PART – A

1. Arrange the given words in alphabetical order and choose the one that comes last.
   A) Cover B) Collect C) Caught D) Callous

Directions : A foreign expression and four English phrases are given. Identify the meaning of the foreign expression from the choices.

2. per se
   A) By word of mouth B) Gossip
   C) By itself D) Spontaneous

Directions : Identify the meaning of underlined word as used in the sentence, from among four alternatives.

3. The presence of hawkers on footpaths hinders both pedestrian and vehicular movement.
   A) buyers B) vendors C) beggars D) rag pickers

Directions : An idiom and four possible meaning are given, identify the meaning of the idiom from among the answer choices.

4. A man of the world
   A) highly trust worthy B) very popular because of success
   C) a man of wit or genius D) highly experienced in many fields

Directions : Fill in the blanks in the given sentence to make it logically and grammatically correct.

5. Farmers know that changing winds _____ rain or drought.
   A) bring B) create C) form D) present

Directions : A sentence is written in four different forms. Only one of them is grammatically correct. Choose the correct sentence as your answer.

6.
   A) Each of the participants were given a gift
   B) Everyone of the participants were given a gift
   C) All of the participants was given a gift
   D) Each of the participants was given a gift

Directions : Four alternative substitutes are given for the underline portion. Identify the choice that replace the underline part to form a logical and grammatically correct statement.

7. I am hoping to see you again tomorrow at the party.
   A) I am hoping to see you B) I may have seen you
   C) I have been seeing you D) I hope to see you

Directions : A word and four jumbled choices are given. One of the choices, when properly arranged, give the meaning of the word. Identify the correct choice.

8. BUSY
   A) EOTRPY B) URDOO
   C) DSTIOINSURU D) AGLEN

Directions : From the choices, select the most suitable synonym for the main word.

9. ADEPT

A) devious B) wily C) clumsy D) dexterous

Directions : From the choices, select the most suitable antonym for the main word.

10. ELUCIDATE

A) impart B) inflame C) excite D) baffle

Directions : There is a certain relation between two given words on one side of : : and one word is given on another side of : : while another word is to be found from the given alternatives, having the same relation with this word as the given pair has. Select the best alternative.

11. Acting : Theatre : : Gambling : ?

A) Casino B) Club C) Bar D) Gym

Directions : There is a certain relation between two given numbers on one side of : : and one number is given on another side of : : while another number is to be found from the given alternatives , having the same relation with this number as the given pair has. Select the best alternative.

12. 25 :125 : : 36 : ?

A) 206 B) 216 C) 226 D) 318

Directions : In the given question, four words have been given, out of which three are alike in some manner and the fourth one is different. Choose out the odd one.

13.

A) Titan B) Mercury C) Earth D) Jupiter

Directions : In the given question, four numbers are given. Out of these, three are alike in a certain way but the rest one is different. Choose the one which is different from the rest three.

14.

A) 324 B) 244 C) 136 D) 352

Directions : In the given question, a number series is given with one term missing. Choose the correct alternative that will continue the same pattern.

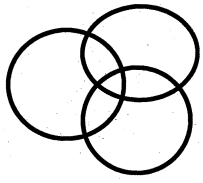
15. 5,9,17,29,45, (……)

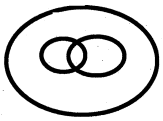
A) 60 B) 65 C) 68 D) 70

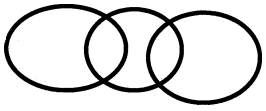
16. If in a certain language, POPULAR is coded as QPQVMBS, which word would be coded as GBNPVT ?

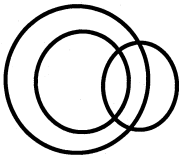
A) FAMOSU B) FAMOUS C) FASOUM D) FOSAUM

17. Which of the following diagrams correctly represents Cricket, Players, students ?

A) 

B) 

C) 

D) 

18. Find the number which when multiplied by 15 is increased by 196.

A) 14 B) 20 C) 26 D) 28

19. Rs. 1210 were divided among A, B, C so that A : B = 5 : 4 and B: C = 9 : 10 then, C gets

A) Rs. 340 B) Rs. 400 C) Rs. 450 D) Rs. 475

20. If 11.25 meter of a uniform iron rod weighs 42.75 kg, what will be the weight of 6 meter of the same rod ?

A) 22.8 kg B) 25.6 kg C) 28 kg D) 26.5 kg

21. A train 132 meter long passes a telegraph pole in 6 seconds. Find the speed of the train.

A) 70 km/hr B) 72 km/hr C) 79.2 km/hr D) 80 km/hr

22. The Travel and Tourism Competitiveness Index (TTCI) is released by

A) IMF B) World Bank

C) World Economic Forum D) UNCTAD

23. Scientists have discovered a protein that can make vaccinations more effective and provide protection from disease such as cancer. The protein is

