Code No. W-11

ENTRANCE EXAMINATION - 2020

M.Sc. Plant Biology & Biotechnology

Department of Plant Sciences

Time: 2 hours Maximum Marks: 100

HALL TICKET NO.

INSTRUCTIONS

Please read carefully before answering the questions:

1. Write your Hall Ticket Number in the OMR Answer Sheet given to you. Also write the Hall Ticket Number in the space provided above.
2. There is negative marking. Each wrong answer carries -0.33 mark.
3. Answers are to be marked only on the **OMR answer sheet** following the instructions provided there upon.
4. Hand over the OMR answer sheet at the end of the examination to the Invigilator.
5. No additional sheets will be provided. Rough work can be done in the question paper itself/space provided at the end of the booklet.
6. The question paper contains **100** questions (**Part-A**: Question Nos. **1-25** and **Part-B**: Questions Nos. **26-100**) of multiple-choice printed in **16** pages, including this page. One OMR answer sheet is provided separately. **Please check.**
7. Each question carries one mark.
8. The marks obtained in **Part-A** will be used for resolving the tie cases.
9. Calculators and mobile phones are NOT allowed.

PART - A

1. One of the following is an instrument used to measure water potential of leaf tissues:
   A. Psychrometer B. Hygrometer
   C. Hydrometer D. Electro diodo-meter

2. The organism that is suitable for mapping the gene with respect to centromere is
   A. *Sachharomyces cerevisiae* B. *Chlamydomonas rheinhardii*
   C. *Aspergillus nidulans* D. *Neurospora crassa*

3. The stain used to test seed viability based on the pink colour developed by the living seed tissue contains one of the following salts:
   A. Molybdenum B. Tetrazolium C. Sodium D. Propidium

4. A cross was made in snapdragon plant between AB/ab x ab/ab. What proportion of the progeny will be aabb if the two genes A and B are 24 map units apart?
   A. 12% B. 24% C. 38% D. 50%

5. The key switches in signal transduction circuits regulating gene expression are:
   A. Internal transcribed spacer B. Transcription factor
   C. Open reading frame D. Coding sequence

6. Removal of male organs from a hermaphrodite flower to prevent selfing is known as:
   A. Hibernation B. Aestivation C. Coronation D. Emasculation

7. The mating of plants in all possible combination is known as:
   A. Recurrent mating B. Diallel mating
   C. Sib mating D. Line X tester mating

8. The arrangement of petals and sepals in a flower bud before it opens is known as:
   A. Anthesis B. Aestivation C. Phyllotaxy D. Vernalization

9. When a cell is fully turgid, which of the following will be zero?
   A. Osmotic pressure B. Wall pressure
   C. Suction pressure D. Turgor pressure

10. Hydathodes are:
   A. Honey glands B. Mucilage secreting glands
   C. Water secreting glands D. Oil secreting glands

11. Deamination of 5-methylcytosine produces ____.
   A. Uracil B. Thymine C. Cytosine D. Guanine

12. One centimorgan is defined as the genetic distance between two loci with a statistically corrected recombination frequency of ____.
   A. 0.1% B. 0.5% C. 1% D. 10%

13. Which of the following amino acid in proteins cannot be post-translationally modified?

A. Cysteine B. Serine C. Tyrosine D. Alanine

14. Reverse transcriptase is

A. DNA dependent DNA polymerase B. RNA dependent RNA polymerase
C. RNA dependent DNA polymerase D. DNA dependent RNA polymerase

15. A plant species nearing its extinction due to virus infection has been given for tissue culture and micropropagation. Scientists choose the below four explants for culturing:

1. Meristem
2. Shoot tip
3. Leaf disc
4. Root tip

Which explants would have produced virus free plants?

