No. of Pages. 20

Code No.	Y – 3042

Register Number :

Name :

Time : 2 Hours

Max.Marks : 100

Entrance Examination for Admission to the P.G. Courses in the Teaching Departments, 2026

CSS

BOTANY WITH SPECIALIZATION IN BIODIVERSITY CONSERVATION

GENERAL INSTRUCTIONS

1. The Question Paper is having 100 Objective Questions, each carrying one mark.
2. The answers are to be marked **only** in the "**OMR Sheet**" provided.
3. **Negative marking** : **0.25 marks** will be deducted for each wrong answer .

INSTRUCTIONS FOR FILLING THE OMR SHEET

- The OMR sheet should not be folded or crushed.
- Use only blue/black ball point pen to fill the circles.
- Use of pencil is strictly prohibited.
- Circles should be darkened completely and properly.
- Cutting and erasing on this sheet is not allowed.
- Do not leave any stray marks on the sheet.
- Do not use marker or white fluid to hide the mark.
- WRONG METHODS

CORRECT METHOD

Choose appropriate answer from the options in the questions.

(100 × 1 = 100 marks)

1. Which of the following regions in India has the highest level of plant endemism?

   A. Indo-Gangetic plains
   B. Thar Desert
   C. Western Ghats
   D. Coastal plains

2. Latitudinal gradient of biodiversity suggests that species diversity:

   A. Increases from equator to poles
   B. Decreases from equator to poles
   C. Remains constant across latitudes
   D. Is highest at the poles

3. The primary aim of biodiversity conservation is to:

A. Increase industrial development

B. Maintain ecological balance and sustain life-support systems

C. Promote urbanization

D. Eliminate all human interference

4. The value of biodiversity that recognizes the inherent worth of all living organisms, irrespective of their utility is called :

A. Economic value

B. Ethical value

C. Intrinsic value

D. Aesthetic value

5. Which of the following represents an economic (utilitarian) value of biodiversity?

A. Spiritual satisfaction

B. Timber and medicinal plants

C. Wildlife photography

D. Cultural identity

6. Pollination of crops by insects is an example of :

A. Provisioning service

B. Regulating service

C. Cultural service

D. Supporting service

7. Soil formation and nutrient cycling fall under:

A. Provisioning services

B. Regulating services

C. Supporting services

D. Cultural services

8. Which of the following is an example of in-situ conservation?

A. Botanical garden

B. Seed bank

C. National park

D. Zoo

9. Which of the following is an example of ex-situ conservation?

A. Wildlife sanctuary

B. Biosphere reserve

C. Sacred grove

D. Gene bank

10. The protected area network in India includes:
    A. Only national parks
    B. Only wildlife sanctuaries
    C. Biosphere reserves, national parks, and wildlife sanctuaries
    D. Only reserved forests

11. Community participation in conservation is important because it :
    A. Reduces biodiversity
    B. Ensures sustainable use and protection of local resources
    C. Eliminates traditional knowledge
    D. Promotes deforestation

12. A biosphere reserve differs from a national park in that it :
    A. Does not allow any human activity
    B. Integrates conservation with sustainable development
    C. Is smaller in size
    D. Exists only for tourism

13. Habitat fragmentation primarily leads to :
    A. Increased gene flow between populations
    B. Isolation of populations and reduced genetic diversity
    C. Expansion of species range
    D. Improved ecosystem stability

14. Which of the following is a major impact of eutrophication in aquatic ecosystems?
    A. Increase in oxygen levels
    B. Decrease in algal growth
    C. Oxygen depletion due to algal blooms
    D. Reduction in nutrient levels