A) Guanine B) Tryptophan C) Peptide P D) Por B

24. 'Bhoorsingh the Barasingha' is the Mascot of

A) Kanha Tiger Reserve B) Ranthambhore Tiger Reserve

C) Pench National Park D) Madhumalai National Park

25. Who has recently become the first Woman Field Officer in the Border Security Force (BSF) ?

A) Ms. Tanushree Pareek B) Ms. Vahini Singh

C) Ms. Roopa Rathore D) Ms. Arundhati Bhattacharya

26. Which of the following is not correct ?
    A) Research refers to a search for new knowledge
    B) Research is an art of scientific investigation
    C) Research is defined as a systematized effort to gain new knowledge
    D) Research means searching the same fact again and again

27. Which of the following is correct ?
    A) The main aim of a research is to find out the hidden truth
    B) The foremost objective of a research is to verify the known truth
    C) The main purpose of a research is to conduct investigations only in scientific areas
    D) The chief objective of a research is to know more about nonscientific fields

28. Which of the following is not correct as a motivation in research ?
    A) To enhance educational qualifications
    B) To face the challenges in solving the unsolved problems
    C) To make more money
    D) To get intellectual satisfaction

29. Which of the following is not a type of research ?
    A) Descriptive vs. Analytical
    B) Applied vs. Fundamental
    C) Explanatory vs. Non-explanatory
    D) Quantitative vs. Qualitative

30. The quantitative approach to a research includes
    A) Inferential approach
    B) Experimental approach
    C) Simulation approach
    D) A, B, and C

31. Research has its special significance in solving various operational and planning problems of
    A) Business B) Industry C) Agriculture D) A', 'B' and 'C'

32. Research methods and research methodology represent
    A) The same thing
    B) The two different issues
    C) The related issues
    D) None of the above

33. Research methods include
    A) Methods for collecting the required data
    B) Methods for finding relationship between the data and the unknowns
    C) Methods for evaluating the accuracy of the results derived
    D) All of the above

34. Research methodology consists of
    A) Research methods
    B) Assumptions of research methods
    C) Relevance of the research methods
    D) All the above

35. Research process begins with
    A) Formulation of the research problem
    B) Literature review
    C) Development of working hypothesis
    D) Preparing the research design

36. Research process ends at
    A) Data collection
    B) Data analysis
    C) Preparation of the report or the thesis
    D) Hypothesis testing

37. A working hypothesis is defined as
    A) Central point of conclusion
    B) Tentative assumption about the target population
    C) Literature review
    D) None of the above

38. A null hypothesis denotes
    A) The neutral hypothesis
    B) No hypothesis
    C) The desired hypothesis
    D) B or C

39. Research design aims at
    A) Conceptual structure within which research would be carried out
    B) Formulation of strategy for drawing conclusion
    C) The data collection stage
    D) The preparation of report

40. Population means
    A) A group of objects having some common characteristics
    B) Number of persons living in a place
    C) Number of only citizens of a country
    D) Only children of a country

41. A sample represents
    A) A part of a population
    B) A smaller part that represents a population
    C) Only a smaller part of a population
    D) None of the above

42. A sample design is
    A) A definite strategy for selecting a sample from a given population
    B) Decided after the data collection
    C) Not important for the data collection
    D) A or B

43. A sample size is denoted by
    A) N B) n C) α D) β

44. A population size is represented by
    A) n B) μ C) N D) α

45. A sampling method could be based on
    A) Probability B) Without the concept of probability
    C) Either 'A' or 'B' D) Neither 'A' nor 'B'

46. Simple random sampling is a method of
    A) Probability sampling B) Non-probability sampling
    C) Both 'A' and 'B' D) Neither 'A' nor 'B'

47. Quota sampling is a method of
    A) Probability sampling B) Non-probability sampling
    C) Both 'A' and 'B' D) Neither 'A' nor 'B'

48. Usually an experiment is conducted in a laboratory following
    A) Latin square design B) Randomized block design
    C) Completely randomized design D) None of the above

49. In a survey schedules are used when the replies of the questions are entered by
    A) Investigators B) Respondents
    C) Both 'A' and 'B' D) Neither 'A' nor 'B'

