MIZORAM PUBLIC SERVICE COMMISSION

COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF FOREST RANGER UNDER ENVIRONMENT, FORESTS & CLIMATE CHANGE DEPARTMENT, GOVERNMENT OF MIZORAM, OCTOBER, 2019

GENERAL SCIENCE - I

Time Allowed : 2 hours   Full Marks : 200

All questions carry equal marks of 2 each.
Attempt all questions.

1. Define complete homozygosity.
   (a) A condition in which all the alleles in the individual are identical
   (b) A condition in which all the alleles at all loci are identical by descent
   (c) A condition in which there is heterozygosity at loci
   (d) All of these

2. The DNA-protein complex is collectively known as
   (a) Chromosome   (b) Chromatin
   (c) Histone   (d) Nucleus

3. The linkage between 3'carbon atom of one sugar and 5' carbon atom of another sugar in DNA is
   (a) Peptide bond   (b) Hydrogen bond
   (c) Phosphodiester bond   (d) Van der waal's force

4. The most striking aspect of the structure of the chloroplast is the extensive system of internal membrane known as
   (a) Stroma   (b) Lacuna
   (c) Thylakoids   (d) All of these

5. A corm is a/an
   (a) Modified shoot consisting of shortened stem enclosed by fleshy leaves
   (b) Underground stem with buds in the axils of reduced leaves
   (c) Swollen stem that grows beneath the soil surface bearing buds
   (d) Swollen stem base bearing buds in the axils of scale-like remains of leaves from the previous year's growth

6. Biological treatment of sewage refers to:
   (a) Secondary treatment   (b) Primary treatment
   (c) Tertiary treatment   (d) None of these

7. Bentham and Hooker's classification is also known as:
   (a) Artificial system of classification   (b) Phylogenetic system of classification
   (c) Natural system of classification   (d) None of these

8. The character which not express in F1 progeny is called:
   (a) Incomplete linkage   (b) Back cross
   (c) 3-point test   (d) Recessive

9. The pH at which a molecule posses no net electrical charge is called:
   - (a) Neutral
   - (b) Iso Electric Point
   - (c) Negative
   - (d) None of these

10. The main plant body in Bryophyta is:
    - (a) Gametophytic
    - (b) Sporophytic
    - (c) Triploid
    - (d) All of these

11. Sporocarp is found in:
    - (a) *Lycopodium*
    - (b) *Selaginella*
    - (c) *Azolla*
    - (d) *Equisetum*

12. Which one of the following is nitrogen fixer in rice fields:
    - (a) Algae
    - (b) Cyanobacteria
    - (c) Fungi
    - (d) Pteridophytes

13. In photosynthesis O_2 comes from splitting of:
    - (a) H_2O
    - (b) CO_2
    - (c) $NADH_2$
    - (d) None of these

14. Which one of the following disease is caused by *Puccinia graminae*?
    - (a) Rust
    - (b) Wilt
    - (c) Smut
    - (d) early blight

15. Plant which are not differentiated into roots, stem and leaves are grouped under
    - (a) Gymnosperm
    - (b) Pteridophyte
    - (c) Thallophytes
    - (d) Spermatophyte

16. Ozone layer depletion is mainly due to
    - (a) Sulphur dioxide
    - (b) Nitrous oxide
    - (c) Chlorofluorocarbon
    - (d) Carbon dioxide

17. Pyramid of energy in ecosystems is
    - (a) always upright
    - (b) always inverted
    - (c) mostly upright
    - (d) mostly inverted

18. Kyoto Protocol is related to:
    - (a) Wetland convention
    - (b) Convention on biodiversity
    - (c) Greenhouse gas
    - (d) DDT

19. Irish potato famine was caused due to the fungal pathogen
    - (a) *Synchytrium endobioticum*
    - (b) *Pythium* sp.
    - (c) *Clavicep purpurea*
    - (d) *Phytophthora infestan*