15. Which of the following is an example of an invasive alien species in India?

A. *Azadirachta indica*
B. *Mangifera indica*
C. *Lantana camara*
D. *Oryza sativa*

16. Overexploitation of biological resources can result in:

A. Sustainable population growth
B. Extinction of species
C. Increased biodiversity
D. Improved ecosystem resilience

17. Which Indian case study is associated with the negative impact of urbanization on biodiversity?

A. Silent Valley conservation
B. Decline of house sparrows in urban areas
C. Chipko movement
D. Project Tiger

18. Which of the following microorganisms lacks a true nucleus and membrane-bound organelles?

A. Fungi
B. Algae
C. Bacteria
D. Protozoa

19. The cell wall of most bacteria is primarily composed of:

A. Cellulose
B. Chitin
C. Peptidoglycan
D. Lignin

20. Which group of microorganisms is primarily responsible for nitrogen fixation in soil?

A. Fungi
B. Viruses
C. Bacteria
D. Protozoa

21. In the nitrogen cycle, conversion of ammonia into nitrite is carried out by:

A. Nitrogen-fixing bacteria
B. Denitrifying bacteria
C. Nitrifying bacteria
D. Sulfur bacteria

22. Which of the following microorganisms plays a major role in decomposition and nutrient recycling in ecosystems?

A. Viruses
B. Fungi
C. Protozoa
D. Algae

23. Which of the following is a characteristic feature of algae?

A. Presence of chitin in cell wall
B. Lack of chlorophyll
C. Autotrophic mode of nutrition
D. Formation of mycelium

24. The reserve food material in most green algae is:

A. Glycogen
B. Starch
C. Lipids
D. Cellulose

25. Fungi are classified under a separate kingdom primarily because they:

A. Are unicellular
B. Are photosynthetic
C. Possess absorptive heterotrophic nutrition
D. Lack a cell wall

26. Lichens represent a symbiotic association between:

A. Algae and bacteria
B. Fungi and bacteria
C. Algae and fungi
D. Fungi and protozoa

27. Which of the following represents an economic importance of fungi?

A. Nitrogen fixation
B. Production of antibiotics like penicillin
C. Oxygen production
D. Primary productivity in oceans

28. According to the International Code of Nomenclature (ICN), which of the following principles is fundamental?

A. Priority of common names
B. One organism can have multiple correct names
C. Each taxon can have only one correct name
D. Names are based only on morphology

29. In phylogenetic classification, organisms are grouped primarily based on:
    A. Morphological similarity only
    B. Evolutionary ancestry and genetic relationships
    C. Habitat preference
    D. Economic importance

30. A monophyletic group (clade) includes:
    A. Organisms with similar morphology only
    B. Organisms from different ancestors
    C. A common ancestor and all its descendants
    D. Only distantly related species

31. Which of the following is an example of a polyphyletic group?
    A. Angiosperms
    B. Gymnosperms
    C. Algae
    D. Mammals

32. The main limitation of artificial classification systems is that they:
    A. Use genetic data
    B. Reflect evolutionary relationships accurately
    C. Consider only a few superficial characters
    D. Are based on phylogeny

33. Lamarck's theory of evolution primarily emphasizes:
    A. Natural selection
    B. Genetic mutation
    C. Inheritance of acquired characters
    D. Genetic drift

34. According to Darwinism, natural selection acts on:
    A. Genotype directly
    B. Phenotypic variations
    C. Mutations only
    D. Acquired traits

35. The modern synthetic theory (Neo-Darwinism) integrates Darwin's theory with :
    A. Cell theory
    B. Mendelian genetics
    C. Germ theory
    D. Chromosomal theory only

36. Which of the following is an example of sympatric speciation?
    A. Geographic isolation of populations
    B. Formation of a physical barrier
    C. Reproductive isolation within the same geographic area
    D. Migration to a new habitat

37. Genetic drift is more significant in:
    A. Large populations
    B. Small populations
    C. Stable populations
    D. Migrating populations

38. The fluid mosaic model of cell membrane was proposed by:
    A. Watson and Crick
    B. Singer and Nicolson
    C. Schleiden and Schwann
    D. Hooke and Leeuwenhoek

39. Which organelle is primarily responsible for protein modification and packaging?
    A. Ribosome
    B. Golgi apparatus
    C. Lysosome
    D. Peroxisome

40. Which of the following events is characteristic of the G_1 phase of the cell cycle?
    A. Chromosome condensation and spindle formation
    B. DNA synthesis and duplication of chromosomes
    C. Active cell growth and synthesis of RNA and proteins
    D. Separation of sister chromatids

41. Crossing over occurs during which stage of meiosis :
    A. Prophase I
    B. Metaphase I
    C. Anaphase II
    D. Telophase I

42. The spindle fibers attach to chromosomes at the :
    A. Centromere
    B. Telomere
    C. Chromatid
    D. Nucleolus

