N-12

ENTRANCE EXAMINATION – 2017
M.Sc. Plant Biology & Biotechnology
(Subject code: N-12)

Time: 2 hours Maximum Marks: 100

HALL TICKET NO.

INSTRUCTIONS

Please read carefully before answering the questions:

1. Enter your Hall Ticket number both on the top of this page and on the OMR answer sheet.

2. Answers are to be marked only on the **OMR answer sheet** following the instructions provided there upon.

3. Hand over the OMR answer sheet to the Invigilator before leaving the examination hall.

4. The question paper contains **100** questions (**Part-A**: Question Nos. **1-25** and **Part-B**: Questions Nos. **26-100)** of multiple-choice printed in **17** pages, including this page. One OMR answer sheet is provided separately. **Please check**.

5. The marks obtained in **Part-A** will be used for resolving the tie cases.

6. Each question carries one mark.

7. There is **Negative marking** for wrong answers, in **Parts A and B**. For each wrong answer, 0.33 mark will be deducted.

8. Calculators and mobile phones are NOT allowed.

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Part-A

1. Which lipid is abundant in chloroplast membranes?

   A) Digalactosyldiacylglycerol
   B) Monogalactosyldiacylglycerol
   C) Phosphatidylglycerol
   D) Sulfoquinovosyldiacylglycerol

2. The space between the outer surface of the cytoplasmic membrane and the inner surface of the bacteria cell wall is called the _____

   A) Stroma
   B) Cytoplasm
   C) Periplasm
   D) Plasma membrane

3. Which organism uses light as source of energy and organic compounds as carbon source?

   A) Autotroph
   B) Chemolithoheterotroph
   C) Photoautotroph
   D) Photoheterotroph

4. The molecular chemical formula for chlorophyll *a* is

   A) $C_{55}H_{74}N_4O_5Mg$
   B) $C_{55}H_{76}N_4O_5Mg$
   C) $C_{55}H_{72}N_6O_5Mg$
   D) $C_{55}H_{72}N_4O_5Mg$

5. A large peripheral membrane antenna complexes found in cyanobacteria and red algae is

   A) Phycobilisomes
   B) Carotenoids
   C) Xanthophylls
   D) Anthocyanins

6. The generation of adenosine triphosphate by the movement of hydrogen ions across a membrane during cellular respiration or photosynthesis is called as which mechanism?

   A) Osmosis
   B) Chemiosmosis
   C) Proton gradient
   D) Photophosphorylation

7. The process of copying DNA into RNA is called _____

   A) Transcription
   B) Ribosomes
   C) Translation
   D) Recombination

8. Many cyanobacteria are capable not only of photosynthesis, but also of _____

A) Phosphorous Fixation
B) Fe fixation
C) Sulphur Fixation
D) Nitrogen fixation

9. Which of the following are not found in plant cells?

A) Golgi complexes
B) Mitochondria
C) Centrosomes
D) Peroxisome

10. Which of the following macromolecules are formed by condensation reactions?

A) Polysaccharides
B) Polypeptides
C) Fatty acids
D) Nucleic acids

11. Usual the shape of the bacteria cell can be determined by which of the following?

A) Nucleoid
B) Cytoskeleton
C) Cell wall
D) Plasma membrane

12. Cellular organelles containing hydrolytic enzymes are called

A) Lysosomes
B) Mesosomes
C) Peroxisomes
D) Proteolytic

13. The binding of substrate to enzyme is accomplished by the same types of ____interaction

A) Noncovalent
B) Covalent
C) Polar Covalent only
D) Nonpolar covalent only

14. Which inhibition is the process by which a regulatory molecule binds to an enzyme in a spot different from the active site for another molecule?

A) Competitive
B) Noncompetitive
C) Uncompetitive
D) Allosteric

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15. A carbon atom with four different substituents is said to be asymmetric, and asymmetric carbons are called?