20. Gibberellins are responsible for
    - (a) Stem elongation, germination, dormancy, flowering
    - (b) Cell division, cytokinesis
    - (c) Axial elongation, lateral expansion, cellular expansion
    - (d) All of these

21. One of the following is another name used to identify Human African Trypanosomiasis
    - (a) Malaria
    - (b) Influenza
    - (c) Sleeping diseases
    - (d) Sleeping sickness

22. The sexual cycle of plasmodium is completed in

    (a) The gut of mosquito   (b) RBC

    (c) Liver tissue   (d) The salivary gland of mosquito

23. Which of the following is characteristic to chordates

    (a) Autonomy   (b) Myotomy

    (c) Pharyngotomy   (d) Dermatotomy

24. Lysosomes are also called "suicidal bags" because

    (a) Parasitic activity   (b) Presence of food vacuoles

    (c) Hydrolytic activity   (d) Catalytic activity

25. Exchange of segments between non-sister chromatid of homologous chromosomes is

    (a) Crossing over   (b) Translocation

    (c) Linkage   (d) Inversion

26. The basic repeating unit of DNA molecule is

    (a) Nucleoside   (b) Nucleotide

    (c) Histone   (d) Amino acids

27. The alternative forms of a gene is called

    (a) Recessive character   (b) Dominant character

    (c) Allele   (d) Alternative gene

28. Genetic code translated the language of

    (a) Amino acids into that of RNA   (b) Proteins into that of RNA

    (c) RNA into that of DNA   (d) RNA into that of proteins

29. Which of the following is not ionising radiation

    (a) X- rays   (b) UV rays

    (c) Cosmic rays   (d) Alpha rays

30. Which of the following technique is used in DNA finger printing?

    (a) Western blotting   (b) Southern blotting

    (c) Northern blotting   (d) Eastern blotting

31. The major storage form of carbohydrates in animals is

    (a) Cellulose   (b) Chitin

    (c) Glycogen   (d) Starch

32. Neurons that formed spinal cord and brain are

    (a) Sensory neurons   (b) Motor neurons

    (c) Interneurons   (d) Rotator neurons

33. Identify the definition for the term zoonotic diseases

    (a) A disease that can be transmitted from humans to animals

    (b) A disease that can be transmitted to zoo animals only

    (c) A disease that is transmitted from zoo animals

    (d) A disease that can be transmitted from animals to humans

34. The theory of use and disuse was given by

    (a) Stebbins   (b) Lamarck

    (c) Aristotle   (d) Vavilox

35. The amount of organic matter present at a given time per unit area is called

    (a) Standing crop   (b) Standing quality

    (c) Carbon content   (d) Carbon foot- print

36. Biogeochemical cycles are also known as

    (a) Material cycling   (b) Gaseous cycling

    (c) Sedimentary cycling   (d) None of these

37. Red data book provides data on

    (a) Red flowered plants   (b) Red coloured fishes

    (c) Endangered plants and animals   (d) Red eyed birds

38. The process of successful establishment of the species in a new area is called

    (a) Sere   (b) Climax

    (c) Invasion   (d) Ecesis

39. System of classification that employs numerical data to evaluate similarities and differences is known as

    (a) Cytotaxonomy   (b) Biosystematics

    (c) Phenetics   (d) Chemotaxonomy

40. Endemic plants are those which are

    (a) Cosmopolitan in distribution   (b) Restricted to certain area

    (c) Found in arctic region   (d) Gregarious in habit

41. The total number of electrons in a subshell designated by azimuthal quantum number, l is given as

    (a) $2l + 1$ (b) l^2

    (c) $4l + 2$ (d) $2l + 2$

42. Which of the following concerning Bohr's model is false?

    (a) Explains line spectrum of hydrogen.

    (b) Angular momentum of electron in H-atom $= \dfrac{nh}{2\pi}$

    (c) Introduces the idea of stationary states.

    (d) Predicts that probability of electron near nucleus is more.