50. In a survey questionnaires are used when the replies of the questions are entered by
    A) Investigators B) Respondents
    C) Both 'A' and 'B' D) Neither 'A' nor 'B'

PART – B

51. Sparrows with average-sized wings survive severe storms better than those with longer or shorter wings, illustrating
   A) bottleneck effect
   B) disruptive selection
   C) frequency-dependent selection
   D) stabilizing selection

52. Which of the following is activated by phosphorylation ?
   A) Glycogen synthase
   B) Acetyl CoA carboxylase
   C) Hexokinase
   D) Mitogen-activated protein kinase

53. Keystone species are thought to have profound effects on the structure and composition of ecological communities because they
   A) tend to reduce diversity by eliminating food resources for other species
   B) provide the foundation for food webs
   C) are more abundant than most other species in their communities
   D) can prevent superior competitors from driving inferior competitors to local extinction

54. Which of these would a paleontologist be most likely to do in order to determine whether a fossil represents a reptile or a mammal ?
   A) Look for the presence of milk-producing glands
   B) Look for the mammalian characteristics of a four-chambered heart and a diaphragm
   C) Because mammals are eutherians, look for evidence of a placenta
   D) Examine the teeth

55. Which of the following statements concerning X-ray crystallography is not true ?
   A) Only crystallized proteins can be analyzed
   B) The electron density maps are obtained by applying the Fourier transform to the scattered electron intensities
   C) This technique can be used only to determine structures of proteins of molecular weight less than approximately 30,000
   D) A structure with a resolution of 2 Å gives atomic details about the protein

56. A student encounters an animal embryo at the eight-cell stage. The four smaller cells that comprise one hemisphere of the embryo seem to be rotated 45 degrees and to lie in the grooves between larger, underlying cells (i.e., spiral cleavage). This embryo may potentially develop into a

A) Turtle B) Earthworm C) Sea star D) Fish

57. Which of the following groups is an electrophile ?

A) amine B) carbonyl

C) hydroxyl D) imidazole

58. The pacemaker action potentials in the heart

A) are generated by the bundle of His _____

B) depend on the gap junctions between the cells that make up the atria and those that make up the ventricles

C) are due to spontaneous depolarization of the plasma membranes of modified cardiac muscle cells

D) result from hyperpolarization of cells in the sinoatrial node

59. The formula N = MC/R is used to estimate population size using mark and recapture data. N = population estimate M = number first captured, marked and released C = total number in second capture R = number marked in second capture

In a survey to estimate a woodlice population, the following data were obtained :

Captured, marked and released = 80

Marked woodlice in second capture = 24

Unmarked woodlice in second capture = 96

The estimated population of the woodlice was

A) 320 B) 200 C) 400 D) 840

60. Bright coloration that warns predators of prey toxicity is called

A) Aposematism B) Crypsis C) Homotypy D) Amensalism

61. Which of the following is true regarding the acetylation of histones during transcription ?
A) Histone acetyltransferases are part of the general transcription factor complex
B) Histones are acetylated immediately after translation in the Golgi apparatus
C) H1 acetylation results in transcriptional silencing
D) Deposition of acetylated histones is regulated by histone phosphorylation

62. What is the frequency of heterozygote Aa in a randomly mating population in which the frequency of all dominant phenotypes is 0.19 ?
A) 0.18 B) 0.018 C) 0.09 D) 0.9

63. You are studying three populations of birds. Population A has ten birds, of which one is brown (a recessive trait) and nine are red. Population B has 100 birds, of which ten are brown. Population C has 30 birds, and three of them are brown. Which population is most likely to be subject to the bottleneck effect ?
A) Population A B) Population B
C) Population C D) All are equally likely

64. Arrange the following units of time in order from the longest to shortest
A) Periods, eras, epochs, eons B) Eras, eons, epoch, periods
C) Eons, eras, periods, epochs D) Epochs, eons, eras, periods

65. Which of the following RNA polymerases are NOT insensitive by alpha-amanitin toxin ?
i. RNA Pol I
ii. RNA Pol II
iii. Bacterial RNA polymerase
iv. RNA pol II of *Amanita phalloides*
A) i and iii B) i, iii and iv C) i and iv D) i and ii

66. Which two genera have members that can evade the human immune system by frequently changing their surface proteins ?
i. Plasmodium
ii. Trichomonas
iii. Paramecium
iv. Trypanosoma
v. Entamoeba
A) i and ii B) i and iv C) ii and iii D) ii and iv