43. The primary objective of Environmental Impact Assessment (EIA) is to:
    A. Promote industrial growth
    B. Predict and mitigate environmental impacts before project implementation
    C. Approve all development projects
    D. Eliminate public participation

44. Which of the following is NOT a standard step in the EIA process?
    A. Screening
    B. Scoping
    C. Auditing
    D. Impact prediction

45. Man-wildlife conflict is most directly intensified by:
    A. Increase in forest cover
    B. Habitat fragmentation and encroachment
    C. Strict conservation laws
    D. Reduced human population

46. Which mitigation strategy is most effective for reducing crop damage by wild herbivores?
    A. Complete removal of wildlife
    B. Electric fencing and community-based monitoring
    C. Increased pesticide use
    D. Deforestation

47. Wetlands are considered highly productive ecosystems because they:
    A. Have low nutrient availability
    B. Support high biodiversity and nutrient cycling
    C. Lack primary producers
    D. Are permanently dry

48. Which of the following is a biological indicator of ecosystem health?
    A. Temperature
    B. pH
    C. Lichen diversity
    D. Wind speed

49. Quadrat and transect methods are commonly used in:

A. Pollution control
B. Biodiversity assessment
C. Climate modelling
D. Soil erosion studies

50. Sustainable development aims to:

A. Maximize present resource use without concern for future
B. Balance economic growth with environmental protection and social equity
C. Focus only on industrial expansion
D. Reduce biodiversity conservation efforts

51. Which of the following best explains why phylogenetic classification is considered superior to natural classification?

A. It uses more morphological characters
B. It reflects evolutionary relationships based on common ancestry
C. It is easier to construct
D. It avoids the use of fossils

52. In the Engler and Prantl system, monocots are considered more primitive than dicots because:

A. They lack secondary growth
B. Their flowers are simple and perianth is not differentiated
C. They have parallel venation
D. They are herbaceous

53. The concept of “type specimen” in taxonomy is most closely associated with:

A. Identification of plants in the field
B. Fixing the application of a scientific name
C. Establishing evolutionary relationships
D. Classifying plants based on utility

54. Which of the following would be given highest priority under ICN rules?

A. A name widely used in literature
B. The earliest validly published name
C. A name published in a local journal
D. A name based on molecular data

55. In numerical taxonomy, a dendrogram represents:
    A. Morphological differences only
    B. Evolutionary lineage
    C. Phenetic relationships based on similarity
    D. Fossil history

56. Which of the following is an example of a monophyletic group?
    A. Group containing organisms with similar morphology but different ancestors
    B. Group including an ancestor and all its descendants
    C. Group excluding some descendants of a common ancestor
    D. Artificial grouping based on habitat

57. The Principle of Typification under ICN applies to:
    A. Only family names
    B. Only species names
    C. Names of taxa at all ranks
    D. Only genus and species

58. Which statement about herbarium techniques is Incorrect?
    A. Specimens should be pressed and dried quickly
    B. Poisoning is done to prevent insect attack
    C. Labels are unnecessary if specimens are well preserved
    D. Mounting is done on herbarium sheets

59. In molecular taxonomy, the rbcL gene is commonly used because:
    A. It codes for ribosomal RNA
    B. It is highly variable in all organisms
    C. It is conserved and useful for phylogenetic studies
    D. It is present only in gymnosperms

60. Which of the following scenarios represents a polyphyletic group?
    A. All members share a recent common ancestor
    B. Group formed based on convergent evolution
    C. Group includes ancestor and all descendants
    D. Group based on homologous characters

61. Which of the following combinations of plant structures and their adaptive significance is correctly matched?

A. Pneumatophores — Mechanical support in climbers

B. Prop roots — Aeration in waterlogged soils

C. Storage roots — Survival during unfavorable seasons

D. Tendrils — Photosynthesis enhancement

62. A plant shows parallel venation, sheathing leaf base, and scattered vascular bundles in the stem. Which inference is most appropriate?