43. Which out of the following is incorrect?

    (a) $1s^2\, 2s^2\, 2p_x^2\, 2p_y^2\, 2p_z^0$ (b) $1s^2\, 2s^2\, 2p_x^1\, 2p_y^1\, 2p_z^0$

    (c) $1s^2\, 2s^2\, 2p_x^1\, 2p_y^1\, 2p_z^1$ (d) $1s^2\, 2s^2\, 2p^6\, 3s^2\, 3p^6\, 3d^5\, 4s^1$

44. The valence electrons of $_{29}$Cu lies in the

    (a) K Shell   (b) M Shell

    (c) N Shell   (d) Both M and N Shell

45. The most favourable conditions for ionic bonding are

    (a) Low charge on ions, large cation, small anion.

    (b) Low charge on ions, large cation, large anion.

    (c) High charge on ions, small cation, large anion.

    (d) High charge on ions, large cation, small anion.

46. Lateral overlap of atomic orbital leads to the formation of

    (a) Pi bonds   (b) Sigma bond

    (c) Metallic bond   (d) Ionic bond

47. Compound in which central atom exhibit sp^3d hybridization is

    (a) SO_3 (b) SO_2

    (c) PCl_5 (d) PCl_3

48. The SI unit of Radioactivity is

    (a) Curie (Ci)   (b) Becquerel (Bq)

    (c) Rutherford (Rd)   (d) Quantum (qt)

49. Average life period is equal to

    (a) $\dfrac{1}{\lambda}$ (b) $\dfrac{1}{t_{0.5}}$

    (c) $(t_{0.5})^2$ (d) $0.75 t_{0.5}$

50. The radiant energy of sun is due to

    (a) Disintegration   (b) Nuclear fission

    (c) Nuclear fusion   (d) Combustion

51. In the nuclear reactor, the material used to control the chain reaction is

    (a) Iron   (b) Cadmium

    (c) Zinc   (d) Bismuth

52. Stable nuclides are those whose n/p ratio is

    (a) 1   (b) 2

    (c) > 1 (d) < 1

53. Fog is a colloidal solution of

    (a) Gas in gas   (b) Solid in gas

    (c) Gas in solid   (d) Liquid in gas

54. During isothermal expansion of an ideal gas its

    (a) Enthalpy decreases   (b) Enthalpy remains constant

    (c) Internal energy decreases   (d) Internal energy increases

55. According to 3rd law of thermodynamics, the entropy at 0K is zero for

    (a) Substances at 1 atm and 25°C   (b) H_2O

    (c) Elements with vacant crystal lattice sites   (d) Perfectly crystalline solids

56. In Schrodinger equation, the wave function Ψ represents

    (a) Intensity   (b) Amplitude

    (c) Wavelength   (d) Energy

57. Polymerisation does not occur through intermediate formation of

    (a) Carbanions   (b) Carbenes

    (c) Carbocations   (d) Free radicals

58. Low density polythene is prepared by

    (a) Free radical polymerisation   (b) Anionic polymerisation

    (c) Cationic polymerisation   (d) Ziegler-Natta polymerisation

59. The first listed of the 12 Principles of Green Chemistry is?

    (a) Benign solvents   (b) Catalysis

    (c) Atom economy   (d) Prevent waste

60. Which of the following is not an example of bottom - up approach for the preparation of nanomaterials?

    (a) Gas phase agglomeration   (b) Molecular beam epitaxy

    (c) Mechanical grinding   (b) Molecular self-assembly

61. Let A and B be any two sets, then $(A - B) =$

    (a) $A \cap B'$, where $'$ denotes complement of the set

    (b) $A' \cup B$, where $'$ denotes complement of the set

    (c) $A' \cup B'$, where $'$ denotes complement of the set

    (d) $A' \cap B'$, where $'$ denotes complement of the set

62. Which of the following is a many-one onto function?

    (a) $f : A \to B, \ f(x) = x^2, \ A$ is the set of integers and is the set of real numbers