A. 1 and 2 B. 1 and 3 C. 2 and 3 D. 2 and 4

16. Consider the following statements on the common features between phase-contrast and dark-field microscopes:

1. Both increase contrast between specimen and background without staining.
2. Both make specimen fluoresce on a dark background.
3. Both make specimen appear dark on a bright background without staining.
4. Both make specimen visible that refract light away from the objective.

"Which of the above is/are **true**?"

A. 1 only B. 1 and 2 C. 3 only D. 3 and 4

17. How would you measure the transcript abundance of a particular gene?

A. by performing Western Blot B. by performing Northern Blot
C. by performing Southern Blot D. by performing Immunoblot

18. Though DNA and RNA are nucleic acids, isolation of RNA in the laboratory requires extreme precautions and pre-preparations than isolating DNA. This could be because:

1. DNA content of a cell is more, but RNA will be present in lesser concentrations, and therefore, care should be taken to avoid loss.
2. RNA is smaller in size than DNA, so it requires stringent procedures to capture those smaller molecules.
3. RNA is unstable and prone to degradation, but DNA is relatively stable that eases DNA isolation.
4. DNA is bound to proteins that safeguard the molecule, but RNA is naked, which makes the separation difficult.

Which of the above statement(s) is/are **correct**?

A. 1 only B. 1 and 2 C. 3 only D. 3 and 4

19. Identify the **mismatch**

A. Zooxanthellae – Pyrrophyta
B. Cephaleuros – Paracitic
C. Ulothrix – Branched filaments
D. Red algae – Phycoerythrin

20. To survive harsh environments, plants have acquired several adaptations with specialized functions. Below is the list of traits (A) and their potential role (B).

A	B
p. Waxy cuticle	1. Mechanical support
q. Thick or lignified cell wall	2. Protection against excess light
r. Homoiohydry	3. Restrict water loss
s. Pigmentation	4. Vascular system

Identify the **correct** match.

A. p-4, q-2, r-1, s-3
B. p-3, q-1, r-4, s-2
C. p-3, q-2, r-1, s-4
D. p-4, q-1, r-2, s-3

21. Plankton will be absent in

A. Lotic biome B. Lentic biome C. Marine biome D. Lakes

22. The most commonly used stain for producing bands on chromosomes for karyotyping is

A. Gentian violet B. Methylene blue C. Giemsa D. Acid fuchsin

23. Cistron is the

A. Smallest unit of recombination
B. Genetic unit of biochemical function
C. Smallest unit that can undergo mutation
D. Largest unit that can undergo mutation

24. Winged Bean is the popular name of

A. *Phaseolus vulgaris*
B. *Cyamopsis tetragonoloba*
C. *Dolichos lablab*
D. *Psophocarpus tetragonolobus*

25. The feature unique to monocotyledonous root is

A. Exarch xylem
B. Small pith
C. Polyarch xylem
D. Radial arrangement of vascular bundles

PART - B

26. Which of the following statement about keratin protein of hair, wool and nail is **false**?
    A. Exhibits α-helical structure
    B. Is a fibrous structural protein
    C. Exhibits stability due to hydrogen bond and disulphide linkages
    D. Is a non-fibrous structural protein

27. Charcoal rot, also known as dry-weather wilt is caused by
    A. *Macrophomina phaseolina* B. *Sclerotium rolfsii*
    C. *Fusarium graminearum* D. *Mycosphaerella graminicola*

28. Electroporation is an experimental technique adopted in
    A. Tissue culture B. Induction of polyploidy
    C. Embryo rescue D. Genetic engineering

29. 2, 4-Dichlorophenoxy acetic acid is generally used as
    A. Fungicide B. Pesticide
    C. Wormicide D. Herbicide

30. The C4 plants are different from the C3 plants with reference to the
    A. Type of end products of photosynthesis
    B. Number of ATP molecules that are consumed in preparing sugar
    C. Type of pigments involved in photosynthesis
    D. Substance that accepts CO_2 in Calvin's cycle

