements is wrong? **(AIPMT main-2012)**
(1) When pollen is shed at two-celled stage, double fertilization does not take place.
(2) Vegetative cell is larger than generative cell.
(3) Pollen grains in some plants remain viable for months.
(4) Intine is made up of cellulose and pectin.

32. Plants with ovaries having only one or a few ovules, are generally pollinated by: **(AIPMT main-2012)**
(1) Bees (2) Butterflies (3) Birds (4) Wind

33. What is the function of germpore? **(AIPMT main-2012)**
(1) Emergence of radicle
(2) Absorption of water for seed germination
(3) Initiation of pollen tube
(4) Release of male gametes

34. Perisperm differs from endosperm in **(NEET-2013)**
(1) having no reserve food
(2) being a diploid tissue
(3) its formation by fusion of secondary nucleus with several sperms
(4) being a haploid tissue

35. Megasporangium is equivalent to: **(NEET-2013)**
(1) Fruit (2) Nucellus (3) Ovule (4) Embryo sac

36. Advantage of cleistogamy is : **(NEET-2013)**
(1) More vigorous offspring (2) No dependence of pollinators
(3) Vivipary (4) Higher genetic variability

37. Which one of the following statements is correct? **(NEET-2013)**
(1) Sporogenous tissue is haploid (2) Endothecium produces the microspores
(3) Tapetum nourishes the developing pollen (4) Hard outer layer of pollen is called intine

38. Which one of the following statements is correct? **(AIPMT-2014)**
(1) The seed in grasses is not endospermic.
(2) Mango is a parthenocarpic fruit
(3) A proteinaceous aleurone layer is present in maize grain.
(4) A sterile pistil is called a staminode.

39. Geitonogamy involves **(AIPMT-2014)**

(1) Fertilization of a flower by the pollen from another flower of the same plant

(2) Fertilization of a flower by the pollen from same flower.

(3) Fertilization of a flower by the pollen from a flower of another plant in the same population

(4) Fertilization of a flower by the pollen from a flower of another plant belonging to a distant population

40. Male gametophyte with least number of cells is present in: **(AIPMT-2014)**

(1) *Pteris* (2) *Funaria* (3) *Lilium* (4) *Pinus*

41. Pollen tablets are avalable in the market for: **(AIPMT-2014)**

(1) In vitro fertilization (2) Breeding programmes

(3) Supplementing food (4) Ex situ conservation

42. Function of filiform apparutus is to: **(AIPMT-2014)**

(1) Recognize the suitable pollen at stigma (2) Stimulate division of genrative cell

(3) Producer nector (4) Guide the entry of pollen tube

43. Non- albuminous seed is produced in: **(AIPMT-2014)**

(1) Maize (2) Castor (3) Wheat (4) Pea

44. Which one of the following statements is not true? **(AIPMT-2015)**

(1) Pollen grains of some plants cause severe allergies and bronchial afflictions in some people

(2) The flowers pollinated by flies and bats secrete foul odour to attract them

(3) Honey is made by bees by digesting pollen collected from flowers

(4) Pollen grains are rich in nutrients, and they are used in the form of tablets and syrups