    (b) $f : A \to B, \ f(x) = x^2 + 1, \ A$ is the set of integers and is the set of perfect squares

    (c) $f : A \to B, \ f(x) = x^2, \ A$ is the set of natural numbers and is the set of perfect squares

    (d) $f : A \to B, \ f(x) = x^2, \ A$ is the set of integers and is the set of perfect squares

63. The square root of which of the following numbers is rational?

    (a) 0.04   (b) 0.08

    (c) 2   (d) 8

64. The value of $\left(1 + i\sqrt{3}\right)^3$ is

    (a) 4   (b) -4

    (c) 8   (d) -8

65. A code consists of two distinct letters of the English Alphabet followed by two distinct numbers between 1 and 4. How many such codes can be formed?

    (a) 3600   (b) 7800

    (c) 15600   (d) 46800

66. The co-factor of the $(3,2)^{\text{th}}$ element of the determinant $\begin{vmatrix} 1 & -3 & 2 \\ 4 & -1 & 2 \\ 3 & 5 & 2 \end{vmatrix}$ is

    (a) 14   (b) -14

    (c) -6 (d) 6

67. In a circle of radius r, if an arc of length l subtends an angle θ^c at the centre, then

    (a) $r = \dfrac{\theta}{l}$ (b) $l = \dfrac{r}{\theta}$

    (c) $r = \dfrac{l}{\theta}$ (d) $\theta = 2lr$

68. $\tan^{-1}1 + \tan^{-1}2 + \tan^{-1}3 =$

    (a) 0   (b) $\dfrac{\pi}{2}$

    (c) π (d) 2π

69. The function $f(x) = \log(x^2 + x - 12)$ is discontinuous when

    (a) $-4 < x < 3$ (b) $4 < x < 3$

    (c) $4 < x < -3$ (d) $-4 < x < -3$

70. If $f'(x) = \dfrac{1}{1+x^5}$, then $(f^{-1})'(x) =$

    (a) $f(x)$ (b) $\{1 + f^{-1}(x)\}^5$

    (c) $\dfrac{1}{\{1 + f^{-1}(x)\}^5}$ (d)   does not exist

71. The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x\, dx$ is

    (a)   0   (b) $\dfrac{\pi}{4}$

    (c) $\dfrac{\pi}{2}$ (d) π

72. The equation of the curve whose slope at any point is equal to $y + x$ and which passes through the origin is given by

    (a) $y = -x - 1 + Ce^x$, where C is the constant of integration
    (b) $y = -x + 1 + Ce^{-x}$, where C is the constant of integration
    (c) $y = -x - 1 + Ce^{-x}$, where C is the constant of integration
    (d) $y = x + 1 + Ce^x$, where C is the constant of integration

73. The average age of seven members of a certain chess club is 75. But the average age of six of them is 74 years 6 months. What is the age of the seventh member?

    (a)   74.5 years   (b)   76 years
    (c)   78 years   (d)   78.5 years

74. Binomial distribution

    (a)   is a continuous distribution
    (b)   is a discrete distribution
    (c)   is an irregular distribution
    (d)   tends to the Poisson Distribution when the number of trials is very small

75. Failing to reject the null hypothesis when it is false is called

    (a)   Type 1 error   (b)   Type 2 error
    (c)   Absolute error   (d)   Relative error

76. The first, second and third moments about the value 4 for the set of numbers 2,4,6,8 are respectively

    (a)   1, 6 and 16   (b)   2, 6 and 16
    (c)   1, 6 and 8   (d)   2, 8 and 16

77. Specification which has little effect on speed of a processor is

    (a)   Cache   (b)   Clock Speed
    (c)   Socket type   (d)   System bus speed

78. Which of the following memory is volatile memory?

    (a)   ROM   (b)   RAM
    (c)   PROM   (d)   EEPROM

79. Which of the following is an example of a non-proprietary software?

    (a)   Windows   (b)   Macintosh
    (c)   MS Office 2010   (d)   Linux

80. Computer network which spans a large physical area, connecting several sites of an organization across cities, countries and continents is known as

