M.Sc. ENVIRONMENTAL SCIENCE ENTRANCE TEST-[redacted]

POST GRADUATE DEPARTMENT OF BOTANY
UTKAL UNIVERSITY, VANIVIHAR, BHUBANESWAR-751004

Name of the Candidate:.....

Entrance Roll No..... Answer copy No.....249.....

Date.....

.....
Signature of Invigilator

Full Marks : 100

Time : 01 hour

INSTRUCTIONS

1. **Answer all questions.**
2. **The questions are of equal value.**
3. **There is no negative mark for giving wrong answers.**
4. **The questions are of multiple choice type. Write the most appropriate answer out of four choices (a), (b), (c) and (d) given for the respective question, on the answer sheet as shown below in the example.**

Example

Question 1: **Four multiplied by four is**

a. 4 **b. 16** **c. 18** **d. 20**

Q. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Answer	b																			

****Important- Please write the answer exactly the way it is shown above in the example. Writing more than one answer will be treated as wrong /cancelled**

"Space for rough work is given at the end of this booklet"

Wish you Best of Luck

1. What is ecological footprint?
(a) Amount of productive land and water surface required to support all the needs of a person.
(b) Amount of productive land and water surface required to support all the needs of a human population
(c) Amount of productive land and water surface required to support the needs of a community
(d) None of the above

2. Demographic transitions explain:
(a) Connections between population growth and socio-economic development
(b) Connections between population growth and social development
(c) Connections between population growth and socio-cultural development
(d) Connections between population growth and resource development

3. Ecotype is the:
(a) Variants which are adapted to a broad-range of environmental conditions
(b) Variants which are adapted to its local environmental conditions
(c) Variants adapted to a changing environment
(d) None of the above

4. Population whose members reproduce sexually is:
(a) Panmictic (b) Amphimictic
(c) Apomictic (d) Species

5. The book "Origin of Species" is written by:
(a) Charles Darwin
(b) Aristotle
(c) Jean-Baptiste Lamarck
(d) Gregor Johann Mendel

6. The abundance of a species population within its habitat is called:
(a) Absolute density (b) Relative density
(c) Regional density (d) Niche density

7. Which one of the following is a non-ionizing radiation that can cause gene mutation?
(a) α-rays (b) β-rays
(c) UV-B rays (d) Cosmic rays

8. Human population shows:
(a) J-shaped growth curve
(b) Z-shaped growth curve
(c) S-shaped growth curve
(d) All the above

9. "Wright effect" involves changes in gene frequency due to:
(a) Loss of alleles
(b) More even distribution of some alleles
(c) Formation of new alleles/mutation
(d) All the above

10. The production of offspring with combinations of traits that differ from those found in either parent:
(a) Genetic drift
(b) Genetic recombination
(c) Gene pool
(d) Allele frequencies

11. 5th June every year is celebrated as:
(a) World Wildlife Day
(b) World AIDS Day
(c) World Environment Day
(d) World Ecology Day

12. Ecological equivalent encodes:
(a) Similar organisms occupying similar niches in different geographical areas
(b) Different organisms occupying similar niches in different geographical areas
(c) Similar organisms occupying different niches in the same geographical area
(d) Different organisms occupying similar niches in similar geographical area

13. Elephant is a _____selected spices.
(a) *R*- (b) *K*-
(c) *C*- (d) *S*-

14. 'World population day' is observed on :
(a) 5th June (b) 11th July
(c) 4th October (d) 21st March

15. 'World wildlife day' is celebrated on:
(a) 2nd July (b) 20th December
(c) 3rd March (d) 10th August

16. The pyramid of energy in any ecosystem is:
(a) Always upright
(b) May be upright or invented
(c) Always inverted
(d) None of the above

17. In an ecosystem, which one shows one way passage?
(a) Nitrogen (b) Carbon
(c) Potassium (d) Free energy

18. Food chain in which microorganisms break down the food formed by primary producers is:
(a) Parasitic food chain
(b) Detritus food chain
(c) Consumer food chain
(d) Predator food chain

19. The dominant second trophic level in a lake ecosystem is:
(a) Benthos (b) Plankton
(c) Zooplankton (d) Phytoplankton

20. A _____ is a group of ecosystems that have the same climate and dominant communities.
(a) Biosphere (b) Biome
(c) Niche (d) Habitat

21. The formation of climax community from an abandoned farmland is an example of:
(a) Autogenic succession
(b) Allogenic succession
(c) Primary succession
(d) Secondary succession

22. In the troposphere, temperature _____ with altitude.
(a)Decreases (b) Increases
(c) Stays the same (d) Changes randomly