45. The hilum is a scar on the: **(AIPMT-2015)**

(1) Fruit, where it was attached to pedicel (2) Fruit, where style was present

(3) Seed, where micropyle was present (4) Seed, where funicle was attached

46. Which one of the following may require pollinators, but is genetically similar to autogamy? **(AIPMT-2015)**

(1) Xenogamy (2) Apogamy (3) Cleistogamy (4) Geitonogamy

47. Which of the following are the important floral rewards to the animal pollinators? **(AIPMT-2015)**

(1) Nectar and pollen grains (2) Floral fragrance and calcium crystals

(3) Protein pellicle and stigmatic exudates (4) Colour and large size of flower

48. Transmission tissue is characteristic feature of **(AIPMT-2015)**

(1) Solid style (2) Dry stigma (3) Wet stigma (4) Hollow style

49. Male gametophyte in angiosperms produces: **(Re-AIPMT-2015)**

(1) Single sperm and a vegetative cell (2) Single sperm and two vegetative cells

(3) Three sperms (4) Two sperms and a vegetative cell

50. Coconut water from a tender coconut is: **(Re-AIPMT-2015)**

(1) Free nuclear endosperm (2) Innermost layers of the seed coat

(3) Degenerated nucellus (4) Immature embryo

51. Flowers are unisexual in: **(Re-AIPMT-2015)**

(1) Cucumber (2) China rose (3) Onion (4) Pea

52. Which one of the followning fruits is parthenocarpic? **(Re-AIPMT-2015)**

(1) Apple (2) Jackfruit (3) Banana (4) Brinjal

53. Filiform apparatus is characteristic feature of: **(Re-AIPMT-2015)**

(1) Nucellar embryo (2) Aleurone cell (3) Synergids (4) Generative cell

54. The wheat grain has an embryo with one, large, shield-shaped cotyledon known as: **(Re-AIPMT-2015)**

(1) Coleorrhiza (2) Scutellum (3) Coleoptile (4) Epiblast

55. In angiosperms, microsporogenesis and megasporogenesis: **(Re-AIPMT-2015)**

(1) form gametes without further divisions (2) Involve meiosis

(3) occur in ovule (4) occur in anther

56. Proximal end of the filament of stamen is attached to the: **(NEET-I-2016)**

(1) Thalamus or petal (2) Anther

(3) Connective (4) Placenta

57. The coconut water from tender coconut represents: **(NEET-I-2016)**

(1) Free nuclear endosperm (2) Endocarp

(3) Fleshy mesocarp (4) Free nuclear proembryo

58. Which of the following statements is not correct? **(NEET-I-2016)**

(1) Some reptiles have also been reported as pollinators in some plant species. ,

(2) Pollen grains of many species can germinate on the stigma of a flower, but only one pollen tube of the same species grows into the style.

(3) Insects that consume pollen or nectar without bringing about pollination are called pollen / nectar robbers.

(4) Pollen germination and pollen tube growth are regulated by chemical components of pollen interacting with those of the pistil

59. Seed formation without fertilization in flowering plants involves the process of: **(NEET-I-2016)**

(1) Apomixis (2) Sporulation (3) Budding (4) Somatic hybridization

60. Which one of the following statements is **not** true? **(NEET-I-2016)**

(1) Stored pollen in liquid nitrogen can be used in the crop breeding programmes

(2) Tapetum helps in the dehiscence of anther

(3) Exine of pollen grains is made up of sporopollenin

(4) Pollen grains of many species cause severe allergies

61. Which one of the following in and generates new genetic combinations leading to variation?

(1) Nucellar polyembryony (2) Vegetative reproduction **(NEET-II-2016)**

(3) Parthenogenesis (4) Sexual reproduction

62. Match **Column-I** with **Column-II** and select the correct option using the codes given below: **(NEET-II-2016)**

Column-I	**Column-II**
a. Pistils fused together	(i) Gametogenesis
b. Formation of gametes	(ii) Pistillate
c. Hyphae of higher Ascomycetes	(iii) Syncarpous
d. Unisexual female flower	(iv) Dikaryotic

Codes:

	a	**b**	**c**	**d**
(1)	(iii)	(i)	(iv)	(ii)
(2)	(iv)	(iii)	(i)	(ii)
(3)	(ii)	(i)	(iv)	(iii)
(4)	(i)	(ii)	(iv)	(iii)

63. In majority of angiosperms **(NEET-II-2016)**
(1) a small central cell is present in the embryo sac:
(2) egg has a filiform apparatus
(3) there are numerous antipodal cells
(4) reduction division occurs in the megaspore mother cells

64. Pollination in water hyacinth and water lily is brought about by the agency of **(NEET-II-2016)**
(1) bats (2) water (3) insects or wind (4) birds

65. The ovule of an angiosperm is technically equivalent to **(NEET-II-2016)**
(1) megaspore (2) megasporangium (3) megasporophyll (4) megaspore mother cell

66. Flowers which have single ovule in the ovary and are packed into inflorescence are usually pollinated by: **(NEET-2017)**
(1) Water (2) Bee (3) Wind (4) Bat

67. A dioecious flowering plant prevents both: **(NEET-2017)**
(1) Autogamy and xenogamy (2) Autogamy and geitonogamy
(3) Geitonogamy and xenogamy (4) Cleistogamy and xenogamy

68. Attractants and rewards are required for: **(NEET-2017)**
(1) Anemophily (2) Entomophily (3) Hydrophily (4) Cleistogamy

69. Winged pollen grains are present in **(NEET-2018)**
(1) Mustard (2) Pinus (3) Mango (4) Cycas

70. Which of the following has proved helpful in preserving pollen as fossils? **(NEET-2018)**
(1) Pollenkitt (2) Sporopollenin (3) Oil content (4) Cellulosic intine

71. Persistent nucellus in the seed is known as **(NEET-1-2019)**
(1) Tegmen (2) Chalaza (3) Perisperm (4) Hilum

72. In some plants, the female gamete develops into embryo without fertilization. This pheno menon is known as: **(NEET-1-2019)**
(1) Parthenogenesis (2) Autogamy (3) Parthenocarpy (4) Syngamy

73. What is the fate of the male gametes discharged in the synergid? **(NEET-1-2019)**
(1) One fuses with the egg and other fuses with central cell nuclei.
(2) One fuses with the egg, other(s) degenerate in the synergid.
(3) All fuse with the egg.
(4) One fuses with the egg, other (s) fuse (s) with synergid nucleus.