(a) LAN
(b) MAN
(c) WAN
(d) PAN

81. An epicenter is

(a) the location where rupture begins
(b) the point on the earth's surface vertically above the focus
(c) the same as the hypocenter
(d) the location where energy is released

82. Hade of a Fault is

(a) 90°+Dip
(b) 90°-DIP
(c) Plunge+Rake
(d) Plunge+Dip

83. An Unconformity exists between sedimentary rocks and metamorphic or igneous rocks is called

(a) Disconformity
(b) Nonconformity
(c) Paraconformity
(d) Angular unconformity

84. Placer Gold deposits are mostly

(a) Elluvial
(b) Colluvial
(c) Pluvial
(d) Alluvial

85. Coal is a/an-

(a) Metamorphic Rock
(b) Sedimentary Rock
(c) Igneous Rock
(d) None of these

86. Which of the following geophysical method of exploration is of particular significance in defining oilfield traps such as anticlines and salt domes

(a) Seismic Refraction
(b) Geomagnetic method
(c) Electromagnetic method
(d) Gravity method

87. The study of Trace Fossil is known as

(a) Paleo-ecology
(b) Syn-ecology
(c) Ichthyology
(d) Ichnology

88. "Petrification" is a type of fossilization where

(a) Original form and structure are preserved
(b) Original form is preserved
(c) Entire organism is preserved
(d) Only the hard parts are preserved

89. Choose the correct of the formation and metamorphism

(a) Shale-Slate-Schist-Phyllite-Gneiss
(b) Shale-Slate-Phyllite-Gneiss-Schist
(c) Shale-Slate-Phyllite-Schist-Gneiss
(d) Slate-Shale-Phyllite-Schist-Gneiss

90. The normal pH of rainwater is about

(a) 8.2
(b) 7.0
(c) 5.5
(d) 3.0

91. The Shillong Plateau is bounded to the south by

(a) Disang thrust
(b) Dhubri fault
(c) Brahmaputra fault
(d) Dauki fault

92. The Cachar earthquake of 5.8 Magnitude occurred on 30th December of
   (a) 1958
   (b) 1963
   (c) 1984
   (d) 1995

93. The transformation of water-saturated granular material, or sediments, from a solid to a liquid state is
   (a) Solifluction
   (b) Liquefaction
   (c) Gelifluction
   (d) Mass movement

94. It is now generally accepted that the event of big bang took place _____ billion years before the present.
   (a) 13.7
   (b) 14.2
   (c) 14.8
   (d) 15.4

95. According to Otto Schimdt, in the beginning the gas and dust particles collected round the sun in form of a
   (a) Ball
   (b) Disc
   (c) Cylinder
   (d) Saucer

96. The boundaries between rocks of different metamorphic grade are commonly demarcated by
   (a) Contour lines
   (b) Assay lines
   (c) Isograd lines
   (d) Isopleth lines

97. _____ are represented by extensive thick sequences of Precambrian (Proterozoic) age
   (a) Iron Stone
   (b) Banded Iron Formation
   (c) Banded Hematite Quartzite
   (d) Banded Hematite Jasper

98. In India coal occurs mostly in the
   (a) Vindhyan Supergroup of rocks
   (b) Delhi Supergroup of rocks
   (c) marwar Supergroup of rocks
   (d) Gondwana Supergroup of rocks

99. Oil and Natural Gas Corporation (ONGC) The company that found hydrocarbon (gas) deposits at Meidum, Kolasib District is
   (a) OIL
   (b) IOC
   (c) ONGC
   (d) Shiv-Vani Oil Exploration

100. According to Indian Bureau of Mines, Ministry of Mines, Goverment of India report, the value of minor minerals produced by the State of Mizoram during 2015-16 was estimated to be
   (a) Rs. 215 Lakh
   (b) Rs. 250 Lakh
   (c) Rs. 295 Lakh
   (d) Rs. 325 Lakh

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