

Roll No.

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(Write Roll Number from left side exactly as in the Admit Card)

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Signature of Invigilator

Question Booklet Series

X

PAPER-II

Question Booklet No.

(Identical with OMR Answer Sheet Number)

Subject Code : 14

LIFE SCIENCES

Time : 2 Hours

Maximum Marks: 200

Instructions for the Candidates

- Write your Roll Number in the space provided on the top of this page as well as on the OMR Sheet provided.
- At the commencement of the examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and verify it:
 - To have access to the Question Booklet, tear off the paper seal on the edge of this cover page.
 - Faulty booklet, if detected, should be got replaced immediately by a correct booklet from the invigilator within the period of 5 (five) minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.
 - Verify whether the Question Booklet No. is identical with OMR Answer Sheet No.; if not, the full set is to be replaced.
 - After this verification is over, the Question Booklet Series and Question Booklet Number should be entered on the OMR Sheet.
- This paper consists of One hundred (100) multiple-choice type questions. All the questions are compulsory. Each question carries *two* marks.
- Each Question has four alternative responses marked: **(A)** **(B)** **(C)** **(D)** . You have to darken the circle as indicated below on the correct response against each question.

Example: **(A)** **(B)** **●** **(D)** , where **(C)** is the correct response.
- Your responses to the questions are to be indicated correctly in the OMR Sheet. If you mark your response at any place other than in the circle in the OMR Sheet, it will not be evaluated.
- Rough work is to be done at the end of this booklet.
- If you write your Name, Phone Number or put any mark on any part of the OMR Sheet, except in the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
- Do not tamper or fold the OMR Sheet in any way. If you do so, your OMR Sheet will not be evaluated.
- You have to return the Original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry question booklet and duplicate copy of OMR Sheet after completion of examination.
- Use only Black Ball point pen.**
- Use of any calculator, mobile phone, electronic devices/gadgets etc. is strictly prohibited.**
- There is no negative marks for incorrect answer.**

PAPER II

(LIFE SCIENCES)

1. Antifungal agents, that disrupt the cell membrane by selectively binding to the ergosterol, forming pores and causing the membrane to become leaky include all of the following except

- (A) Amphotericin B
- (B) Nystatin
- (C) Ketokonazole
- (D) Natamycin

2. Which of the following hormones promotes seed dormancy in plant?

- (A) 6- γ - γ diethyl allyl amino purine
- (B) Ethylene
- (C) Abscisic acid
- (D) 2, 4, 6 tri-chloro phenoxy acetic acid

3. In a basket, there are 6 red flowers, 5 white flowers and 4 pink flowers. If 2 flowers are picked up randomly by a student, what is the probability that the selected flowers are of same colour?

- (A) $\frac{1}{7}$
- (B) $\frac{29}{105}$
- (C) $\frac{31}{105}$
- (D) $\frac{27}{120}$

4. During gastrulation, splitting of one cellular sheet into two parallel sheets is known as

- (A) Epiboly
- (B) Delamination
- (C) Involution
- (D) Ingression

5. Select the correct decreasing order of pH of the following cellular compartments.

- (A) Mitochondrial matrix > Cytosol > Lysosome
- (B) Mitochondrial matrix > Lysosome > Cytosol
- (C) Cytosol > Mitochondrial matrix > Lysosome
- (D) Lysosome > Cytosol > Mitochondrial matrix

6. Peristome in *Funaria* consists of two sets of long and conical teeth that take part in spore discharge. Which of the following shows hygroscopic movement?

- (A) Inner set of peristome teeth
- (B) Outer set of peristome teeth
- (C) Both sets of peristome teeth simultaneously
- (D) Both sets of peristome teeth intermittently

7. Gastric secretion is not inhibited by the

- (A) Enterogastric reflex
- (B) Secretin
- (C) Somatostatin
- (D) Gastrin induced secretion of histamin

8. If the distribution is negatively skewed, then the

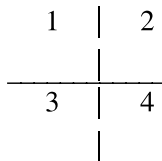
- (A) mean is more than the mode.
- (B) median is at right to the mode.
- (C) mean is less than the mode.
- (D) mean is at right to the median.