67. Proteins destined to be secreted move through the secretory pathway in which of the following orders ?
    A) Smooth ER → Golgi transport vesicle → Golgicisternae → Secretoryvesicle → cell surface
    B) Rough ER → Golgi transport vesicle → Golgicisternae → Secretoryvesicle → cell surface
    C) Golgi cisternae → ER transport vehicle → smoothER → ?Secretoryvesicle → cell surface
    D) Rough ER → SmoothER → Golgi transport vehicle → Golgi cisternae → Secretoryvesicle → cell surface

68. Which of the following gene clusters DONOT contribute to antigen binding ?
    A) VL B) CL C) VH D) D

69. Shikimate pathway is found in all except
    A) Plants B) Animals
    C) Bacteria D) Protozoa

70. The biological clock of mammals is located in the
    A) suprachiasmatic nuclei of the hypothalamus
    B) suprachiasmatic nuclei of the pineal gland
    C) melatonin of the pineal gland
    D) androgens of the gonads

71. Viral genomes vary greatly in size and may include from four genes to several hundred genes. Which of the following viral features is most apt to correlate with the size of the genome ?
    A) size of the viral capsomeres
    B) double-versus single-strand genomes
    C) size and shape of the capsid
    D) glycoproteins of the envelope

72. Which of the following was a conclusion from the experiments of Spemann and Mangold ?
    A) Cytoplasmic determinants of development are homogenously distributed in the amphibian zone
    B) The dorsal lip of the blastopore can initiate gastrulation
    C) The dorsal lip of the blastopore can be isolated and will form a complete embryo
    D) In the late blastula, certain regions of cells are determined to form skin or nervous tissue

73. Which of these turtle species of India has been pushed from endangered category to critically endangered category of red list ?
    A) Red crowned roofed turtle
    B) Hawksbill Turtle
    C) Leatherback Turtle
    D) All of the above

74. Which of the following organisms do you think must have the highest proportion of unsaturated fatty acids in their membranes ?
    A) Antarctic fish
    B) Cactus plant
    C) Bacteria from thermal hot springs
    D) Humans

75. If an ion for which the cell membrane does not have a transport protein is injected into the blood in significant amounts, which of the following would occur ?
    A) The cell would swell and eventually burst
    B) The volume of the blood would decrease
    C) Blood proteins would diffuse into the cells to compensate
    D) The cells would shrivel due to osmotic movement of water out of the cell

76. Which of the following times was marked by the largest mass extinction of life in the history of Earth ?
    A) The end of Cretaceous
    B) The end of Devonian
    C) The end of Permian
    D) The end of Triassic

77. Name the ion which is pumped across membranes by bacteriorhodopsin.
    A) Sodium
    B) Hydrogen
    C) Potassium
    D) Manganese

78. According to the concept of punctuated equilibrium,
    A) transitional fossils, intermediate between newer species and their parent species, should be abundant
    B) given enough time, most existing species will branch gradually into new species
    C) a new species accumulates most of its unique features as it comes into existence
    D) evolution of new species features long periods during which changes are occurring, interspersed with short periods of equilibrium, or stasis

79. You are studying how the protein transferrin enters cells. When you examine cells that have taken up transferrin, you find it inside clathrin-coated vesicles. Therefore, the most likely mechanism for uptake of transferrin is

A) Facilitated diffusion
B) An antiporter
C) Pinocytosis
D) Receptor-mediated endocytosis

80. Which statistical test can be utilized to validate the statement "people having high cholesterol suffer more from hypertension" ?

A) student t test
B) regression analysis
C) correlation coefficient
D) ANOVA

81. Presence of Nuclear Localization Signal (NLS) in a steroid receptor indicates that the receptor resides

A) In the cytosol
B) On the nuclear membrane
C) Within the nucleus
D) On the cell membrane

82. Before puberty

A) The pituitary secretes luteinizing hormone and follicle-stimulating hormone but the gonads are unresponsive
B) The hypothalamus does not secrete much gonadotropin-releasing hormone
C) Testosterone plays no role in development of the male sex organs
D) Genetic females will develop male genitals unless estrogen is present

83. In 4'O clock plant, the allele for tall plants (D) is completely dominant to the allele for dwarf plants (d) and the allele for blue flower colour (W) is completely dominant to the allele for white flower colour (w). In a cross between a tall violet plant, with the genotype DDWw, and a dwarf white plant, what phenotypic ratio of the progeny would be expected from this cross ?