31. Match the following

p. Rock weed	1. Chondrus
q. Gulfweed.	2. Cladonia
r. Reindeer moss	3. Sargassum
s. Irish moss	4. Fucus

    A. p-1, q-2, r-3, s-4 B. p-3, q-4, r-2, s-1
    C. p-4, q-3, r-2, s-1 D. p-3, q-4, r-1, s-2

32. Amphidiploidy has played a major role in the production of new species of *Brassica*. The chromosome number of *B. juncea*, an amphidiploid that is produced by crossing *B. nigra* (2n = 16) with *B. campestris* (2n = 20) is
    A. 18 B. 26 C. 28 D. 36

33. Tic/Toc complex is associated with import of proteins into
    A. Nucleus B. Chloroplast C. Mitochondria D. Cell wall

34. Which of the following genera has two polar nuclei in its mature embryo sac?

A. Orchis B. Oenothera C. Plumbago D. Nymphaea

35. Members of which of the following families usually lacks endosperm?

A. Brassicaceae B. Onagraceae C. Piperaceae D. Orchidaceae

36. Which of the following class of genes does **not** act as transporters in plants?

A. PIN proteins B. AP2/ERF C. ABC transporters D. Aquaporin

37. Choose the **right** answer for the given statements on the location of photosystems (PS) in chloroplast

Statement 1: PS II mostly occurs in the stacked region of the thylakoids

Statement 2: PS I is predominantly present in the unstacked regions of the thylakoids

A. Statement 1 is correct whereas statement 2 is false

B. Statement 2 is correct whereas statement 1 is false

C. Both statements are true

D. Both statements are false

38. Apomixis is the type of reproduction which results in

A. Development of plants without fusion of gametes

B. Development of plants from fusion of gametes

C. Development of embryo from tapetal cells

D. Development of embryo from endosperm

39. Pectin, a component of plant cell wall, is stained by

A. Phosphorus B. Potassium C. Acetocarmine D. Ruthenium red

40. Characteristic curling of root hairs in plants is associated with the assimilation of

A. Sudan III B. Iodine C. Nitrogen D. Boron

41. Match the acronyms listed in the first column with the corresponding expanded form present in the second column

p. CRISPR	1.RNA interference
q. RNAi	2. Messenger RNA
r. TALEN	3. Clustered regularly interspaced short palindromic repeats
s. miRNA	4. Clustered randomly interspaced short palindromic repeats
	5. MicroRNA
	6. Transcription activator-like effector nuclease
	7. Transcription activator-like endo nuclease

A. p-3, q-7, r-6, s-5 B. p-3, q-1, r-6, s-5

C. p-4, q-1, r-7, s-2 D. p-4, q-1, r-7, s-5

42. Significance of Reynolds number is

A. Inertial force / gravity force
B. Inertial force / viscous force
C. Pressure force / Inertial force
D. Inertial force / Surface tension force

43. If a single somatic cell in a multicellular organism harbors a mutation, it

A. is usually inherited in the next generation
B. has no phenotypic effect
C. causes cell death
D. creates hundreds of genetic alterations during DNA replication

44. α-D-(+)-glucose and β-D-(+)-glucose are

A. Confonmers B. Epimers C. Anomers D. Enantiomers

45. Match the following:

p. Co-enzyme	1. Michaelis Menten
q. Competitive inhibition	2. Vitamin
r. Trypsin	3. Succinic dehydrogenase by malonic acid
s. Km and Vmax	4. Right-handed
t. α-Helix	5. Alkaline pH

A. p-5, q-2, r-1, s-3, t-4
B. p-2, q-4, r-5, s-1, t-3
C. p-2, q-3, r-5, s-1, t-4
D. p-2, q-3, r-4, s-1, t-5

46. How many EDTA (ethylenediaminetetraacetic acid) molecules are required to make an octahedral complex with a Ca^{+2} ion?