9. Bacillus Calmette Guerin (BCG) is a vaccine primarily used for the prevention of tuberculosis (TB) disease is prepared by which of the following methods?

- (A) By heat or radiation inactivation of *Bacillus subtilis*
- (B) By using the purified extracellular polysaccharide of *Mycobacterium tuberculosis*
- (C) By using an attenuated strain of *Mycobacterium bovis* that has lost the ability to cause disease in humans
- (D) By treating the purified tuberculosis necrotizing toxin (TNT) with formaldehyde

[Please Turn Over]

10. miRNA based gene silencing is a type of
- transcription gene silencing
 - post transcription gene silencing
 - translation gene silencing
 - post translation gene silencing
11. During acclimatization to high altitude, all of the following changes take place, except
- increase in minute ventilation.
 - increase in sensitivity of central chemoreceptors.
 - increase in sensitivity of carotid body to hypoxia.
 - increase in aortic body baro receptors activity to hypoxia.
12. In human, normal B and T cells develop $CDC4^+$ and $CDC8^+$ at first and then they differentiate into $CDC4^+ CDC^-$ and $CDC4^- CDC^+$. If there is a defect in development, which quadrant of the flow cytometer graph will show more density?



- 1
 - 2
 - 3
 - 4
13. The distinguishing feature of the confocal microscopy is the use of
- beam of electrons instead of visible light.
 - laser light to illuminate one plane of a specimen at a time.
 - a thin metal probe that scans the specimen and produces an image.
 - UV as a source of illumination causing fluorescent probes in a specimen to emit light.

14. Embryo culture technique is employed for
- Clonal propagation
 - Embryo rescue
 - Induction of somaclonal variation
 - Prevention of precocious germination of embryo
15. During oogenesis, a group of somatic cells form a covering around the developing egg cell. This covering is called
- Zona pellucida
 - Zona granulosa
 - Theca
 - Corona radiata
16. Inductively Coupled Plasma Mass Spectrometer (ICP-MS) principle is similar to which of the following?
- Flame Emission Spectroscopy
 - Fourier Transform Spectroscopy
 - Atomic Emission Spectroscopy
 - Absorption Spectroscopy
17. A researcher injected exogenous β -catenin at the future ventral side of a *Xenopus* gastrula. What result did he obtain?
- No change in embryonic development.
 - The embryo failed to form its anterior-posterior axis.
 - A secondary body axis developed at the injected side.
 - Dorsal lip of the blastopore degenerated.
18. The establishment of the anterior-posterior or dorsal-ventral body axis is called
- Pattern formation
 - Morphogenesis
 - Differentiation
 - Growth

19. When a freshwater fish migrates down stream in search of food, this kind of migration may be referred to as

- (A) Oceanodromous migration
- (B) Potamodromous migration
- (C) Anadromous migration
- (D) Catadromous migration

20. 'Pen culture' is one of the well known enclosed culture techniques practiced in aquaculture. In pen culture, the cage introduced in the water body

- (A) uses bottom of the water body as one side.
- (B) may be raised into some height from bottom.
- (C) does not allow fish waste to be stored within the culture system.
- (D) has all sides enclosed.

21. The predictable and gradual change in the species composition of a given area is called

- (A) Native community
- (B) Climax community
- (C) Pioneer community
- (D) Ecological succession

22. *Plasmodium* sp., the malarial parasite is having a complex life cycle. The fusion between male and female gametocytes of *Plasmodium* occurs inside the

- (A) human RBC
- (B) human liver
- (C) mosquito salivary gland
- (D) mosquito mid-gut

23. Identification of relative abundance of a specific protein or a specific protein modification at a certain region in the genome by a method is known as

- (A) Chromatin immunoprecipitation
- (B) Co-immunoprecipitation
- (C) Ribonucleoprotein immunoprecipitation
- (D) Individual protein immunoprecipitation

24. In order to evade the immune response from the host, molecular mimicry is exhibited by

- (A) Guinea worm (*Dracunculus medinensis*)
- (B) Tape worm (*Taenia saginata*)
- (C) Liver fluke (*Fasciola hepatica*)
- (D) Blood fluke (*Schistosoma haematobium*)

25. In a honey bee colony, the role of the workers can be best explained by

- (A) Agonistic behaviour
- (B) Altruistic behaviour
- (C) Selfish behaviour
- (D) Cooperative behaviour

26. Some kinds of touch, such as stroking a dog or cat, are especially pleasant. Which one of the following receptors found mostly in the fingertips probably play important role in this?