23. Carbon dioxide and water vapour are both_____, acting to warm the atmosphere.
(a) Highly variable (b) Greenhouse gases
(c) Major components (d) Minor components

24. Atmospheric pressure at sea level is_____.
(a) 760 mm Hg (b) 1013 mb
(c) 1013 hPa (d) All of the above

25. Which of the following is NOT a major component of the atmosphere in ppm by volume?
(a) Nitrogen (b) Oxygen
(c) Ozone (d) Argon

26. Plants receive their nutrients mainly from?
(a) Atmosphere (b) Chlorophyll
(c) Light (d) Soil

27. If '+' means 'minus', '-' means 'added to', '×' means 'divided by' and '÷' means 'multiplied by', then which of the following will be the value of the following expression? $8 \times 2 - 4 + 6 \div 2 = ?$
(a) 2 (b) 4
(c) 6 (d) 12

28. The difference between one-half of a number and one-fifth of it is 561. The number is:
(a) 2805 (b) 1870
(c) 5610 (d) 187

29. The radius of a cylinder is 1 centimeter. The height is 2 centimeters. A rectangle can be formed into this cylinder. Find the length of the rectangle.
(a) 2π cm (b) 4π cm
(c) π^2 cm (d) $2\pi^2$ cm

30. What percent of 36 is 27?
(a) 36% (b) 50%
(c) 66¾% (d) 75%

31. In a certain code BANKPOWER is written as REWOPKNAB. How is GREENLAND written in that code?
(a) DNALGREEN (b) NEERGDNAL
(c) DNALGRNEE (d) DNALNEERG

32. In a certain code 'NOIDA' is written as '24 25 19 14 11'. How is 'AMBALA' will be written in that code?
(a) 11 25 24 11 11 11 (b) 11 23 12 11 22 11
(c) 11 25 24 11 12 11 (d) 24 25 11 14 19 11

33. 8 9 20 64 256 ?

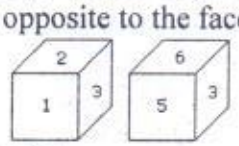
(a) 20 (b) 512
(c) 1285 (d) 256

34. In a certain code, PAN is written as 31 and PAR as 35, then PAT is written in the same code as:
(a) 30 (b) 37
(c) 39 (d) 41

35. The letters in the first set have certain relationship. On the basis of this relationship, make the right choice for the second set : AF : IK : : LQ : ?
(a) MO (b) NP
(c) QR (d) TV

36. If 5472 = 9, 6342 = 6, 7584 = 6, what is 9236 ?
(a) 2 (b) 3
(c) 4 (d) 5

37. Which digit will appear on the face opposite to the face with number 4?



(a) 3 (b) 5
(c) 6 (d) 2/3

38. Starting from point A, Ajit walks 14 metres towards west, he then turns to his right and walks 14 metres and then turns to his left and walks 10 metres. He again turns to his left and walks 14 metres and reaches to the point E. The shortest distance between A and E is:
(a) 38 (b) 42
(c) 52 (d) 24

39. A, B, C, D, E and F are sitting around a round table. A is between E and F. E is opposite to D and C is not in either of the neighbouring seats of E. The person opposite to B is:
(a) C (b) D
(c) A (d) F

40. The missing term in the series 2, 7, 24, 77, ?, 723 is:
(a) 238 (b) 432
(c) 542 (d) 320

41. A milk man makes a Profit of 20% on the sale of milk .If he were to add 10% water to the milk, by what % would profit increase?
(a) 12 (b) 15
(c) 10 (d) 32

42. Which one of the following is an antioxidant enzyme?
(a) Pepsin (b) Choline esterase
(c) Amylase (d) Catalase

43. Snake venom represents ---------- biomolecule.
(a) Carbohydrate (b) Protein
(c) Nucleic acid (d) Lipids

44. Deforestation will decrease:
(a) Soil erosion (b) Soil fertility
(c) Land slides (d) Rainfall

45. Acid rains are produced by:
(a) Excess NO_2 and SO_2 from burning fossil fuels
(b) Excess production of NH_3 by industry and coal gas
(c) Excess release of carbon monoxide by incomplete combustion
(d) Excess formation of CO_2 by combustion and animal respiration

46. Greenhouse effect is warming due to:
(a) Infrared rays reaching earth
(b) Moisture layer in atmosphere
(c)Increase in carbon dioxide concentration of atmosphere
(d) Ozone layer of atmosphere

47. Which of the following is absent in polluted water?
(a) Diatom
(b) Water hyacinth
(c) Larva of stone fly (*Plecoptera order*)
(d) Blue green algae