A. Six B. Three C. One D. Two

47. Which one of the following pair is **not** matched?

A. Mg & Chlorophyll
B. Cu & Cytochrome
C. Mn & Nitrogenase
D. Mo & Nitrate reductase I

48. A student wanted to prepare 2500 mL buffer containing 100 mM Sodium acetate pH 4.0 containing 0.01% NaCl. He has the stocks of 2M Sodium acetate buffer pH 4.0; and 10% NaCl solution. What volumes of the given stock solutions he has to mix in distilled water for preparing 2500 mL of the above reaction buffer?

A. 125 mL of Sodium Acetate; and 2.5 mL of NaCl
B. 1.25 mL of Sodium Acetate ; and 25 mL of NaCl
C. 12.5 mL of Sodium Acetate; and 0.25 mL of NaCl
D. 120 mL of Sodium Acetate; and 2.5 mL of NaCl

49. Identify the monounsaturated fatty acid given below

A. Linoleic acid
B. Linolenic acid
C. Arachidonic acid
D. Oleic acid

50. Match the cell organelles in Group I with their functions listed in Group II

Group I	**Group II**
p. Peroxisome	1. Storage of starch granules
q. Mitochondria	2. Detoxification
r. Ribosome	3. Proton gradient formation
s. Leucoplast	4. Protein synthesis

A. p-3, q-2, r-1, s-4
B. p-2, q-4, r-3, s-1
C. p-2, q-3, r-4, s-1
D. p-1, q-3, r-4, s-2

51. The basis of precipitation of proteins by ammonium sulfate is best described by which of the following statements?

A. Proteins become insoluble when they bind the ammonium ion
B. Proteins become insoluble when they bind sulfate ion
C. Addition of ammonium sulfate adjusts the pH to the isoelectric point of the proteins
D. Ammonium sulfate binds water molecules, making them less available for hydration of proteins

52. Match the following Disease with Pathogen/Causative factor

p. Creutzfeldt-Jakob	1. Fungi
q. Pseumocystis	2. Virus
r. Legionnaries disease	3. Prion
s. Rabies	4. Bacteria
	5. Helminthes

A. p-2, q-1, r-4, s-3
B. p-3, q-1, r-4, s-2
C. p-1, q-2, r-5, s-4
D. p-5, q-4, r-1, s-3

53. One student from Kozhikode district of Kerala got his admission in Wuhan University, China for his PhD. He travelled to Wuhan University during first week of January 2020 to start his semester. Within one week of his arrival in Wuhan, he became sick and consulted University Health Center. Based upon his symptoms, doctor immediately suggested him for "Widal Test". His Widal test report was positive. Which disease/pathogen he was suffering from?

A. Covid-19 B. Nipah Virus C. Typhoid D. Weil's disease

54. One scientist has given a genomic DNA sample of a plant species to his research scholar and asked him to amplify a specific gene of interest "xyz" using the available components in the lab. As suggested, he mixed all the components and performed the experiment which was finally failed. Upon investigation, his supervisor realized that his student forgot to add one very important component to the tube. His student mixed the following in the tube: genomic DNA, pairs of primers, 4 types of dNTPs, buffer and dH_2O. Which component his student forgot to add in the tube?

A. EcoRI B. Taq Polymerase C. EtBr D. DNA ligase

55. Which of the chemical formula belong to Valeric acid?

A. $CH_3CH_2CH_2CH_2COOH$
B. $HOCH_2COOH$
C. $BrCH_2COOH$
D. $ClCH_2CH_2COOH$

56. What is the term "Amphipathic"means ?
    A. Those pathogens which infect only amphibian animals
    B. Those pathogens which infect only amphioxus animals
    C. A chemical compound or biomolecule which possess both hydrophilic and hydrophobic properties
    D. This term is used for describing amphibolic pathway