- (A) Meissner's endings
- (B) Ruffini's endings
- (C) Merkel's discs
- (D) Pacini's corpuscles

27. In a terrestrial area with known number of food plants, several species of herbivore land snails can coexist if they exhibit

- (A) low niche overlap and low niche differentiation.
- (B) high niche overlap and high niche differentiation.
- (C) low niche overlap and high niche differentiation.
- (D) high niche overlap and low niche differentiation.

28. Which of the following organizations promotes sustainable management and conservation of tropical forests?

- (A) United Nations Forum on Forests
- (B) International Tropical Timber Organization
- (C) Greenpeace
- (D) World Wide Fund for Nature

29. Upwelling is an important oceanographic phenomenon. What is the significance of upwelling zone for marine ecosystems?

- (A) It is responsible for maintaining uniformity of temperature in ocean to support the marine life.
- (B) It is responsible for uniform oxygenation of marine waters that increases marine productivity.
- (C) It brings nutrients from deeper zones to relatively nutrient poor ocean surface that increases marine productivity.
- (D) It helps in circulating decomposers from the bottom to surface of the ocean that brings about proper decomposition of dead materials on the surface.

30. Which of the following survivorship curves is suitable for the organisms who breed several times during the course of their life span?

- (A) Type IV
- (B) Type I
- (C) Type III
- (D) Type II

31. A group comprising of two or more sets of taxa, whose most recent common ancestor is not a member of the same group is called as

- (A) Paraphyletic group
- (B) Monophyletic group
- (C) Polyphyletic group
- (D) Metataxon

32. Haemophilia is a sex-linked recessive trait in human. If both father and son are haemophilic and mother is normal, what would be the genotype of the mother?

- (A) $X^h X^h$
- (B) $X^H X^h$
- (C) $X^H X^H$
- (D) $X^H O$

33. The larva that occurs in the development of a polychaete worm is

- (A) Bipinnaria
- (B) Nauplius
- (C) Tornaria
- (D) Trochophore

34. The variant of lactate dehydrogenase predominantly found in brain is

- (A) LDH_4
- (B) LDH_3
- (C) LDH_2
- (D) LDH_1

35. Formation of extra-embryonic membrane is one of the most remarkable features in the evolution of the vertebrates. In geological time scale, extra-embryonic membrane appeared for the first time in

- (A) Cartilaginous fish
- (B) Reptiles
- (C) Aves
- (D) Mammals

36. The cambial layer of the periderm is termed as

- (A) Phellogen
- (B) Phellem
- (C) Phelloderm
- (D) Rhytidome

37. After exposure of a xenobiotic substance to a biological system, its apparent volume of distribution will be larger, if it is a

- (A) non-ionized hydrophilic substance
- (B) non-ionized lipophilic substance
- (C) ionized hydrophilic substance
- (D) ionized lipophilic substance

38. Panhypopituitarism is a condition where a type of dwarfism is found with other symptoms in the affected individual. It happens due to

- (A) deficiency of somatomedin C.
- (B) deficiency of growth hormone releasing hormone (GHRH) secreted from hypothalamus.
- (C) reduction in production and secretion of all hormones from anterior pituitary.
- (D) deficiency of thyroid stimulating hormone (TSH).