74. Which one of the following statements regarding post-fertilization development in flowering plants is incorrect ? **(NEET-1-2019)**
(1) Ovules develop into embryo sac (2) Ovary develops into fruit
(3) Zygote develops into embryo (4) Central cell develops into endosperm

75. Which is the most common type of embryo sac in angiosperms? **(NEET-2-2019)**
(1)Tetrasporic with one mitotic stage of divisions
(2) Monosporic with three sequential mitotic divisions
(3) Monosporic with two sequential mitotic divisions
(4) Bisporic with two sequential mitotic divisions

76. What type of pollination takes place in Vallisneria ? **(NEET-2-2019)**
(1) Pollination occurs in submerged condition by water.
(2) Flowers emerge above surface of Water and pollination occurs by insects.
(3) Flowers emerge above water surface and pollen is carried by wind.
(4) Male flowers are carried by water currents to female flowers at surface of water.

77. In which one of the following, both autogamy and geitonogamy are prevented? **(NEET-2-2019)**
(1) Wheat (2) Papaya (3) Castor (4) Maize

PART - II : AIIMS QUESTION (PREVIOUS YEARS)

1. The cotyledon in monocot plant is one and **(AIIMS-1999)**
(1) Lateral (2) Terminal (3) Basal (4) Vertical

2. The root cell of wheat plant has 42 chromosomes. What would be the number of chromosomes in the synergid cells **(AIIMS-1999)**
(1) 7 (2) 14 (3) 21 (4) 28

3. Pollen grain are able to tolerate extremes of temperature and desiccation because their exine consists of **(AIIMS-2003)**
(1) Cutin (2) Suberin (3) Sporopollenin (4) Callose

4. Pollen tube usually enters the embryo sac through **(AIIMS-2004)**
(1) one of the synergids (2) Directly penetrates the egg
(3) Between one synergid and central cell (4) By knocking of antipodal cells

5. Double fertilization involves **(AIIMS-2005)**
(1) Fertilization of egg by two male gametes
(2) Fertilization of two eggs in the same embryo sac by two sperms brought by one pollen tube
(3) Fertilization of the egg and the central cell by two sperms brought by the same pollen tube
(4) Fertilization of the egg and the central cell by two sperms brought by two different pollen tubes.

6. A scion is grafted on a stock.Quality of fruits produced will depend upon genotypes of **(AIIMS-2006)**
(1) Scion (2) Stock (3) 1 and 2 both (4) None of the above

7. Match the following ovular structure with post fertilization structure and select the correct alternative. **(AIIMS-2007)**

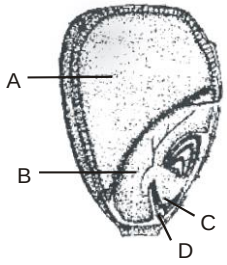
(a) Ovule	1. Endosperm
(b) Funiculus	2. Aril
(c) Nucellus	3. Seed
(d) Polar nuclei	4. Perisperm

(1) a–3, b–2, c–4 , d–1 (2) a–3, b–2, c–1, d–4
(3) a–1, b–2, c–3, d–4 (4) a–2, b–3, c–1, d–4

8. The plant part which consists of two generations one within the other, is **(AIIMS-2008)**
(1) Embryo (2) Germinated pollen grain
(3) Unfertilized ovule (4) Seed

9. Which one of the following pairs of plant structures has haploid number of chromosomes? **(AIIMS-2008)**
(1) nucellus and antipodal cells. (2) egg nucleus and secondary nucleus.
(3) megaspore mother cell and antipodal cells. (4) egg cell and antipodal cells.

10.# The given figure shows L.S of the seed of maize. What do A, B, C and D represent? **(AIIMS-2010)**



(1) A : endosperm, B : scutellum, C: plumule, D : coleoptile
(2) A : scutellum, B : pericarp, C : radicle, D : coleoptile
(3) A: endosperm, B : scutellum, C : radicle, D : coleorrhiza
(4) A : scutellum, B : peri carp, C : plumule, D : coleorrhiza

11. The normal type of embryo sac is 8-nucleated and **(AIIMS-2011)**
(1) 8-celled (2) 7-celled (3) 6-celled (4) 5-celled

12. Embryo sac is **(AIIMS-2011)**
(1) megaspore (2) microgametophyte
(3) female gametophyte (4) megasporangium

13. Feathery stigma belongs to **(AIIMS-2011)**
(1) Wheat (2) Pea (3) *Datura* (4) *Caesalpinia*

14. A fertilized egg of a plant has 40 chromosomes. The number of chromosomes present in the microspore mother cell is **(AIIMS-2011)**
(1) 20 (2) 40 (3) 60 (4) 80

15. Chasmogamy refers to the condition where **(AIIMS-2012)**
(1) Flowers remains closed (2) Flowers are absent
(3) Flowers are open (4) Flower are gamopetalous