48. The 10% energy transfer law of food chain was given by:
(a) Lindemann (b) Tansley
(c) Stanley (d) Weismann

49. Fick's law related to which physical transported quantity:
(a) Heat (b) Mass
(c) Viscocity (d) Diffusion

50. $\delta Q = T\,dS$. represents ---------- - law of thermodynamics.
(a) 1^{st} (b) 2^{nd}
(c) 3^{rd} (d) 0^{th}

51. The spherical shape of the rain drop is due to:
(a) Viscocity (b) Surface tension
(c) Friction (d) All of the above

52. Solar energy is produced out of a giant nuclear reactor based on _____ reaction.
(a) Fusion (b) Fission
(c) Transmutation (d)Exothermic reaction

53. A thermodynamic quantity representing the unavailability of a system's thermal energy for conversion into mechanical work:
(a) Free energy (b) Enthalpy
(c) Entropy (d) Heat capacity

54. Which instrument is used to measure depth of ocean?
(a) Galvanometer (b) Fluxmeter
(c) Endoscope (d) Fathometer

55. An astronaut on a strange planet finds that acceleration due to gravity is twice as that on the surface of Earth. Which of the following could explain this?
(a) Both the mass and radius of the planet are twice as that of Earth.
(b) Mass of the planet is half as that of Earth, but radius is same as that of Earth.
(c) Both the mass and radius of the planet are half as that of Earth.
(d) Radius of the planet is half as that of Earth, but the mass is the same as that of Earth.

56. A train is moving slowly on a straight track with a constant speed of 2 ms^{-1}. A passenger in that train starts walking at a steady speed of 2 ms^{-1} to the bank of the train in the opposite direction of the motion of the train. So to an observer standing on the platform directly in front of that passenger, the velocity of the passenger appears to be _____ .
(a) 2 ms^{-1} in the opposite direction of the train
(b) Zero (c) 4 ms^{-1} (d) 2 ms^{-1}

57. Which one of the following is a renewable resource of energy?
(a) Wind (b) Fossil fuel
(c) Biomass (d) None of the above

58. $_{92}U^{235}$ undergoes successive disintegrations with the end product of $_{82}Pb^{203}$. The Number of α- and β-particles emitted are:
(a) $\alpha = 6, \beta = 4$ (b) $\alpha = 6, \beta = 0$
(c) $\alpha = 8, \beta = 6$ (d) $\alpha = 3, \beta = 3$

59. A bar magnet is equivalent to _____.
(a) Solenoid carrying current
(b) Circular coil carrying current
(c) Toroid carrying current
(d) Straight conductor carrying current

60. A white light passed through a prism is
(a) Deviated (b) Diffracted
(c) Polarized (d) Dispersed

61. The wavelength of visible rays is in the range of
(a) 190-340 nm (b) 400-700 nm
(c) 800-1000 nm (d) 190-1000 nm

62. The terminal velocity of a small sphere settling in a viscous fluid varies as the:
(a) Inverse square of the diameter
(b) First power of its diameter
(c) Inverse of the fluid viscosity
(d) Square of the difference in specific weights of solid & fluid

63. The fluid property, due to which mercury does not wet the glass, is:
(a) Surface tension (b) Viscosity
(c) Adhesion (d) Cohesion

64. Frequency below which no electrons are emitted from metal surface is:
(a) Minimum frequency
(b) Angular frequency
(c) Maximum frequency
(d) Threshold frequency

65. The prosthetic group of NADH dehydrogenase is:
(a) FMN (b) NADH
(c) FAD (d) NADPH

66. Which one of the following is/are referred to as "living fossil"?
(a) Red panda (*Ailurus fulgens*)
(b) Goblin shark (*Mitsukurina owstoni*)
(c) Cycad plants
(d) All of the above

67. Which organization publishes "Red Data Book"?
(a) WWF (b) UNO
(c) IUCN (d) ICBN

68. How many number of ATP is produced in photosynthesis process in a C_3 plant?
(a) One (b) Two
(c) Eight (d) Thirty two

69. Swelling of egg placed in pure water is an example of:
(a) Diffusion (b) Effusion
(c) Reverse osmosis (d) Endosmosis

70. Carrot is orange in colour because?
(a) It grows in the soil
(b) It is not exposed to sunlight
(c) It contains carotene
(d) The entire plant is orange in colour

71. The main excretory product of frog is?
(a) Urea (b) Uric acid
(c) Amino acid (d) Ammonia

72. The largest part of the human brain is?
(a) Medulla Oblongata (b)Cerebellum
(c) Mid-brain (d) Cerebrum

73. Insects responsible for transmitting diseases are called?
(a) Transmitter (b) Drones
(c) Vector (d) Conductor

74. What is "ALZHEIMER'S" disease?
(a) It affects liver
(b) It affects kidney
(c) It affects human immune system
(d) It affects nervous system