39. A major group of animals having radially symmetrical adults, but bilaterally symmetrical larva is

- (A) Annelida
- (B) Cnidaria
- (C) Echinodermata
- (D) Mollusca

40. Which of the following brain centres receives a motor plan from the motor cortex before the execution of a movement?

- (A) Spinocerebellum
- (B) Substantia nigra
- (C) Hippocampus
- (D) Nucleus basalis of Meynert

41. Crescent shaped or banana shaped gametocytes are seen in infection with

- (A) *Plasmodium vivax*
- (B) *Plasmodium falciparum*
- (C) *Plasmodium ovale*
- (D) *Plasmodium malariae*

42. In *Selaginella*, trabeculae are modified

- (A) Pericycle cells
- (B) Endodermal cells
- (C) both Pericycle and Endodermal cells
- (D) Cortex cells

43. The adaptation of an animal which warns a predator that it is toxic, distasteful or dangerous is called

- (A) Batesian mimicry
- (B) Mullerian mimicry
- (C) Cryptic colouration
- (D) Aposematic colouration

44. Among algae, presence of a phragmoplast during cytokinesis is a general feature of

- (A) Phaeophycean algae
- (B) Charophycean algae
- (C) Cyanophycean algae
- (D) Rhodophycean algae

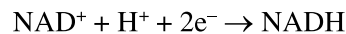
45. Which theory states that organisms contain coded information that dictates their form, function and behaviour?

- (A) Cell theory
- (B) Evolutionary theory
- (C) Natural selection
- (D) Biogenesis theory

46. Probability of dissociation of a solution of DNA double helix into its component single strands by removing certain susceptible protons is the highest in which one of the following pH values?

- (A) pH 3.0
- (B) pH 5.0
- (C) pH 7.0
- (D) pH 9.0

47. What would be the value of $[E'^{\circ}(V)]$ standard reduction potential of the following biologically important half-reaction at 25°C and pH 7.0?



- (A) - 0.320
- (B) - 0.324
- (C) - 0.219
- (D) - 0.185

48. In echinoderms, the neuropeptide signal releases a hormone that affects the reproductive system is called

- (A) Juvenile hormone
- (B) FSH
- (C) Estrogen
- (D) Maturation inducing substance

49. During C_3 pathway when 3 molecules of CO_2 are fixed, how many molecules of ATP and NADPH are utilized?

- (A) 6 ATP and 4 NADPH
- (B) 3 ATP and 2 NADPH
- (C) 9 ATP and 6 NADPH
- (D) 12 ATP and 9 NADPH

50. What is the role of Schwann cells in peripheral nerve impulse transmission?

- (A) Release of neurotransmitters
- (B) Genesis of action potential
- (C) Enhancement of the speed of nerve impulse conduction along the axon fiber
- (D) Facilitation of Na^+ conductance

51. A major application of liposomes in human medical health-care is

- (A) detection of malignant cells.
- (B) drug-delivery for cancer and other diseases.
- (C) identification of enzyme reaction sites.
- (D) used for site-directed mutagenesis.

52. Plants bearing both hermaphrodite and female flowers on the same individual are designated as

- (A) Andromonoecious
- (B) Gynomonoecious
- (C) Polygamous
- (D) Dioecious

53. The direction of helix and rotation per base pair in ZDNA is

- (A) Right handed, 32.7°
- (B) Left handed, 32.7°
- (C) Right handed, -30°
- (D) Left handed, -30°

54. Which of the following statements is *not* correct for teichoic acids?

- (A) Teichoic acids are anionic polymers found in the cell walls of Gram-positive bacteria.
- (B) They are composed of glycerol phosphate or ribitol phosphate residues joined through phosphodiester linkage.
- (C) They are covalently linked to N-acetylmuramic acid of the peptidoglycan layer.
- (D) They are composed of N-acetylglucosamine residues linked by $\beta(1-4)$ linkages.

55. The actin binding protein that forms a flexible bridge between two actin filaments at various angles is called

- (A) Spectrin
- (B) Filamin
- (C) Fimbrin
- (D) Gelsolin

56. Which of the following amino acids can not participate in α -helix conformation in protein by introducing a destabilizing Kink?