A) Enantiomers
B) geometric
C) Chiral centers
D) *cis-trans*, isomers

16. Which of the following amino acid is having guanidine group

A) Aspartate
B) Arginine
C) Histidine
D) Glutamate

17. How many amino acid residues occurred per turn in helical structure?

A) 3.2
B) 3.4
C) 3.6
D) 3.8

18. Disaccharides consist of two monosaccharides joined covalently by an _____

A) O-glycosidic bond
B) Peptide bond
C) Phosphodiester bond
D) Hydrogen bond

19. The starch consists of long, unbranched chains of D-glucose residues connected by which linkage?

A) (β1→4)
B) (α1→4)
C) (α1→6)
D) (β1→4)

20. Chitin is a long-chain polymer of___

A) Glucose
B) N-glucosamine
C) N-acetylglucosamine
D) glycosaminoglycans

21. Which of the following of the environment has the least storage capacity of matter

A) Lithosphere
B) Atmosphere
C) Biosphere
D) Hydrosphere

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22. The most stable ecosystem is

A) Mountain
B) Desert
C) Forest
D) Ocean

23. The largest reservoir of nitrogen in our planet is the

A) Fossil fuel
B) Atmosphere
C) Biosphere
D) Ocean

24. Increase in fauna and decrease in flora would be harmful due to increase in

A) CO_2
B) O_2
C) N_2
D) SO_2

25. Deforestation generally decreases

A) Drought
B) Rainfall
C) Global warming
D) Soil erosion

Part-B

26. Which of the following is a component of abiotic ecosystem

A) Plants
B) Humus
C) Bacteria
D) Fungi

27. The Earth Summit was held at

A) New Delhi
B) Washington
C) Rio de Janerio
D) Copenhagen

28. The plants rhizopora are grown in swampy areas and the roots produced by this plant grow vertically upwards from the ground are called as

A) Pneumatophores
B) Prop roots
C) Adventitious roots
D) Fibrous roots

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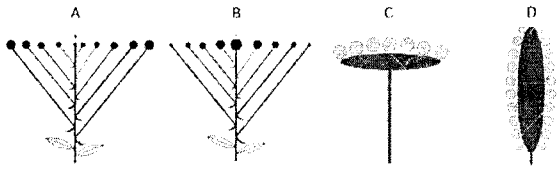
29. Find out the right order of inflorescence(s) from the below given cartoon (A to D)



A) Corymb, cyme, capitulum, spadix
B) Cyme, corymb, spadix, capitulum
C) Capitulum, spadix, cyme, corymb
D) Spadix, capitulum, cyme, corymb

30. In monocot plants, the outer covering of endosperm separates the embryo by a proteinaceous layer is called

A) Aleurone layer
B) Coleoptile
C) Coleorhiza
D) Apocarpus layer

31. Enzymes that catalyze removal of groups from substrates by mechanisms other than hydrolysis leaving double bonds are called as

A) Hydrolases
B) Transferases
C) Lyases
D) Dehydrogenases

32. The capacity to generate a whole plant from any cell or explant is called as

A) Micropopagation
B) Somaclones
C) Totipotency
D) Vegetative propagation

33. A substance that inhibits the development of a fungus on hypersensitive tissue formed when host plant cells come in contact with the parasite.

A) Phytoalexin
B) Aflatoxin
C) Vincristine
D) Nematicide

34. Molecular landmarks that provide a profile of mRNAs and allow cloning of a large number of genes being expressed in a cell population.

A) Microarrays
B) CRISPER-CAS
C) Expressed sequence tags
D) Silencing

35. The swollen tip of a hypha or germ tube that facilitates attachment and penetration of the host by a fungus is called

A) Appressorium
B) Haustorium
C) Apothecium
D) Ascostroma

36. Dependence of bacterial or spore behavior and pathogenicity on their cells reaching a certain density by sensing the concentration of certain signal molecules in their environment is called

A) Quorum sensing
B) Quarantine
C) Phyllody
D) Polyetic

37. What do you understand by term "Scutellum"?

A) It is type of human scrotal filariasis disease which is caused by *Wuchereria bancrofti*
B) It is a part of newly identified human organ mesentery which helps in protection of intestine
C) This a part of monocot seeds in plant
D) This a part of plant flower which help in sexual reproduction

38. Acetophenone is also known as

A) 3-pentanone
B) Methyl phenyl ketone
C) Acetone cyanohydrin
D) Acetone phenylhydrazone

39. Orlon is used as synthetic textile fiber in clothing and carpeting. It is obtained in the lab by polymerizing?

A) Vinyl chloride
B) Vinyl cyanide
C) Tetrafluoroethylene
D) Styrene

40. Hexachlorophene is an organochlorine compound which is sued as

A) Skin disinfectant
B) Water purifier
C) Dye for microbe identification
D) Anti-histamine to treat allergic rhinitis

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41. Many heat sensitive items such as disposables, plastic petri-dishes, syringes, heart-lung machine components, catheters are now sterilize with which of the following gas treatment

A) Phosgene
B) Perchloroethylene
C) Ethylene oxide
D) Propylene oxide

42. Alkaline phosphatase is an enzyme which removes phosphate group from many biomolecules. This enzyme comprises which metal?

