Botany(Ph.D.) (BOT)

1. **Which of the following chemicals are most widely used for protoplast fusion?**
   (A) Mannitol (B) Polyethylene glycol
   (C) Sorbitol (D) Xylitol

2. Downward movement of methylene blue drop during Chardakov's method experiment indicates solution is
   (A) Hypertonic (B) Hypotonic
   (C) Isotonic (D) Suspension

3. Glyphosate-based herbicides, such as Roundup, target which enzyme of the plants?
   (A) DAHP synthase (B) EPSP synthase
   (C) Shikimate synthase (D) Chorismate synthase

4. Which of the following genetic engineering methods is best suited for addition of gene into plants?
   (A) Plasmid method (B) Vector method
   (C) Biolistic (gene gun) method (D) Microinjection

5. Standard deviation of a sample is 320 and number of individuals of the sample are 64. Find out the Standard Error of Mean (SEM)?
   (A) 30 (B) 50
   (C) 40 (D) 60

6. If the seeds of plants are treated with polyethylene glycol (PEG) during germination phase, then it would results in?
   (A) Delayed germination and slow growth (B) Vigorous germination
   (C) No effect on germination (D) Vigorous seedling growth

7. FlavrSavr tomato was produced by using
   (A) Transformation (B) Transduction
   (C) Gene silencing by Antisense RNA (D) *Agrobacterium* Transformation

8. YAC behaves similar to normal chromosomes because it has
   (A) Centromere (B) Centromere and telomere
   (C) Telomere and ARS (D) Centromere, telomere and ARS

9. Which of the following combinations of molecular markers is of co-dominant type?
   (A) SNP and RFLP (B) SSR and RAPD
   (C) RAPD and RFLP (D) AFLP and SSR

10. Inducer of "vir" operon is
    (A) Kanamycin (B) Hygromycin
    (C) Penicillin (D) Acetosyringone

11. If for a distribution, the difference of first quartile and median is greater than difference of median and third quartile then distribution is classified as
    (A) Absolute open end (B) Positively skewed
    (C) Negatively skewed (D) Not skewed at all

12. If an investigator commits Type I error in testing hypothesis then he/ she accepts or rejects following hypothesis
    (A) Accepts null hypothesis when it is false
    (B) Rejects null hypothesis when it is true
    (C) Accepts null hypothesis when it is true
    (D) Rejects null hypothesis when it is false

13. Transmission electron microscopy is most often used to reveal.
    (A) Surface structures
    (B) Internal structures
    (C) Both surface and internal structures simultaneously
    (D) Either surface or internal structures, but not simultaneously

14. Temperature and pressure maintained during autoclaving sterilization technique in plant tissue culture is:
    (A) 15 Psi pressure, 121 ºC
    (B) 15 Psi pressure, 21 ºC
    (C) 5 Psi pressure, 121 ºC
    (D) 10 Psi pressure, -196 ºC

15. **Which of the following methods uses high voltage electrical impulses for gene transfer?**
    (A) Liposome fusion
    (B**)** Microinjectile
    (C**)** Electroporation
    (D**)** Silicon carbide fibers

16. The basis of the technique of chromatography for separating components of a mixture is?
    (A) The differing movement of particles of different mass in an electrical field
    (B) The interaction of the components with a stationary and a mobile phases
    (C) The absorption of infrared radiation by the components
    (D) The deflection of charged particles in a magnetic field

17. The results for precision studies in Analytical Method Validation, are expressed in terms of?
    (A) % Relative error
    (B) Correlation coefficient
    (C) % Relative standard deviation
    (D) Mean

18. Which of the following is used as a spraying reagent in paper chromatography?
    (A) conc. HCl
    (B) NaCl solution
    (C) Ninhydrin solution
    (D) $CuSO_4$ solution

19. The fluorescent dye such as Ethidium bromide is used for visualization of DNA, binds to DNA at
    (A) Stacked between histone molecules
    (B) Binds to nucleotide base
    (C) Intercalated between the stacked bases
    (D) Binds to the phosphodiestester backbone