A) 1 tall blue: 1 dwarf blue
B) 1 tall blue: 1 tall white
C) all dwarf white
D) 1 tall blue: 1 tall white: 1 dwarf blue: 1 dwarf white

84. Which of the following macromolecules would yield only one type of monomer after complete hydrolysis ?

A) DNA B) Glycogen

C) Lipoprotein D) Triaylglycerol

85. In the enzyme chymotrypsin, which amino acid is not a part of the catalytic triad

A) Asp 102 B) His 57 C) Ser 195 D) Gly 193

86. In the lac operon, if the operator is moved to the far end of the operon (past the transacetylase gene), which of the following would likely occur when the cell is exposed to lactose ?

A) The inducer will no longer bind to the repressor

B) The repressor will no longer bind to the operator

C) The structural genes will be transcribed continuously

D) The operon will never be transcribed

87. Why the amniotic egg is considered an important evolutionary breakthrough ?

A) It has a shell that increases gas exchange

B) It allows deposition of eggs in a terrestrial environment

C) It prolongs embryonic development

D) It provides insulation to conserve heat

88. Which of the following statements concerning Ig genes are true ?

I. Each light chain isotype is encoded in a separate gene cluster

II. For the heavy chain and the kappa light chain, the V-region contains DNA segments for many different V-domains

III. The constant regions for the heavy chains are encoded on a different chromosome from the variable regions of the heavy chain

IV. The complete protein sequence of a VL or VH domain is encoded in a single gene segment

A) I only B) I and II C) I, II and III D) II and III

89. Which statement about the feedback inhibition of enzymes is NOT true ?

A) It is usually exerted through allosteric effects

B) It is directed at the enzyme that catalyzes the commitment step in a metabolic pathway

C) It affects the rate of reaction, not the concentration of enzyme

D) It acts by permanently modifying the active site

90. The presence of tusks is governed by a holandric gene in a certain mammalian species. When a tusked male is mated to nontusked females, among 100 of their F2 progeny we would expect to find

A) 50 tusked males, 50 non-tusked females

B) 25 tusked males, 25 tusked females, 25 non-tusked males, 25 non-tusked females

C) 50 non-tusked females, 25 tusked males, 25 non-tusked males

D) 50 non-tusked males, 25 tusked females, 25 non-tusked females

91. For developing transgenic mice, embryonic stem cells are engineered to express the transgene. These cells are selected by

A) Novobiocin B) Neomycin

C) Tetracycline D) Kanamycin

92. Which of the following statements is NOT true ?

A) An antibody has more than one antigen-binding site

B) An antigen can have different epitopes

C) A lymphocyte has receptors for multiple different antigens

D) A liver cell makes one class of MHC molecule

93. Mutation in homeotic cluster genes often results in which of the following developmental defects in *Drosophila* ?

A) Absence of a group of contiguous segments

B) Transformation of one segment into another

C) Polarity defects in every segment along the anterior-posterior axis

D) Absence of every other segment along the anterior-posterior axis

94. On an average, how many phosphoanhydride bonds are hydrolysed in the course of synthesizing a 400 amino acid protein ? Assume that you begin with the mature mRNA, ribosomal subunits, tRNAs, free amino acids, and all other essential factors

A) 1600 B) 1500 C) 1200 D) 900

95. Humans can acquire which one of the following diseases from the droppings of infected birds

A) Q fever
B) Legionellosis
C) Inhalational anthrax
D) Psittacosis

96. Eukaryotic cells and their organelles are disrupted by sonication. A centrifuge is used to separate soluble and insoluble components. Protein X is found in the insoluble following centrifugation. The insoluble fraction is treated with 0.5 M NaCl and centrifugation is repeated. Protein X is now found in the soluble fraction. Protein X would be most likely

A) An integral plasma membrane protein
B) A peripheral membrane protein
C) A soluble cytoplasmic protein
D) A soluble nuclear protein

97. The half-life of Zn-71 is 2.4 minutes. If one had 100 g at the beginning, how many grams would be left after 432 seconds has elapsed ?

A) 12.5 g B) 25 g C) 12 g D) 76 g

98. Which of the following should be the same in identical twins ?

A) the set of antibodies produced
B) the set of MHC molecules produced
C) the set of T cell antigen receptors produced
D) the set of immune cells eliminated as self-reactive

99. A mouse strain deficient in NK cells is the

A) SJL
B) Beige
C) Nude
D) MRL-lpr/lpr

100. Which of the following statements is correct concerning cell locomotion ?

A) The amount of F-actin continues to increase as the cell moves
B) Actin polymerizes at the leading edge
C) Actin is synthesized at the leading edge
D) Myosin contraction pushes actin filaments to the leading edge

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SPACE FOR ROUGH WORK

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