A) Iron
B) Copper
C) Zinc
D) Cobalt

43. Which of the following disease is related to rice crop

A) Bacterial blight and blast
B) Alternaria leaf blight and crown rot
C) Powdery mildew and crown gall
D) Charcoal rot and fusarium wilt

44. Two anticancer compounds "Vinblastine and Vincristine" isolated from a well known medicinal plant called

A) *Taxus brevifolia*
B) *Withania somnifera*
C) *Veronica officinalis*
D) *Catharanthus roseus*

45. Molecular technique in which DNA sequences of interest can be amplified is known as

A) Southern blotting
B) Northern blotting
C) Polymerase chain reaction
D) cDNA library

46. The Southern blotting technique depends on

A) Similarities between the sequences of probe DNA and experimental DNA
B) Similarities between the sequences of probe RNA and experimental RNA
C) Similarities between the sequences of probe protein and experimental protein
D) The molecular mass of proteins

47. It is known that cactus is well adapted to the deserts. Which of the following characteristics would be detrimental to cactus to survive in hot and dry areas?

A) Thin leaves with a large surface area
B) A thick waxy cuticle
C) Water storage tissue
D) Deep root structure

48. The movement of water from soil to top of the tree is by which process follows from the bellow statements?

A) Osmosis
B) Capillary rise
C) Ionization
D) Adhesion and cohesion mechanism

49. In the cytoplasm of living plant and animal cells under a light microscope, one can see several tiny dots. Which of the following organelle could it be?

A) Chloroplasts
B) Ribosomes.
C) Mitochondria
D) Nuclei.

50. You are given a photograph of a cell which has ribosomes, endoplasmic reticulum, chloroplasts, a nucleus, and a cell wall. Which of the following could be the source of this cell?

A) A fungus
B) An animal
C) A plant
D) A bacterium

51. The carnivorous habit of plants was evolved mainly to compensate for deficiency in soil for following element:

A) Potassium
B) Nitrogen
C) Calcium
D) Manganese.

52. Lichens which often grow on rocks or tree:

A) Require moist and sheltered place
B) Are prokaryotic organisms
C) Involve a fungus parasitizing an alga
D) Differ from their constituent organisms

53. The development of roots on the petioles of detached leaves prevents senescence of leaf, because root produces the following plant hormone.

A) Auxin
B) Cytokinin
C) Salicylic acid
D) Systemin

54. Which of the following application of genetics has maximally benefited mankind?

A) Plant breeding
B) Animal breeding
C) Genetic engineering
D) *In vitro* fertilization

55. Which of the following crop varieties was used for the 'Green Revolution' in the country?

A) Basmathi rice
B) Hybrid sugarcane
C) C S H -5 jowar
D) Dwarf variety of wheat

56. An important peptide involved in scavenging superoxide radicals in plants is

A) Insulin
B) Glutathione
C) Beta-carotene
D) Ascorbate

57. Which mineral is essential for the activity of the enzyme nitrate reductase?

A) Copper
B) Iron
C) Molybdenum
D) Magnesium

58. The chemical substance found abundantly in the middle lamella of plant cells is

A) Suberin
B) Lignin
C) Cellulose
D) Pectin

59. The incorrect pair is

A) Cyanobacteria - Primary producer
B) Grass hopper - Primary consumer
C) Eagle - Top carnivore
D) Zooplankton - Secondary consumer

60. Which one of the following is a secondary pollutant?

A) CO
B) CO_2
C) SO_2
D) PAN (Peroxy acetyl nitrate)

61. One of the following is a hydrocarbon plant

A) *Elaeis guinensis*
B) *Jatropha curcas*
C) *Musa paradisiaca*
D) *Calotropis gigantia*

62. Soilless cultivation of plants is known as

A) Arboriculture
B) Hydroponics
C) Horticulture
D) Olericulture

63. The tree commonly called "subabul" is

A) *Prosopis juliflora*
B) *Leucaena leucocephala*
C) *Pithecalobium saman*
D) *Albizzia lebbeck*

64. *Datura stramonium* has 12 pairs of chromosomes (2n = 24). How many chromosomes will be found per cell in a double monosomic member of this species?