20. Function of β-mercaptoethanol in SDS-PAGE is
    (A) To give negative charges to amino acids in the proteins
    (B) For the oxidation of disulphide bonds in the proteins

(C) For breaking hydrogen bonds in the proteins
(D) For the reduction of disulphide bonds in the proteins

21. Which of the following will migrate faster if the molecular weight of the following is equal
(A) Nicked circular DNA
(B) Supercoiled circular DNA
(C) Single stranded DNA
(D) Double stranded DNA

22. Red colour appears on the seeds and pollen grains by TTC (Triphenyl Tetrazolium Chloride) is due to formation of
(A) Formazon (B) Ninhydrin
(C) Aniline blue (D) Saffranin

23. Cell A has osmotic potential of -10 bars and pressure potential of 8 bars, whereas, cell B has osmotic potential of -18 bars and pressure potential 6 bars. The direction of flow of water will be:
(A) From cell B to cell A (B) From cell A to cell B
(C) No flow of water (D) In both directions

24. When the seeds of crop plants are treated at low temperature under moist conditions to break seed dormancy, the technique is called:
(A) Scarification (B) Vernalization
(C) Chelation (D) Stratification

25. Photosynthetic pigments are separated by using paper chromatography; the order of pigments on chromatogram is as follows:
(A) Chl b Chl a Xanthophylls Carotenes
(B) Chl a Chl b Xanthophylls Carotenes
(C) Chl a Chl b Carotenes Xanthophylls
(D) Carotenes Chl a Chl b Xanthophylls

26. Synzoospores are found in alga
(A) Oedogonium (B) Vaucheria
(C) Nostoc (D) Spirogyra

27. Flask shaped fruiting body of Ascomycotina is known as
(A) Cleistothecium (B) Apothecium
(C) Perithecium (D) Sclerotium

28. Which of the following is an aquatic species of *Riccia?*
(A) Riccia discolor (B) Riccia crystallina
(C) Riccia fluitans (D) Riccia himalayensis

29. Which of the following is NOT true for monocots?
(A) Sieve tube element with companion cell
(B) Atactostele
(C) Tricolpate pollen
(D) Absence of vascular cambium

30. Anther culture was first time reported in which plant?
(A) Calotropis procera (B) Datura innoxia
(C) Ocimum sanctum (D) Jatropha curcas

31. The plants which are mostly found in arid zone and have their buds completely hidden in soil as bulbs or rhizomes are known as
(A) Therophytes (B) Chaemophytes
(C) Cryptophytes (D) Phanerophytes

32. Which of following aquatic pteridophytes represents heterospory?
(A) Azolla (B) Selaginella
(C) Equisetum (D) Psilotum

33. In case of heteroecious rust (*Puccinia graminis tritici*), the following infection strategy is observed
(A) Haploid basidiospores infect wheat, dikaryotic aecidiospores infect barberry
(B) Haploid aecidiospore infect wheat, dikaryotic basidiospore infect barberry
(C) Haploid basidiospores infect barberry, dikaryotic aecidiospores infect wheat
(D) Haploid teleutospore infect wheat, dikaryotic basidiospore infect barberry

34. Heteromorphic alternation of generation occur in
(A) Ectocarpus (B) Ulva
(C) Draparnaldiopsis (D) Laminaria

35. In case of dihybrid cross, F_2 phenotypic ratio, 15:1 results due to
(A) Supplementary genes (B) Duplicate genes
(C) Inhibitory genes (D) Complementary genes

36. A plant has 2n=12 chromosome which form 6 bivalents at meiosis. A chromosomal variant of this plant with 4 bivalents and 2 univalents at meiosis would be called
(A) Disomic (B) Double monosomic
(C) Double trisomic (D) Nullisomic

37. The development of a sporophyte from gametophyte without gamete formation is called
(A) Apospory (B) Parthenogenesis
(C) Apogamy (D) Hyperplasia