A. It is a dicot with anomalous secondary growth

B. It is a monocot adapted to xeric conditions

C. It is a monocot, but venation is unrelated to vascular bundle arrangement

D. It is a monocot showing typical morphological features

63. In placentation, the condition where ovules are attached to a central column in a multilocular ovary is termed:

A. Marginal

B. Parietal

C. Axile

D. Free central

64. Which of the following correctly differentiates a tuber from a corm?

A. Tuber has nodes and internodes; corm lacks them

B. Corm is a modified root; tuber is a modified stem

C. Tuber is irregular and bears “eyes”; corm is solid and uniform

D. Both are identical in internal structure

65. A flower is described as actinomorphic, hypogynous, with valvate aestivation and superior ovary. Which of the following conclusions is most appropriate?

A. The flower is zygomorphic with inferior ovary

B. The floral parts are free and ovary is above other whorls

C. The petals overlap irregularly in bud

D. The ovary is embedded within the receptacle

66. Which of the following centres of origin is correctly matched with the crop according to the concept proposed by Nikolai Vavilov?

A. Wheat — Central America

B. Rice — Indo-Burma region

C. Maize — South-East Asia

D. Potato — Africa

67. Which of the following combinations correctly distinguishes cereals from pulses in terms of their primary storage product and botanical family?

A. Cereals — Protein — Fabaceae

B. Pulses — Starch — Poaceae

C. Cereals — Starch —Poaceae

D. Pulses — Oil — Brassicaceae

68. In fibre-yielding plants, which of the following statements is CORRECT regarding cotton and jute?

A. Cotton fibres are derived from stem phloem

B. Jute fibres are seed hairs

C. Cotton fibres are epidermal outgrowths of seeds

D. Jute fibres are obtained from leaf mesophyll

69. Which of the following medicinal plants is correctly matched with its therapeutic use?

A. *Rauvolfia serpentina — Antimalarial*

B. *Digitalis purpurea — Cardiac stimulant*

C. *Azadirachta indica — Anticancer drug*

D. *Papaver somniferum — Antibiotic*

70. Which of the following best explains the economic importance of spices and beverages in global trade?

A. They are staple food crops with high caloric value

B. They contribute mainly to structural materials in industries

C. They have high value due to flavoring, stimulant, and preservative properties

D. They are primarily used for fibre extraction

71. In a plant species, two genes A and B interact such that gene A is epistatic over gene B. A cross between AaBb $\times$ AaBb produces a phenotypic ratio of :

A. 9 : 3 : 3 : 1

B. 12 : 3 : 1

C. 9 : 7

D. 13 : 3

72. In a test cross of a heterozygous plant (AB/ab × ab/ab), the following progeny were obtained:
    - AB = 420
    - ab = 380
    - Ab = 100
    - aB = 100

    What is the recombination frequency?

    A. 10%
    B. 20%
    C. 30%
    D. 40%

73. A color-blind father and a normal mother (whose father was color-blind) have children. What proportion of daughters will be color-blind?

    A. 0%
    B. 25%
    C. 50%
    D. 100%

74. In a cross between a heterozygous A blood group individual and a heterozygous B blood group individual, what is the probability of producing an offspring with O blood group?

    A. 0%
    B. 25%
    C. 50%
    D. 75%

75. Which of the following situations would violate Mendel's Law of Independent Assortment?

    A. Genes located on different chromosomes
    B. Genes far apart on the same chromosome
    C. Genes closely linked on the same chromosome
    D. Genes showing incomplete dominance

76. Which of the following features is considered most critical in establishing the evolutionary transition of certain green algae toward land plants?

    A. Presence of chlorophyll a and b
    B. Storage of starch in plastids
    C. Presence of phragmoplast and cell plate formation
    D. Flagellated gametes

77. Which of the following algae exhibits the highest level of thallus differentiation resembling tissue-level organization?