- (A) Glycine
- (B) Leucine
- (C) Lysine
- (D) Proline

57. Yeast 2 hybrid system helps in understanding which one of the following?

- (A) DNA–DNA interactions
- (B) Protein–Protein interactions
- (C) RNA–Protein interactions
- (D) DNA–RNA interactions

58. Identify the amino acid that being a constituent of a protein does not function as a substrate for Kinase enzyme.

- (A) Tryptophan
- (B) Tyrosine
- (C) Threonine
- (D) Serine

59. If for a distribution, the mean is 10, variance is 16, Y_1 is +1 and β_2 is 4, then the distribution is

- (A) leptokurtic
- (B) platykurtic
- (C) normal
- (D) mesokurtic

60. If hydrophathy index values of two amino acids, X and Y are respectively +4.5 and -4.5 during their transfer from a hydrophobic solvent to water, then it can be assumed that

- (A) Y is more hydrophobic than X.
- (B) X is more hydrophobic than Y.
- (C) hydrophobicity of X and Y are equal.
- (D) hydrophobicity of X and Y cannot be predicted.

61. Transfection is a modern and powerful method by which foreign nucleic acids are delivered into eukaryotic cells to modify their genetic makeup. Which one of the following is *not* a commonly used physical / mechanical transfection approach?

- (A) Electroporation
- (B) Magnetofection
- (C) Laser irradiation
- (D) Dendrimers

62. Which one of the following restriction endonucleases generate fragments with blunt ends?

- (A) Sma I
- (B) Bam HI
- (C) EcoR I
- (D) Hind III

63. Virus free plants can be generated from a viral infected individual through

- (A) shoot meristem culture
- (B) protoplast culture
- (C) androgenesis
- (D) somatic embryogenesis

64. Proteins bearing Mannose-6-phosphate and KDEL signal sequence at the C-terminus carry signals for directing a protein respectively into

- (A) Lysosome and Endoplasmic reticulum
- (B) Endoplasmic reticulum and Lysosome
- (C) Nucleus and Peroxisome
- (D) Peroxisome and Nucleus

65. A method adopted to localize genes on a particular chromosome within a cell using fluorescent probe is called

- (A) ISH
- (B) FISH
- (C) ELISA
- (D) Western Blot

66. In gel-filtration chromatography, the term void volume (V_0) is usually referred to as the

- (A) external volume consisting of the liquid between the beads.
- (B) internal volume consisting of the liquid within the beads.
- (C) total volume representing the sum of the external and internal volumes.
- (D) volume of the sample applied to the top of the column.

67. Which one of the following statements is *not* true regarding differentiation of different cell types originating from embryonic germ layers?

- (A) Neurons of brain originate from ectoderm layer
- (B) Bone tissues originate from mesoderm layer
- (C) Facial muscles originate from mesoderm layer
- (D) Red Blood cells originate from endoderm layer

68. In a randomly mating population two phenotypes are segregating; one is due to dominant allele (T), the other to a recessive allele (t). The frequencies of the dominant and recessive phenotypes are 0.75 and 0.25 respectively. What would be the frequency of dominant allele?

- (A) 0.55
- (B) 0.75
- (C) 0.50
- (D) 0.64

69. In which of the following events, serotonin secreting interneurons facilitate presynaptic neurons?

- (A) Ataxia
- (B) Sensitization
- (C) Habituation
- (D) Retrograde amnesia

70. The bacterial ribosome (70S) is composed of two asymmetric subunits, the 30S and 50S. In *Escherichia coli* the small 30S subunit is composed of

- (A) the 23S rRNA and 34 proteins.
- (B) the 16S rRNA and 21 proteins.
- (C) the 23S rRNA, 5S rRNA and 34 proteins.
- (D) the 5S rRNA and 21 proteins.

71. Which one of the following conditions will hamper completion of cell cycle by progression through mitosis in a proper manner?

- (A) Inactivation of Cdc 20 prior to metaphase
- (B) Ubiquitination of securin
- (C) Release of separase
- (D) Cleavage of cohesin

72. Certain Mycoplasmas contain lipoglycans in addition to sterols. Which one of the followings is *not* a correct statement for lipoglycans?