38. In two species population interaction, when one population is benefited and other remains unaffected, then it is called
(A) Commensalism (B) Proto-cooperation
(C) Amensalism (D) Mutualism

39. Species showing non-heritable differences in morphology of plants due to varied natural environment are called
(A) Ecophenes (B) Ecotypes
(C) Environmental types (D) Phenotype

40. The rate of storage of organic matter in plant tissues in excess of respiratory utilization during the period of measurement in the ecosystem is termed as
(A) Net primary productivity (B) Secondary productivity
(C) Biomass (D) Net gross productivity

41. At the time of seed germination in cereals, GA induced amylase synthesis occurs in
(A) Aleurone layer (B) Radicle
(C) Coleoptile (D) Hypocotyl

42. Tropical regions may have more species diversity because of the following possible reasons, EXCEPT
(A) Tropical regions had more time to diversify under stable climate conditions than temperate regions
(B) Tropical regions have high spatial heterogeneity
(C) Greater biological competition in the tropics leads to narrower niches
(D) Lower predation intensity in the tropics allows survival of more prey species

43. Saffron commonly called 'Kesar' is obtained from
(A) Dried stigma and pollen grains of *Crocus sativus*
(B) Dried stigma as well as top of style of *Crocus sativus*
(C) Dried stigma as well as anther of *Crocus sativus*
(D) Dried anthers as well as petals of *Crocus sativus*

44. 'Reserpine' an alkaloid commonly used for lowering the blood pressure is obtained from
(A) Roots of Rauvolfia (B) Rhizome of Rauvolfia
(C) Roots of Withania (D) Stem of Withania

45. Interxylary phloem and intraxylary phloem are present in which of the following plants?
(A) Bignonia (B) Strychnos
(C) Nyctanthes (D) Dracaena

46. The plant family, which is characterized by squarish stem, zygomorphic bilabiate flower, verticillaster inflorescence, gynobasic style and carcerulus fruit is
(A) Apiaceae (B) Solanaceae
(C) Lamiaceae (D) Asclepiadaceae

47. Which of the following statements about phylogenetic system of plant classification is false?
(A) Placing of Gymnosperms prior to angiosperms
(B) Inferior ovary is treated as primitive character
(C) Orchidaceae of monocot and Compositae of dicots are considered as most advanced
(D) Amentiferae is treated more primitive than Ranunculaceae

48. Which of the following statements about LEAFY (LFY), a regulatory gene in *Arabidopsis thaliana* is correct?
    (A) LEAFY (LFY) is involved in floral meristem identity
    (B) LEAFY (LFY) is involved in leaf expansion
    (C) LEAFY (LFY) is involved in root meristem identity
    (D) LEAFY (LFY) is responsible for far red light mediated growth of seedlings

49. Pioneer seral communities of succession are characterized by
    (A) Low species diversity, short life cycle, r-strategist
    (B) Low species diversity, narrow niche specialization, predominant detritus food chain
    (C) High species diversity, broad niche specialization, predominant grazing food chain
    (D) Low species diversity, long life cycle, k-strategist

50. Which one of the following statements is true for competitive inhibition?
    (A) It increases the Km of an enzyme
    (B) It decreases the Km of an enzyme
    (C) It Increases both the Vmax and Km of an enzyme
    (D) It decreases the Km but increases the Vmax of an enzyme

x-x-x

Space for Rough Work

Panjab University, Chandigarh
M.Phil./PHD - 2021
ANSWERS / KEY

Subject: Botany(Ph.D.)

1	2	3	4	5	6	7	8	9	10
B	A	B	C	C	A	C	D	A	D
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
B	B	B	A	C	B	C	C	C	D
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
B	A	A	D	A	B	C	C	C	B
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
C	A	C	D	B	B	C	A	A	A
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
A	D	B	A	B	C	B	A	A	A

Note: An 'X' (if any) in the key indicates that either the question is ambiguous or it has printing mistake. All candidates will be given credit for this question