    A. *Chlamydomonas*
    B. *Ulothrix*
    C. *Fucus*
    D. *Spirogyra*

78. In which of the following algae does a diplontic life cycle with gametic meiosis occur?

A. *Ulva*
B. *Ectocarpus*
C. *Fucus*
D. *Polysiphonia*

79. Which of the following correctly distinguishes isogamy, anisogamy, and oogamy in algae?

A. All involve morphologically identical gametes
B. Only oogamy involves non-motile gametes
C. Anisogamy always involves non-motile gametes
D. Isogamy always involves one large and one small gamete

80. Which structure helps in attachment of bryophytes to the substratum?

A. Roots
B. Rhizoids
C. Stems
D. Leaves

81. In bryophytes, fertilization requires:

A. Wind
B. Insects
C. Water
D. Soil

82. In Funaria, the peristome teeth play a crucial role in:

A. Photosynthesis
B. Protection of archegonia
C. Regulated spore dispersal in response to humidity
D. Formation of gametes

83. Which of the following statements correctly distinguishes *Marchantia* from *Funaria*?

A. *Marchantia* has a dominant sporophyte phase
B. *Funaria* lacks protonema stage
C. *Marchantia* shows dorsiventral thallus, while *Funaria* has leafy gametophyte
D. *Funaria* reproduces only asexually

84. Which of the following is considered the most significant evolutionary step toward the seed habit in pteridophytes?

A. Homospory

B. Dominant sporophyte

C. Retention of megaspore within the megasporangium

D. Independent gametophyte

85. In ferns, meiosis occurs during:

A. Formation of gametophyte

B. Development of archegonium

C. Spore formation inside sporangium

D. Fertilization

86. Which of the following combinations is correctly matched?

A. *Lycopodium — Homosporous*

B. *Selaginella — Homosporous*

C. *Equisetum — Heterosporous*

D. *Marsilea — Homosporous*

87. Which of the following conditions is essential for the origin of seed habit but absent in most pteridophytes?

A. Formation of spores

B. Alternation of generations

C. Presence of vascular tissue

D. Development of integuments around megasporangium

88. Which of the following statements best distinguishes Ascomycetes from Basidiomycetes?

A. Presence of septate mycelium

B. Formation of endogenous spores within asci

C. Production of dikaryotic stage

D. Absence of sexual reproduction

89. The relationship between fungal and algal components in lichens is best described as:

A. Parasitism

B. Commensalism

C. Controlled parasitism

D. Mutualism

90. Which of the following best explains the role of lichens as bioindicators of air pollution?

A. They accumulate heavy metals in vacuoles

B. They lack a cuticle and absorb pollutants directly from atmosphere

C. They depend on soil nutrients for growth

D. They have high tolerance to sulfur dioxide

91. Which of the following statements best supports the fluid mosaic model proposed by S. J. Singer and Garth L. Nicolson?

A. Proteins are embedded within a dynamic lipid bilayer and can move laterally

B. Lipids are static and form a rigid framework

C. Proteins are only present on the outer surface of the membrane

D. Membrane is composed entirely of phospholipids

92. Which organelle is primarily responsible for oxidative phosphorylation and ATP synthesis in eukaryotic plant cells?

A. Chloroplast

B. Golgi apparatus

C. Mitochondrion

D. Endoplasmic reticulum

93. Which of the following features is unique to eukaryotic cells when compared to prokaryotic cells?

A. Presence of ribosomes

B. Presence of plasma membrane

C. Presence of DNA

D. Presence of membrane-bound organelles

94. Which of the following transport processes involves movement of molecules against their concentration gradient with energy expenditure?

A. Diffusion

B. Osmosis

C. Facilitated diffusion

D. Active transport

95. Which of the following statements correctly describes the structure of chloroplast thylakoids?

A. They are single membranes enclosing the stoma

B. They form interconnected sacs arranged in grana and stroma lamellae

C. They contain DNA but no enzymes

D. They are independent of photosynthetic reactions

96. DNA replication in the cell cycle occurs during:

A. G1 phase

B. S phase

C. G2 phase

D. M phase

97. Mitosis results in the formation of:

A. Four haploid cells

B. Two haploid cells

C. Four diploid cells

D. Two identical diploid cells

98. Which of the following best explains the functional difference between euchromatin and heterochromatin?

A. Euchromatin is genetically inactive and densely packed

B. Heterochromatin is transcriptionally active and early replicating

C. Euchromatin is loosely packed and transcriptionally active

D. Heterochromatin has high gene expression

99. Failure of separation of homologous chromosomes during Anaphase I of meiosis leads to:

A. Crossing over

B. Polyploidy

C. Mutation

D. Nondisjunction

100. Which phase of mitosis is characterized by the alignment of chromosomes at the equatorial plane?

A. Prophase

B. Metaphase

C. Anaphase

D. Telophase

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