57. When a protein solution containing tyrosine and tryptophan is warmed with concentrated nitric acid, it has turned to yellow color because of nitration of aromatic ring. This test is called
    A. Xanthoproteic test
    B. Biuret test
    C. Hopkins-Cole test
    D. Million's test

58. When diazonium fluoroborate was dried and heated it gave aryl fluoride. This process of preparing fluorobenzene is called
    A. Sandmeyer's Reaction
    B. Schiemann Reaction
    C. Gomberg Reaction
    D. Gatterman's Reaction

59. Which of the following reaction is popularly known as Wittig reaction?
    A. Treatment of aldehyde and ketone with phosphorous to form alkenes
    B. Formaldehyde reacts with conc. NaOH solution to form methanol and sodium formate
    C. Formation of toluene from benzene
    D. Formation of chlorobenzene from benzene diazonium chloride

60. Which of the following human disease is caused by helminth?
    A. Grave's disease
    B. Trichomoniasis
    C. Trichuriasis
    D. Tinea corporis

61. When ethylene is treated with Sulphur monochloride, a toxic product is obtained. This product is
    A. Tear gas
    B. Chloroform
    C. Phosgene gas
    D. Mustard gas

62. In plant biology studies some of the abbreviated terms are used which are listed in Column-A. Match its best combination present in Column-B and select the **correct** answer.

Column-A	**Column-B**
p. Xa21	1. Name of a plant X-chromosome
q. SmaI	2. A type of fluorescent dye
r. DAPI	3. DNA based marker technique
s. RFLP	4. A Restriction Endonuclease enzyme
	5. Rice disease resistance gene"

    A. p-5, q-4, r-3, s-2
    B. p-5, q-4, r-2, s-3
    C. p-1, q-4, r-2, s-3
    D. p-4, q-5, r-2, s-3

63. Which of the following is considered as a secondary metabolite of higher plants?

A. Phospholipid B. Adenine C. Carotenoid D. Fructose

64. Morphine was initially isolated from

A. *Papaver somniferum* B. *Rauwolfia serpentina*
C. *Catharanthus roseus* D. *Piper nigrum*

65. *Ocimum tenuiflorum* belongs to

A. Oxalidaceae B. Lamiaceae
C. Malvaceae D. Liliaceae

66. Plant tannins are

A. Polyphenolic compounds B. Alkaloids
C. Polyterpenoids D. Nucleo-protein complexes

67. Match the common names of the plants listed in the left panel with their scientific names from the right panel, and choose the **correct** answer.

Common name	**Scientific name**
p. Finger millet	1. *Avena sativa* L
q. Foxtail millet	2. *Pennisetum glaucum* L.
r. Pearl millet	3. *Eleusine coracana* L.
s. Oat	4. *Setaria italica* L.
	5. *Secale cereale* L.

A. p-2, q-4, r-3, s-1 B. p-3, q-4, r-2, s-1
C. p-2, q-5, r-3, s-1 D. p-5, q-4, r-1, s-2

68. Match the following:

p. Lysine	1. Guanidino group
q. Aromatic Amino acid	2. Positive charge R group
r. Cystine	3. Alanine
s. Arginine	4.Tyrosine
t. α- helical structure	5. Sulfur
	6. Glycine

A. p-2, q-4, r-5, s-1, t-3 B. p-1, q-4, r-5, s-6, t-3
C. p-2, q-6, r-5, s-1, t-3 D. p-1, q-4, r-2, s-5, t-6

69. Match the following and choose the **correct** combination

p. Rho and Rac proteins	1. Ser/Thr kinase
q. Rb	2. Tumor suppressor gene
r. MAPKs	3. GTP-binding proteins
s. Bad	4. Apoptotic factor

A. p-2, q-3, r-4, s-1 B. p-2, q-4, r-3, s-1
C. p-3, q-2, r-1, s-4 D. p-4, q-1, r-2, s-3

70. Match the following and choose the **correct** answer given below

p. Inbred	1. Vegetatively propagated plants
q. Pureline	2. First Filial Progeny
r. Clone	3. Self-pollinated plant progeny
s. Hybrid	4. Cross-pollinated plant progeny