- (A) They are long-chain heteropolysaccharides covalently linked to membrane lipids.
- (B) Structurally the lipoglycans resemble the lipopolysaccharide in having the Lipid A backbone.
- (C) The lipoglycans help in stabilizing the cytoplasm membrane and facilitate attachment of mycoplasmas to cell-surface receptors of animal cells.
- (D) Lipoglycans are associated with the cytoplasmic membranes of several genera of Mollicutes.

73. In liquid scintillation counter, which of the followings is a fluorescent substance?

- (A) Solvent
- (B) Crystal
- (C) Solute
- (D) Reagent

74. A sparger is an essential component of a typical fermenter and is used to

- (A) introduce sterile air to a fermentation vessel.
- (B) add nutrients and acid/alkali to the fermenter.
- (C) control the level of foam formed in the fermenter.
- (D) maintain uniform suspension of microbial cells in the liquid medium.

75. A rare autosomal recessive disease is expressed in a child. Only one parent of the child is a carrier. Which of the followings best explains expression of this disease?

- (A) Uniparental disomy
- (B) Trisomy
- (C) Monosomy
- (D) Somatic mosaicism

76. Which one of the following pairs is constituted of an excitatory and an inhibitory neurotransmitter respectively?

- (A) Glutamate and Glycine
- (B) Glycine and Gamma aminobutyric acid
- (C) Gamma aminobutyric acid and Dopamine
- (D) Histamine and Acetylcholine

77. Electron Spin Resonance (ESR) is based on the

- (A) interactions of polarized light with chiral protein components spin.
- (B) intensity of reflected light.
- (C) spin of a nucleon.
- (D) spin of the electron.

78. During fertilization, which part of the female gametophyte is responsible for pollen tube growth arrest — a task that plays significant role in zygote formation?

- (A) Central cell
- (B) Synergids
- (C) Antipodals
- (D) Egg cell

79. Which of the following molecules depresses cardiac contractility by disrupting F-actin?

- (A) Cytochalasin D
- (B) Cofilin
- (C) Calmodulin
- (D) Rhodamin B

80. Cytokinin oxidase is a key enzyme that is responsible for degradation of endogenous cytokinin in plants. To understand the gene function in regulation of cytokinin, if you overexpress a cytokinin oxidase gene (CKX) in tobacco, which one of the following would be the expected phenotype of the plant?

- (A) Reduced shoot and enhanced root
- (B) Enhanced stem and reduced root
- (C) Reduced root and enhanced branching
- (D) Enhanced shoot and reduced root

81. The type of ovule, where the ovule is curved in such a way that the micropyle comes near to the hilum, is termed as

- (A) Anatropous
- (B) Orthotropous
- (C) Campylotropous
- (D) Hemianatropous

82. Which of the following class of genes maintains the boundary of floral organ development?

- (A) Meristem identity genes
- (B) Cadastral genes
- (C) Organ identity genes
- (D) Lateral primordium identity genes

83. Which of the following hormones decreases insulin sensitivity and also decreases utilization of glucose in the mother during pregnancy?

- (A) Human chorionic somatomammotropin
- (B) Glucagon
- (C) Oxytocin
- (D) Relaxin

84. In *Arabidopsis*, which of the following auxin transporters that redirects auxin laterally back into the vascular parenchyma tissue?

- (A) PIN 1
- (B) PIN 2
- (C) PIN 3
- (D) PIN 7

85. Phloem tissue in gymnosperm lacks

- (A) both sieve tubes and companion cells.
- (B) companion cells only.
- (C) sieve tubes only.
- (D) both albuminous cells and sieve cells.

86. Lichenin also called lichenan is a complex glucan occurring in certain species of lichen. Which of the following statements is *not* correct for lichenin?

- (A) It consists of repeating glucose units linked by β -1,3 and β -1,4 glycosidic bond.
- (B) It is a complex organic compound that promotes dissolution of rock and other surfaces.
- (C) It is extracted with hot water from the fronds of Iceland moss (*Cetraria islandica*).
- (D) It is located on the cell walls of the mycobiont.