16. What is common between vegetative reproduction and apomixis? **(AIIMS-2013)**
(1) Both are applicable to only dicot plants
(2) Both bypass the flowering phase
(3) Both occur around the year
(4) Both produce progeny identical to the parent

17. Emasculation is not required when flowers are **(AIIMS-2013)**
(1) bisexual (2) intersexual (3) unisexual (4) either (a) or (b)

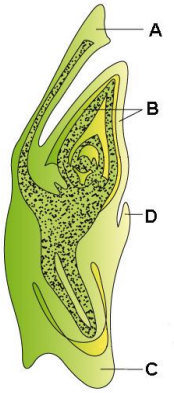
18. How many haploid nuclei are present in a mature pollen grain? **(AIIMS-2014)**
(1) One (2) Two (3) Three (4) Four

19. Match the **Column-I** with **Column-II** and select the correct options from the given codes **(AIIMS-2016)**

	Column-I		**Column-II**
A.	Parthenocarpy	(i)	Seed formation without fertilization
B.	Polyembryony	(ii)	More than one embryo in same seed
C.	Apomixis	(iii)	Seedless fruits without fertilization
D.	Somatic embryogenesis	(iv)	Embryo developes from a somatic cell

(1) A – (iv), B – (ii), C – (iii), D – (i) (2) A – (iii), B – (ii), C – (i), D – (iv)
(3) A – (i), B – (iv), C – (iii), D – (ii) (4) A – (ii), B – (iii), C – (i), D – (iv)

20. Identify the parts labelled A, B, C and D in the given figure and select the correct option **(AIIMS-2016)**



	A	**B**	**C**	**D**
(1)	Scutellum	Epiblast	Coleoptile	Coleorhiza
(2)	Scutellum	Coleorhiza	Coleoptile	Epiblast
(3)	Scutellum	Coleoptile	Coleorhiza	Epiblast
(4)	Epiblast	Coleoptile	Coleorhiza	Scutellum

21. Ploidy level of Nucellus, endosperm, polar nuclei, Megaspore mother cell, female gametophyte respectively are **(AIIMS-I-2018)**

(1) 2n, 3n, n, 2n, n (2) 2n, 3n, 2n, n, n (3) n, 2n, n, 2n, n (4) 2n, 3n, 2n, 2n, n

22. Albuminous seeds are found in– **(AIIMS-II-2018)**

(1) Pea, Groundnut, Castor (2) Castor, Sunflower, Barley
(3) Wheat, Barley, Castor (4) Pea, Groundnut, Sunflower

23. Which of the following is false fruit **(AIIMS-III-2018)**

(1) Groundnut (2) Mustard, Mango (3) Citrus (4) Apple, strawberry

24. In somatic hybridization of leaf and nucellus cells of pinus the ploidy level is **(AIIMS-III-2018)**

(1) 2n (2) 3n (3) 5n (4) 4n

Answers

EXERCISE - 1

SECTION - A

1.	(3)	**2.**	(3)	**3.**	(1)

SECTION - B

1.	(2)	**2.**	(3)	**3.**	(4)	**4.**	(2)	**5.**	(4)	**6.**	(2)	**7.**	(2)
8.	(2)	**9.**	(1)	**10.**	(3)	**11.**	(2)	**12.**	(2)	**13.**	(2)	**14.**	(3)
15.	(4)	**16.**	(3)	**17.**	(4)	**18.**	(2)	**19.**	(4)	**20.**	(2)	**21.**	(2)
22.	(3)	**23.**	(1)										

SECTION - C

1.	(4)	**2.**	(3)	**3.**	(1)	**4.**	(3)	**5.**	(3)	**6.**	(3)	**7.**	(4)
8.	(3)	**9.**	(2)	**10.**	(1)	**11.**	(4)	**12.**	(3)	**13.**	(3)	**14.**	(1)
15.	(4)	**16.**	(2)	**17.**	(4)	**18.**	(4)	**19.**	(4)	**20.**	(3)		

SECTION - D

1.	(3)	**2.**	(3)	**3.**	(4)	**4.**	(1)	**5.**	(3)	**6.**	(1)	**7.**	(4)
8.	(1)	**9.**	(2)	**10.**	(1)								

SECTION - E

1.	(2)	**2.**	(1)	**3.**	(3)	**4.**	(4)	**5.**	(3)	**6.**	(1)	**7.**	(3)
8.	(4)	**9.**	(1)	**10.**	(4)	**11.**	(4)	**12.**	(3)	**13.**	(3)	**14.**	(3)
15.	(4)	**16.**	(2)	**17.**	(3)	**18.**	(3)	**19.**	(2)	**20.**	(4)	**21.**	(2)
22.	(4)	**23.**	(4)	**24.**	(3)	**25.**	(2)	**26.**	(3)	**27.**	(4)	**28.**	(2)
29.	(2)	**30.**	(2)										