A. p-1, q-2, r-4,s-2 B. p-3,q-1,r-4,s-2
C. p-4, q-3, r-1,s-2 D. p-1,q-3,r-2,s-4

71. In *E. coli,* four Hfr strains donate the following genetic markers shown in the order donated
Strain 1: Q W D M T, Strain 2: A X P T M
Strain 3: B N C A X, Strain 4: B Q W D M
All of these Hfr strains are derived from the same F^+ strain
What is the order of these markers on the circular chromosome of the original F+?

A. Q,W,D,M,T,P,X,A,C,N,B,Q B. T, P, X, A, C, N, B, Q, W, D, M
C. Q, W, D, M, N, B, Q, T, P, X, A, C D. Q, T, P, X, A, C, N, B, Q, W, D, M

72. miRNAs have been shown to play a significant role in gene expression. Some miRNAs induce gene silencing by binding to mRNAs and inducing inhibition of translation. On the other hand, there are miRNAs that bind to mRNAs and activate their degradation. The following characteristics can be applicable to the miRNAs that inhibit mRNA translation:

1. miRNA is partially complementary to a region of target mRNA in the 3` UTR.
2. miRNA always base pairs with full mRNA and a AU-rich sequence
3. miRNA base pairs with mRNA through 6-7 nucleotides at its 5` end referred to as "seed sequence" as well as few additional base elsewhere.
4. miRNA is always partially complementary to the conserved sequence of the target mRNA.

Choose the **correct** options from the following:
A. 1 and 2 B. 1 and 3 C. 1 and 4 D. 2 and 4

73. When the dihybrid ratio (9:3:3:1) gets modified to 9: 3: 4 due to gene interaction, then it is referred as
A. Dominant epistasis B. Recessive epistasis
C. Duplicate recessive epistasis D. Duplicate dominant epistasis

74. Promoter is
A. Upstream RNA sequence of a mRNA, which is recognized by translation initiation factors in order to initiate translation
B. Upstream DNA sequence of a gene, which is recognized by RNA polymerase in order to initiate transcription
C. Sequence of amino acids in a protein, which promote catalysis of an enzyme
D. Sequence of amino acids in a protein, which specifically promote oxidative/ reductive reaction.

75. Regarding the relationship between two organisms in an ecosystem, match the following

Group I	Group II
p. Commensalism	1. Both organisms are benefited
q. Mutualism	2. One impeding the success of the other
r. Parasitism	3. One organism benefits but the other is unaffected
s. Amensalism	4. One benefited, other is harmed

A. p-1, q-2, r-3, s-4
B. p-2, q-3, r-4, s-1
C. p-3, q-1, r-4, s-2
D. p-1, q-4, r-3, s-2

76. Mutation in a gene x in *Arabidopsis thaliana* results in more number of lateral root formation. Which one of the following is the **correct** statement?

A. The gene product acts as a positive regulator of lateral root formation.
B. The gene product acts as a negative regulator of lateral root formation.
C. The gene product is not likely to be involved in lateral root formation.
D. The gene product niether promotes/reduce the lateral root development.

77. Identify the corresponding target sites for the following restriction endonucleases

Restriction endonucleases	Target site
p. EcoR I	1. GGATCC
q. BamH I	2. GCGGCCGC
r. Hind III	3. GAATTC
s. Not I	4. CTGCAG
	5. AAGCTT

A. p-3, q-5, r-1, s-2
B. p-5, q-1, r-2, s-3
C. p-3, q-2, r-5, s-1
D. p-3, q-1, r-5, s-2

78. Match the scientists names given in the Panel-A with their contributions given in the Panel-B and choose the **correct** answer