A) 20
B) 21
C) 22
D) 23

65. Sickle cell anemia is a monogenic disorder that produces abnormal hemoglobin S (HbS) resulting in sickling of erythrocytes. Which of the following is **incorrect** about sickle cell anemia?

A) Carriers of the sickle cell allele are resistant to malaria
B) Red blood cells carrying mutant hemoglobin become sickle shape when deprived of oxygen
C) Individuals with two copies of sickle cell gene have the disease
D) Individuals afflicted with sickle-cell anemia are two time more likely to be males than to be females

66. A base substitution resulting in a different amino acid in the proteins are

A) Missense mutation
B) Nonsense mutation
C) Silent mutation
D) Neutral mutation

67. DNA microarray technologies are used widely for

A) DNA sequence analysis
B) Studying gene expression under certain conditions
C) Detecting DNA sequences in restriction fragments separated using gel electrophoresis
D) Locating DNA sequences in colonies grown in agar plats

68. Cinnabar eyes is a sex-linked recessive characteristic in fruit flies. If a female heterozygous for cinnabar eyes is crossed with a wild-type male, what percentage of the F_1 males will have cinnabar eyes?

A) 25%
B) 50%
C) 75%
D) 100%

69. Two genes of a flower, one controlling Blue (B) *versus* white (b) petals and the other controlling round (R) *versus* oval (r) stamens are linked and are 20 map units apart. A cross is made between a homozygous blue-oval plants with a homozygous white-round plant. The resulting F_1 progeny are crossed with homozygous white-oval plants, and 1000 F_2 progeny are obtained. How many F_2 plants with blue-oval phenotypes are expected?

A) 100
B) 200
C) 400
D) 800

70. A dicentric chromosome is produced when crossing over takes place in an individual heterozygous for

A) Paracentric inversion
B) Pericentric inversion
C) Deletion
D) Duplication

71. Gregor Johann Mendel worked on garden pea with diploid chromosome number 2n = 14 and discovered laws of inheritance. Imagine, had Mendel studied the seven different traits, each trait controlled by different alleles of a single gene, with all the seven genes being present on single homologous chromosome pair and are not very far apart, then he would not have possibly discovered

A) Law of dominance
B) Law of segregation
C) Law of independent assortment
D) Dominant and recessive alleles of a gene

72. A cross is made in *Neurospora* to determine the distance of the gene from its centromere. It was found that 90 asci showed first-division segregation pattern and 25 asci showed second-division segregation pattern. Then the map distance from gene to centromere is

A) 10.9 map units
B) 14 map units
C) 21.7 map units
D) 39 map units

73. Vascular bundles are bicollateral in

A) Poaceae
B) Anonaceae
C) Boraginacae
D) Malvaceae

74. Which of the following plant organ is the main site of transportation

A) Lenticels
B) Leaf
C) Root
D) Stem

75. Leaf tendrils are found in

A) Arabidopsis
B) Heliotropism
C) Sunflower
D) Clematis

76. Which of the enzymes is involved in Glyphosate resistance

A) 5-enolpyruylshikimate-3-phosphate synthase
B) Phosphoenol pyruvate Carboxylase
C) Phosphoinothricin N-Acetyltransferase
D) Hexokinase

77. Casparian strips in the root endodermal cells are rich in

A) Lignin
B) Chitin
C) Cellulose
D) Suberin

78. Browning of apple occurs due to

A) Oxidation of polyphenols
B) Reduction of polyphenols
C) Oxidation of o-quinones
D) Reduction of o-quinones

79. Which one of the following is not a genome-editing tool

A) Zinc Finger Nucleases
B) Transcription activator-like effector nucleases
C) Clustered regularly interspaced short palindromic repeats
D) S1 nucleases

80. Which is a correct statement in case of DNA binding property of Zinc Finger Nucleases (ZFN) and Transcription activator-like effector nucleases (TALEN)

A) ZFN binds to a codon whereas TALEN binds to single nucleotide base
B) TALEN binds to a codon whereas ZFN binds to single nucleotide base
C) Both bind to a codon
D) Both bind to single nucleotide base