MISCELLANEOUS QUESTIONS

1.	(1)	**2.**	(3)	**3.**	(2)	**4.**	(4)	**5.**	(4)	**6.**	(2)	**7.**	(3)
8.	(2)	**9.**	(4)	**10.**	(1)	**11.**	(3)	**12.**	(3)	**13.**	(2)	**14.**	(4)
15.	(4)	**16.**	(1)	**17.**	(4)	**18.**	(2)	**19.**	(4)	**20.**	(3)	**21.**	(3)
22.	(4)	**23.**	(4)	**24.**	(4)	**25.**	(2)	**26.**	(3)	**27.**	(4)	**28.**	(2)
29.	(4)	**30.**	(1)	**31.**	(1)	**32.**	(4)	**33.**	(3)	**34.**	(3)	**35.**	(1)
36.	(2)	**37.**	(1)	**38.**	(2)	**39.**	(3)	**40.**	(4)	**41.**	(2)	**42.**	(2)
43.	(1)	**44.**	(4)	**45.**	(1)	**46.**	(3)	**47.**	(4)	**48.**	(2)	**49.**	(1)
50.	(4)	**51.**	(2)	**52.**	(4)	**53.**	(3)	**54.**	(2)	**55.**	(3)	**56.**	(4)
57.	(3)	**58.**	(3)	**59.**	(2)	**60.**	(2)	**61.**	(4)	**62.**	(4)	**63.**	(2)
64.	(1)	**65.**	(3)	**66.**	(4)	**67.**	(3)	**68.**	(1)	**69.**	(3)	**70.**	(4)
71.	(1)	**72.**	(2)	**73.**	(1)	**74.**	(1)	**75.**	(4)	**76.**	(1)	**77.**	(4)
78.	(4)	**79.**	(3)	**80.**	(3)	**81.**	(4)	**82.**	(4)	**83.**	(4)		

EXERCISE - 2

1.	(3)	**2.**	(4)	**3.**	(4)	**4.**	(4)

EXERCISE - 3

PART- I

1.	(4)	**2.**	(2)	**3.**	(3)	**4.**	(2)	**5.**	(1)	**6.**	(2)	**7.**	(1)
8.	(3)	**9.**	(2)	**10.**	(2)	**11.**	(1)	**12.**	(3)	**13.**	(3)	**14.**	(2)
15.	(4)	**16.**	(2)	**17.**	(3)	**18.**	(1)	**19.**	(1)	**20.**	(1)	**21.**	(1)
22.	(1)	**23.**	(3)	**24.**	(1)	**25.**	(4)	**26.**	(3)	**27.**	(1)	**28.**	(2)
29.	(4)	**30.**	(1)	**31.**	(1)	**32.**	(4)	**33.**	(3)	**34.**	(2)	**35.**	(3)
36.	(2)	**37.**	(3)	**38.**	(3)	**39.**	(1)	**40.**	(3)	**41.**	(3)	**42.**	(4)
43.	(4)	**44.**	(3)	**45.**	(4)	**46.**	(4)	**47.**	(1)	**48.**	(1)	**49.**	(4)
50.	(1)	**51.**	(1)	**52.**	(3)	**53.**	(3)	**54.**	(2)	**55.**	(2)	**56.**	(1)
57.	(1)	**58.**	(2)	**59.**	(1)	**60.**	(2)	**61.**	(4)	**62.**	(1)	**63.**	(4)
64.	(3)	**65.**	(2)	**66.**	(3)	**67.**	(2)	**68.**	(2)	**69.**	(2)	**70.**	(2)
71.	(3)	**72.**	(1)	**73.**	(1)	**74.**	(1)	**75.**	(2)	**76.**	(4)	**77.**	(2)

PART- II

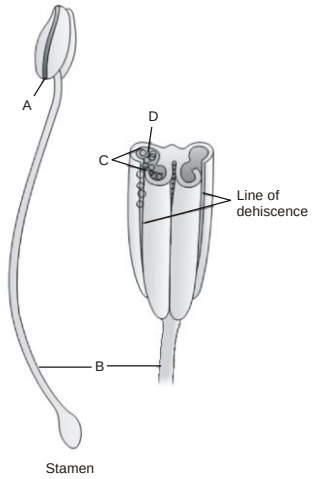
1.	(1)	**2.**	(3)	**3.**	(3)	**4.**	(1)	**5.**	(3)	**6.**	(1)	**7.**	(1)
8.	(4)	**9.**	(4)	**10.**	(3)	**11.**	(2)	**12.**	(3)	**13.**	(1)	**14.**	(2)
15.	(3)	**16.**	(4)	**17.**	(3)	**18.**	(2)	**19.**	(2)	**20.**	(3)	**21.**	(1)
22.	(3)	**23.**	(4)	**24.**	(4)								