75. Which is known as natural genetic engineer?
(a) *Saccharomyces cerevisiae*
(b) *Agrobacterium tumefaciens*
(c) *Escherichia coli*
(d) *Pseudomonas putida*

76. Movement of cell against concentration gradient is called:
(a) Osmosis (b) Active transport
(c) Diffusion (d) Passive transport

77. Root nodules are commonly found in:
(a) Leguminous plants
(b) Parasitic plants
(c) Epiphytic Plants
(d) Aquatic plants

78. Which is the largest living bird?
(a) Ostrich (b) Peacock
(c) Dodo (d) Turkey

82. The ABO blood groups were discovered by:
(a) Charles Darwin (b) Karl Landsteiner
(c) Gregor Mendel (d) Watson

80. DNA structure was first described by:
(a) Catcheside (b) Nirenberg
(c) Lederberg (d) Watson and Crick

81. The only methylated base in mammals is?
(a) 7-methyl guanine (b) Thymine
(c) Methyl adenine (d) 5-methyl cytosine

88. What is the pH of 0.0001 HCl solution?
(a) 1 (b) 4
(c) 13 (d) 10

83. Out of the following, one class of RNA characteristically contains unusual purines and pyrimidines. This RNA is:
(a) tRNA (b) rRNA
(c) mRNA (d) 16s RNA

84. The electron flow from complex I to complex III is through:
(a) Cytochrome c (b) Ubiquinone
(c) Complex II (d) Complex IV

85. Biochemical Oxygen Demand, (BOD) is a measure of organic material present in water. BOD value less than 5 ppm indicates a water sample to be _____.
(a) Rich in dissolved oxygen.
(b) Poor in dissolved oxygen.
(c) Highly polluted.
(d) Not suitable for aquatic life

86. A stoichiometric ratio of a reagent is the optimum amount or ratio where, the reaction proceeds to completion with which of the following assumption?
(a) All of the reagent is consumed
(b) There is no deficiency of the reagent
(c) There is no excess of the reagent.
(d) All of the above

87. What is the oxidation no of Cr in $K_2Cr_2O_7$?
(a) 3 (b) 6
(c) 4 (d) 7

88. Which of the following enzyme(s) can remove or insert supercoil twists into circular DNA?
(a) Topoisomerases (b)DNA PolymeraseII
(c) Spliceosomes (d) Helicase

89. Oleum is also known as:
(a) Glacial acetic acid
(b) Fuming Sulphuric acid
(c) Conc. Ammonium Hydroxide solution
(d) Picric acid

90. $\Delta G = -nFE$; In this equation the value of F is:
(a) 6.02×10^{23} (b) 1.6×10^{-19} C
(c) 69500 C (d) 96500 C

91. If a gas A diffuses in gas B and the ratio of their rate of diffusions is 2/3, then what is the ratio of their molecular masses_____.
(a) 3/2 (b) 2/3
(c) 4/9 (d) 9/4

92. The maximum density of water is at_____ °C.
(a) 0 (b) 4
(c) 5 (d) -2

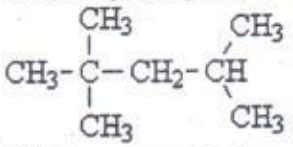
93. Which one of the following is an allotrope of Oxygen?
(a) O_3 (b) O_2
(c) CO_2 (d) N_2O_5

94. The strength of Gram equivalent weight of the substance dissolved in 1000 ml of solution is expressed as _____.
(a) Molarity (b) Molality
(c) Normality (d) Formality

95. To prepare one Littre of 10 ppm solution of NaOH (M.W. = 40), the amount of NaOH taken is _____.
(a) 10 g (b) 4 g
(c) 10 mg (d) 40 mg

96. Neoprene is a:
(a) Monomer (b) Synthetic rubber
(c) Polyester (d) None of the above

97. What is the IUPAC name for the following compound?



(a)1,3-pentamethylpropane
(b)1,1,3,3-tetramethylbutane
(c)2,4,4-trimethylpentane
(d)2,2,4-trimethylpentane

98. Cylohexane shows which type of isomerism?
(a) Geometric isomerism
(b) Functional isomerism
(c) Optical isomerism
(d) Conformational isomerism

99. This reaction is known as_____.

(a)Wurz reaction
(b)Etard reaction
(c)Klobe's synthesis
(d)Reimer–Tiemann reaction

100. What is the 'http' stands for:
(a) Hypertext transform protocol
(b) Hypertext transfer protocol
(c) Hypertext transmission protocol
(d) Hyperlinked transfer protocol