81. The insecticidal protein produced by *Bacillus thuringiensis* bacterium in BT transgenic plants is

A) Amylase
B) Protease
C) Proteinase K
D) Cry protein

82. Root hairs are extension of

A) Epidermal cells
B) Pericycle cells
C) Endodermal cells
D) Cortical cells

83. Ozone is pollutant in

A) Stratosphere
B) Troposphere
C) Thermosphere
D) Tropopause

84. Endosperm is a prominent feature in the seeds of

A) Dicotyledons
B) Gymnosperms
C) Monocotyledons
D) None of the above

85. The plant hormone responsible for the breaking of seed dormancy is

A) Abscisic acid
B) Gibberellins
C) Brassinosteroids
D) Auxin

86. In plant tissue culture, root formation is promoted by

A) High auxin to cytokinin ratio
B) High cytokinin to auxin ratio
C) High auxin to gibberellins ratio
D) None of the above

87. Epipetalous, syngenesious, hooded stamens are found in family

A) Lamiaceae
B) Asteraceae
C) Solanaceae
D) Euphorbiaceae

88. Polyadelphous condition is found in

A) Leguminaceae
B) Rutaceae
C) Composiate
D) Liliaceae

89. Indefinite stamens are characteristic of family

A) Malvaceae
B) Poaceae
C) Cruciferae
D) Solanaceae

90. Heavily polluted water zone of reservoir is known as

A) Pleosaprophytic zone
B) Mesosaprophytic zone
C) Oligosaprophytic zone
D) Neosaprophytic zone

91. Which of the following is known to control Colorado potato beetle?

A) *Metarhizium anisopliae*
B) *Verticillium lecauii*
C) *Beaveria bassiana*
D) *Nomuraea rileyi*

92. During which phase of growth of *Penicillium chrysogenum* maximum antibiotic production takes place

A) During the first phase
B) During the second phase
C) During the third phase
D) Same in all the phases

93. Fermentation medium for oxytetracyclin (terramycin) consist of

A) CSL, starch, $(NH_4)_2SO_4$, NaCl and $CaCO_3$
B) CSL, $(NH_4)_2SO_4$, NaCl and $CaCO_3$
C) CSL, starch, $(NH_4)_2SO_4$, NH_4Cl and $CaCO_3$
D) CSL, $(NH_4)_2SO_4$, NH_4Cl and $CaCO_3$

94. Identify the mismatch

A) Molecular chaperones – Aid a newly synthesized polypeptide in folding to its proper shape
B) Tetracycline – Blocks the binding of amino-acyl tRNA to the A site of ribosomes
C) Quorum sensing – Detects a signal from the external environment
D) *Haemophilus influenzae* – First bacterial genome to be sequences and made public

95. Which of the following acid will have higher bacteriostatic effect at a given pH?

A) Acetic acid
B) Tartaric acid
C) Citric acid
D) Maleic acid

96. Which of the following is not true for the thermal resistance of the bacterial cells?

A) Cocci are usually more resistant than rods
B) Higher the optimal and maximal temperatures for growth, higher the resistance
C) Bacteria that clump considerably or form capsules are difficult to kill
D) Cells low in lipid content are harder to kill than other cells

97. The ability of *Vibrio fischeri* to convert chemical energy directly into radiant energy in bioluminescence is an example of _____ at work.

A) Shelford's law of tolerance
B) Leibig's law of minimum
C) The first law of thermodynamics
D) The third law of thermodynamics

98. The whole-genome shotgun sequencing approach depends primarily on

A) Rapidly sequencing thousands of small randomly cloned fragments
B) Methodical sequencing a few large cloned fragments of DNA
C) Sequencing the bacterial chromosome while it is still intact
D) None of those mentioned above

99. Which of the following statement is correct?

A) All members of photolithotrophic autotrophs are also members of algae, but not all members of algae are members of photolithotrophic autotrophs
B) All members of algae are also members of photolithotrophic autotrophs, but not all members of photolithotrophic autotrophs are members of algae
C) All members of photolithotrophic autotrophs are members of algae, and all members of algae are members of photolithotrophic autotrophs
D) No member of photolithotrophic autotrophs is a member of algae

100. Post-translational modification is a process of _____

A) Enzymatic modification after protein biosynthesis
B) Carbohydrate modification
C) Nucleic acid modification
D) All Amino acid modification gets after or before protein biosynthesis

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