Self Practice Paper (SPP)

1. Ploidy of ovary, anther, egg, pollen, male gamete and zygote are respectively

(1) 2n, 2n, n, 2n, n, 2n (2) 2n, 2n, n, n, n, 2n (3) 2n, n, n, n, n, n (4) 2n, 2n, n, 2n, 2n, 2n

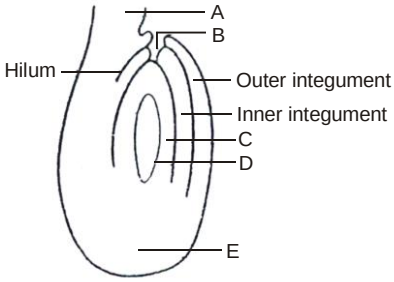
2.#



Identify A to D

	A	B	C	D
(1)	Anther	Petiole	Pollen sac	Megaspore
(2)	Anther	Petiole	Megasporangium	Pollen grains
(3)	Anther	Pedicel	Megasporangium	Pollen grains
(4)	Anther	Filament	Pollen sac	Pollen grains

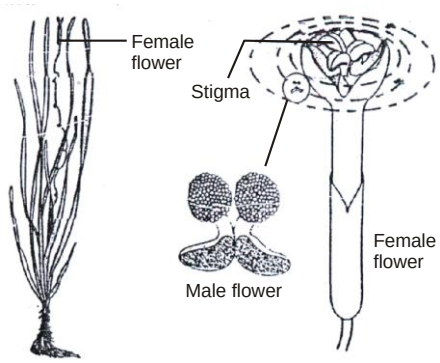
3.#



A diagrammatic view of a typical anatropous ovule is given above. In which of the following all five parts labelled as A, B, C, D and E are correctly identified

	A	B	C	D	E
(1)	Funicle	Micropyle	Female gametophyte	Embryo sac	Chalaza
(2)	Raphe	Micropyle	Egg	Embryo sac	Chalaza
(3)	Placenta	Micropyle	Egg	Embryo sac	Chalaza
(4)	Funicle	Micropyle	Nucellus	Embryo sac	Chalaza

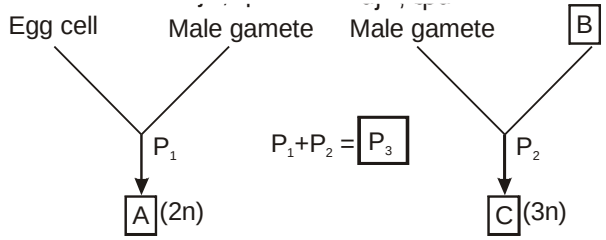
4.#



In the above figure the hydrophily is

(1) *Zostera* (2) Lotus (3) *Vallisneria* (4) *Hydrilla*

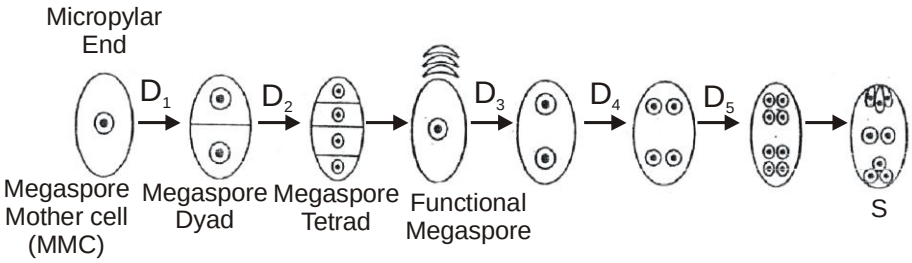
5.#



Identify structures A, B, C and phenomena - P_1, P_2,P_3

	A	B	C	P_1	P_2	P_3
(1)	Zygote	Polar nuclei	PEN	Syngamy	Triple fusion	Double fertilization
(2)	Zygote	Polar nuclei	PEN	Triple fusion	Syngamy	Double fertilization
(3)	Zygote	Synergid	PEN	Syngamy	Triple fusion	Double fertilization
(4)	Zygote	Polar nuclei	PEN	Syngamy	Apogamy	Double fertilization

6.#



The above diagram shows megasporogenesis and development of typical female gametophyte in angiosperms.

In which of the following options all divisions (D_1 to D_5) and structure (S) are correctly identified

	D_1	D_2	D_3	D_4	D_5	S
(1)	Meiosis I	Meiosis II	Mitosis	Mitosis	Mitosis	Microgametophyte
(2)	Meiosis I	Meiosis II	Mitosis	Mitosis	Mitosis	Embryo
(3)	Meiosis I	Meiosis II	Mitosis	Mitosis	Mitosis	Embryo sac
(4)	Mitosis	Meiosis	Mitosis	Mitosis	Mitosis	Embryo sac

7. Given below are five statements (a–e) regarding contrivances to ensure cross pollination in plants.

(a) Dichogamy – Pollen grains and stigma of same flower mature at same time.