87. Cleavage polyembryony in plant is a type of polyembryony where

- (A) multiple embryos originate as a result of cleavage of the zygote into small units.
- (B) multiple embryos originate from cells of the embryo sac other than the egg.
- (C) multiple embryos arising from cells outside the embryo sac.
- (D) multiple embryos originate from outside the ovular tissue.

88. Which of the following adverse health effects is not probably protected by a diet rich in potassium?

- (A) Health effects of a high sodium diet
- (B) Coronary artery disease
- (C) Risk for stroke
- (D) Parkinson's disease

89. A random sample of 100 pre-school children revealed that only 80 have been vaccinated. Provide an approximate 95% confidence interval for the proportion vaccinated in that locality. (Given, $Z_{0.025} = 1.96$)

- (A) $0.8 \pm 1.96 \sqrt{\frac{0.8 \times 0.2}{100}}$
- (B) $0.8 \pm 1.96 \sqrt{\frac{0.8}{100}}$
- (C) $0.8 \pm 1.96 \sqrt{\frac{0.2}{100}}$
- (D) $0.8 \pm 1.96 \sqrt{\frac{1}{80}}$

90. Which of the followings is an example of the phenomenon of palaeoendemism?

- (A) *Cycas circinalis*
- (B) *Franklinia alatamaha*
- (C) *Magnolia grandiflora*
- (D) *Ginkgo biloba*

91. Presence of nucleolus within the nucleus can be differentially located using

- (A) Feulgen stain
- (B) Pyronine methyl green stain
- (C) Acridine orange
- (D) Triphenyl tetrazolium chloride

92. A researcher obtained one *Drosophila* specimen with four wings. He exclaimed this as a bizarre phenotype, as *Drosophila* is a dipteran insect. He screened out the gene responsible for this mutation. What gene he could identify for this bizarre phenotype?

- (A) Exuperantia (*exu*)
- (B) Krüppel (*kr*)
- (C) Torso (*tor*)
- (D) Ultrabithorax (*ubx*)

93. After meiosis I, the resultant daughter cells contain

- (A) twice as much DNA as a gamete contains.
- (B) as much DNA as a gamete contains.
- (C) four times as much DNA as a gamete contains.
- (D) half the amount of DNA as a gamete contains.

94. Find out the value of numerical aperture (NA) of a compound microscope having limit of resolution 200 nm and a source of light with 400 nm wavelength.

- (A) 1.00
- (B) 1.22
- (C) 1.28
- (D) 1.40

95. The only positive evidence of aquatic ancestry of bryophyte is indicated by the presence of

- (A) thread-like protonema.
- (B) green pigment.
- (C) ciliated sperms.
- (D) some forms which are still aquatic.

96. For producing monoclonal antibodies *in vivo*, mice are primed by intraperitoneal injection with

- (A) 10^6 – 10^8 hybridoma cells
- (B) 10^7 – 10^9 myeloma cells
- (C) 10^5 – 10^7 hybridoma cells
- (D) 10^4 – 10^6 B Lymphocytes

97. Downy mildew of Crucifer is caused by

- (A) *Alternaria brassicae*
- (B) *Xanthomonas campestris*
- (C) *Hyaloperonospora parasitica*
- (D) *Plasmodiophora brassicae*

98. The diatoms do not easily decay like other algae as because

- (A) they have mucilagenous wall.
- (B) they have highly siliceous wall.
- (C) they have high lipid on the wall.
- (D) they have walls made up of keratin.

99. Which of the followings best explains why do inhabitants of an estuary adapt to frequent environmental changes?

- (A) Estuaries receive little sunlight.
- (B) The water temperature is constantly warm.
- (C) The salinity of the water is constantly changing.
- (D) Low levels of oxygen are absorbed by the water.

100. The assembly of abundant golgi vesicles near the cell plate of a plant cell at late telophase and at cytokinesis of mitosis reflects the role of golgi complex in

- (A) lysosomal enzyme targeting.
- (B) polysaccharide synthesis.
- (C) protein packaging.
- (D) uptake of membrane lipids.

X-15
Space for Rough Work

14-II