Panel-A	Panel-B
p. H. J. Muller	1. Non-disjunction proof that chromosomes contain genes
q. C. Bridges	2. Demonstration of extra nuclear inheritance in higher plants
r. B. Mcclintock	3. Mutagenic effect of X-rays in Drosophila flies
s.T. H. Morgan	4. Discovery of mobile genetic elements
	5. Discovery of sex-linkage

A. p-3, q-1, r-4, s-5
B. p-3, q-5, r-4, s-2
C. p-5, q-1, r-2, s-3
D. p-5, q-1, r-4, s-2

79. Which of the following can form a part of a Biosensor?

1. Enzyme 2. Antibody 3. Lipid 4. Vitamin

A. 2 and 4 are correct
B. 2 and 3 are correct
C. 1 and 2 are correct
D. 1, 2 and 3 are correct

80. Match the aneuploid condition of a diploid organism given in Panel A with the description given in Panel B and choose the **correct** answer

Panel A	**Panel B**
p. Nullisomy	1. Gain of a single chromosome
q. Monosomy	2. Loss of a single chromosome
r. Trisomy	3. Gain of two homologous chromosomes
s. Tetrasomy	4. Loss of both members of a homologous pair of chromosomes

A. p-4, q-1, r-2, s-3
B. p-4, q-2, r-1, s-3
C. p-2, q-4,r-1, s-3
D. p-2, q-4, r-3, s-1

81. Which is the set of forward and backward primer pair of below gene

5'ATCGTGCTATTCGTCGA.....ATTCGCTGCTAAGCTGACTCGACTCG 3'

A. Forward primer 5' ATCGTGCTATTCGTCG 3'
Backward primer 5'CGGATCGAATCTAGCTT 3'

B. Forward primer 5' ATCGTGCTATTCGTCGA3'
Backward primer5'CGAGTCGAGTCAGCTTA 3'

C. Forward primer 5' ATCGTGCTATTCGTCG3'
Backward primer5'5, CGAGTGCAGTAATGCTT 3'

D. Forward primer 5' ATCGTGCTATTCGTCG 3,
Backward primer5' TAGCACGATAAGCAGC 3'

82. Homeobox sequence is

A. Integration site for viruses
B. Junk DNA sequences
C. Conserved sequences which regulate development of many animal species
D. Transcription start site

83. Match the below research institutes with places

Research Institutes	**Places**
p. International Crops Research Institute for the Semi-Arid Tropics	1. Coimbatore
q. National Institute of Virology	2. Bangalore
r. Indian Institute of Horticultural Research	3. Hyderabad
s. Institute of Forest Genetics and Tree Breeding	4. Pune
	5. Delhi

A. p-3, q-4, r-2, s-1
B. p-2, q-4, r-1, s-3
C. p-1, q-5, r-4, s-3
D. p-2,q-4, r-5, s-1

84. Ribulose-1,5-bisphosphate carboxylase oxygenase is also called as

A. Carboxytetra mutase
B. Carboxypetamutase
C. Carboxytrimutase
D. Carboxydimutase

85. Which of the following are involved in the derivation of induced pluripotent stem (iPS) cells from somatic cells?

A. BMPs and Activins
B. EGF and FGF
C. Insulin and growth hormone
D. Sox2, cMyc, Oct-4, KLF4

86. Nitrogen fixation is **not**:

A. Carried out by cyanobacteria
B. Carried out by higher plants
C. Carried out by fungi
D. Carried out by *Rhizobium*

87. In Mendel's experiments, the spherical seed character (SS) is completely dominant over the dented seed character (ss). If the characters for height were incompletely dominant, such that TT are tall, Tt are intermediate and tt are short, what would be the phenotypes resulting from crossing a spherical-seeded, short (SStt) plant to a dented-seeded, tall (ssTT) plant?

A. All the progeny would be spherical-seeded and tall.
B. 1/2 would be spherical-seeded and intermediate height; 1/2 would be spherical-seeded and tall.
C. All the progeny would be spherical-seeded and short.
D. All the progeny would be spherical-seeded and intermediate height.