(b) Dicliny – Flowers are unisexual

(c) Prepotency – Pollen grains of another flower germinate more rapidly over the stigma than the pollen grains of the same flower.

(d) Herkogamy : It is mechanical device to promote the self pollination.

(e) Heterostyle : Two or three types of flowers with different heights of styles

Pick up the incorrect statements.

(1) a, b, e (2) b ,c (3) c, d (4) a, d

8. When pollen of a flower is transferred to the stigma of another flower of different plant, the pollination is-

(1) Xenogamy (2) Geitonogamy

(3) Homogamy (4) Cleistogamy

9. Polysiphonous pollen tube is a feature of

(1) Cruciferae (2) Asteraceae

(3) Cucurbitaceae (4) Liliaceae.

10. In which type flowers are odourless, nectar secreting and yellow petals are found

(1) Hydrophilous flower (2) Anemophilous flower

(3) Ornithophilous flower (4) Entomophilous

11. Body of ovule is straight but at right angle to the funicle. It is called

(1) Anatropous ovule (2) Amphitropous ovule

(3) Campylotropous ovule (4) Hemitropous ovule

12. Dichogamy favouring cross pollination is type of floral mechanism where -

(1) Anthers and stigma are placed at different levels

(2) Stamens and stigma mature at different times

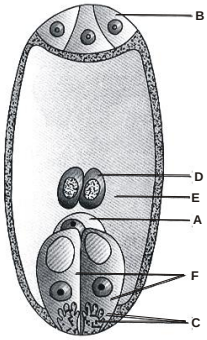
(3) Structure of anther and stigma act as barrier

(4) Pollen is unable to germinate on its own stigma

13. Placental or funicular outgrowth present at the micropylar end that directs the passage of pollen tube in to the ovule is

(1) Aril (2) Caruncle (3) Obturator (4) Raphe

14.#



On the basis of above diagram select the correct option having correct labellings of A, C, D and their functions

	Name of labelling	**Functions**
(1)	A = Synergid	Facilitates entry of pollen tube
	C = filiform appuratus	Secrete chemical substance to attract pollen tube towards micropyle of ovule
	D = Central cell	Carry polar nuclei
(2)	A = Egg	Zygote formation after fertilzation
	C = Synergid	Formation of additional embryo
	D = Antipodel cells	To provide nourishment to the developing embryo
(3)	A = Egg	Generative fertilization with the fusion of first male gamete and forms diploid zygote
	C = Filifrom-apparatus	Secretes chemicals for attracting pollen tube towards micropyle of ovule
	D = polar nuclei	Triple fusion with IInd mele gaemete
(4)	A = Degenerated synergid	Facilitates entry of pollen tube
	C = Filiform apparatus	Nourishing embryo after fertilization
	D = Polar nuclei	Formation PEN by Triple fusion

15. Select the incorrect statement
(1) Cleistogamy do not favours inbreeding depression.
(2) *Commelina* and *Viola* bears both cleistogamous and chasmogamous flowers.
(3) Cleistogamous flowers can produce seeds even in the absence of pollinator.
(4) Cleistogomy is disadvantageous in respect to no further development of variations in offsprings.

16. The diameter of normal pollen grain is:
(1) 25 - 50 micrometer (2) 60 - 80 micrometer
(3) 10 - 15 micrometer (4) 4 - 6 micrometer

17. Sporopollenin of exine of pollen grain provides protection from
(1) High temperature (2) Strong acids
(3) Alkali (4) All of the above

18. Which of the following plant came in India as a contaminant with important wheat and causes pollen allergy.
(1) *Chenopodium* (2) Parthenium (3) Castor (4) *Prosopis*

19. Give below the following statements
(a) In western contries, Pollen consumption has been claimed to increase the performance of athletes and race horses.
(b) The vaibility of pollen grains in some members of Rosaceae, Leguminosae and Solanaceae is few years
(c) Multicarpellary and apocarpous gynoecium is found in *Michelia*
(d) In pollen banks, the pollen grains of large no. of species can be stored in liquid nitrogen at –196°C.
(e) Micropyle represent the basal part of ovule.
Pickup the correct options
(1) c, d, e (2) a, b, e (3) a, c, d (4) b, c, e

20. How many mitotic divisions are required for the formation of polygonum type of embryo sac from functional megaspore.
(1) 2 (2) 1 (3) 4 (4) 3

21. 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 and Sporopollenin

22. In most of the water pollinated species, pollen grains are protected from wetting by
(1) Pollen Kitt (2) Mucilagenous covering
(3) Spiny exine (4) None of the above

23. In some plants like castor and maize, both male and female flowers are present on the same plants that is called monoecious which prevents
(1) Both autogamy and geitonogamy (2) Geitonogamy but not autogamy
(3) Both geitonogamy and Xenogamy (4) Autogamy but not geitonogamy

24 On culturing the young anther of a plant a botanist got a few diploid plants along with haploid plants which of the following might have given the diploid plants:
(1) Exine of pollen grain (2) Vegetative cell of pollen grain
(3) Cells of anther wall (4) Generative cell of pollen grain.

25. *Cucurbita* shows
(1) Porogamy (2) Mesogamy (3) Chalazogamy (4) Acarogamy

26. Which statement is true
(1) The formation of fruit without fertilization is called parthenocarpy.
(2) The membranous coating of radicle in monocot seed is called coleorhiza.
(3) The development of new individual plant without meiosis and gametic fusion is called Apomixis.
(4) All the above.

27. Pollen tube is formed by
(1) Intine (2) Generative cell (3) Tube cell (4) None

28. A plant has 24 chromosomes in microspore mother cell. The number of chromosomes in its endosperm will be
(1) 36 (2) 24 (3) 12 (4) 48

29. Entry of pollen tube in the ovule through integument is called
(1) Chalazogamy (2) Basigamy (3) Mesogamy (4) Porogamy

30. Endosperm is absent in
(1) Podostemonaceae (2) Orchidaceae (3) Trapaceae (4) All the above

31. Hay fever (Allergy) is caused due to pollen grains of
(1) *Amaranthus* (2) *Sorghum* (3) *Ambrosia* (4) All the above.

32. Siphonogamy is feature of
(1) Bryophytes (2) Pteridophyte
(3) Gymnosperm and Angiosperm (4) Algae

33. The cells of endosperm have 24 chromosomes. What will be number of chromosomes in the gametes?
(1) 8 (2) 16 (3) 72 (4) 24

34. If a leaves of one plant has 50 chromosomes. What would be the number of chromosomes in the endosperm?
(1) 25 (2) 50 (3) 75 (4) None of above

35. Which type of association is found in between entomophilous flower and pollinating agent
(1) Mutualism (2) Commesnsalism (3) Co-operation (4) Co-evolution

36. Formation of megaspores from megaspore mother cell is called-
(1) Megagametogenesis (3) Microgametogenesis
(3) Megasporogenesis (4) Microsporogenesis

37. Which one is surrounded by callose wall?
(1) Male gamete (2) Pollen grain
(3) Egg (4) Microspore mother cell.

38. Match the following ovular structure with post fertilization structure and select the correct alternative.

(a) Ovule	1. Micropyle
(b) Funiculus	2. Aril
(c) Nucellus	3. Seed
(d) Micropyle	4. Perisperm

(1) a–3, b–2, c–4 , d–1 (2) a–3, b–2, c–1, d–4
(3) a–1, b–2, c–3, d–4 (4) a–2, b–3, c–1, d–4

39. Upon fertilization what structure develops from carpel?
(1) Testa (2) Tegmen (3) Pericarp (4) Perisperm

40. Point out the odd one-
(1) Archegonium (2) Oogonium (3) Ovule (4) Antheridium

41. Which of the following is false fruit
(1) Mango (2) Strawberry (3) Coconut (4) Custard apple

42. Which of the following regenerates with the help of layering
(1) Cactus (2) Rose (3) Mango (4) Jasmine

43. Additional embryos develop from integument or Nucellus in
(1) *Citrus* (2) Papaya (3) Maize (4) Coconut

44. Dicot plants have two cotyledons in a seed. In monocot the first cotyledon is called scutellum while the second cotyledon is rudimentary and is called
(1) Epiplast (2) Epiblast (3) Apoplast (4) None

45. Which of the following represent the correct relationship between pollen grain and embryo sac
(1) Sperm and egg (2) Male gametophyte and egg
(3) Sperm and female gametophyte (4) Male gametophyte and female gametophyte

SPP Answers

1.	(2)	**2.**	(4)	**3.**	(4)	**4.**	(3)	**5.**	(1)	**6.**	(3)	**7.**	(4)
8.	(1)	**9.**	(3)	**10.**	(3)	**11.**	(4)	**12.**	(2)	**13.**	(3)	**14.**	(3)
15.	(1)	**16.**	(1)	**17.**	(4)	**18.**	(2)	**19.**	(3)	**20.**	(4)	**21.**	(4)
22.	(2)	**23.**	(4)	**24**	(3)	**25.**	(2)	**26.**	(4)	**27.**	(3)	**28.**	(1)
29.	(3)	**30.**	(4)	**31.**	(4)	**32.**	(3)	**33.**	(1)	**34.**	(3)	**35.**	(1)
36.	(3)	**37.**	(4)	**38.**	(1)	**39.**	(3)	**40.**	(4)	**41.**	(2)	**42.**	(4)
43.	(1)	**44.**	(2)	**45.**	(4)								