88. Which of the following pairs is **not** correctly matched?

A. Niacin-Pellagra
B. Vitamin B12- Pernicious anemia
C. Vitamin C- Scurvy
D. Vitamin B6-Beriberi

89. Maize seeds become viviparous when they are deficient in

A. Abscisic acid
B. Gibberellic acid
C. Indole acetic acid
D. Jasmonic acid

90. Which of the following is **not** present in plant cells?

A. Microtubules B. Peroxisomes C. Centriole D. Plasmodesmata

91. Glycolysis is one of the important metabolic pathway to convert the glucose to pyruvate. Identify the specific glycolysis product(s) given bellow:

1. Glucose-6-phosphate
2. Acetyl-CoA
3. Glyceraldehyde-3-phosphate
4. 2-Phosphoglycerate

A. 1, 2, 3 and 4
B. 1, 2 and 4
C. 1, 2 and 3
D. 1, 3 and 4

92. Bulbosum method has been used in barley to generate

A. doubled haploids
B. triploids
C. monosomics
D. trisomics

93. Which of the following photoreceptors has pterin as a chromophore?

A. Phytochrome
B. Cryptochrome
C. Phototropin
D. Neochrome

94. Match plant growth regulators from left panel to their effects listed in right panel and mark the **correct** answer

Plant growth regulator	**Effect**
p. Auxins	1. Breaking dormancy of seeds
q. Cytokinins	2. Promotes senescence of flowers
r. Gibberellic acid	3. Inhibits the outgrowth of axillary buds
s. Ethylene	4. Prevention of senescence

A. p-3, q-4, r-1, s-2
B. p-3, q-4, r-2, s-1
C. p-2, q-3, r-4, s-1
D. p-4, q-3, r-1, s-2

95. Which enzyme is involved in epigenetic inheritance?

A. MAPK
B. Acetyl CoA carboxylase
C. Telomerase
D. Histone methyl transferase

96. Flowers represent a complex array of functionally specialized structures that differ substantially from the vegetative plant body in form and cell types. Following are statements made regarding floral meristems.

1. Floral meristems can usually be distinguished from vegetative meristems by their larger size.
2. The increase in the size of the meristem is largely a result of increased rate of cell division in central cells
3. The increase in the size of the meristem is due to larger size of the cells, which in turn results from rapid cell expansion only
4. A network of genes control floral morphogenesis in plants.

Which combination of the above statements is **true**?

A. 1, 2 and 4
B. 1, 2 and 3
C. 2, 3 and 4
D. 1, 3 and 4

97. Z-DNA is one of the many possible double helical structures of DNA. However it is a

A. Right handed
B. Shorter right handed
C. Left handed
D. Non-linear

98. Match the terms listed in Panel A with the description indicated in Panel B and choose the **correct** answer.

A	B
p. Xerophyte	1. Plants adapted to non-saline soil
q. Hydrophyte	2. Plants that grow in places with scanty water
r. Mesophyte	3. Plants adapted to saline soils
s. Halophyte	4. Plants grow in water may rooted in the mud
	5. Plants that grow under average conditions of temperature and moisture

A. p-2, q-4, r-1, s-3
B. p-2, q-4, r-5, s-3
C. p-2, q-1, r-5, s-3
D. p-3, q-5, r-4, s-2

99. The diploid chromosome number of *Zea mays* is 2n = 20. The number of chromosomes and DNA molecules that are found per cell when this original cell progresses through the G2 phase of mitosis is

A. 20 and 20
B. 20 and 40
C. 40 and 40
D. 40 and 20

100. The cluster of the Oxygen Evolving Complex in photosystem II contains

A. Mn_4O_4Ca
B. $Mn_4O_4Ca_2$
C. Mn_5O_4Ca
D. Mn_4O_5Ca

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