KEY FOR PHDEV (Entrance Test held dated on 07.01.2024)

Q. NO.	ANS.
1	2
2	3
3	2
4	3
5	4
6	1
7	2
8	1
9	1
10	3
11	4
12	3
13	2
14	3
15	2
16	3
17	2
18	1
19	2
20	4
21	1
22	3
23	4
24	3
25	3
26	4
27	1
28	2
29	4
30	2

Q. NO.	ANS.
31	4
32	4
33	2
34	3
35	2
36	2
37	3
38	4
39	2
40	4
41	3
42	2
43	4
44	4
45	3
46	3
47	2
48	3
49	2
50	1
51	1
52	3
53	1
54	3
55	3
56	4
57	1
58	3
59	1
60	3

Q. NO.	ANS.
61	2
62	2
63	4
64	3
65	1
66	3
67	2
68	2
69	3
70	3
71	3
72	1
73	4
74	4
75	2
76	3
77	2
78	1
79	1
80	4
81	2
82	3
83	3
84	2
85	1
86	4
87	1
88	1
89	3
90	4

Q. NO.	ANS.
91	1
92	1
93	3
94	4
95	3
96	3
97	2
98	3
99	2
100	4

23/1/24

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Nandini Sinha Kapur

23/1/24.

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PHDEV

Ph. D. (Environmental Science)
Entrance Test, July, 2023

Time : 3 Hours *Maximum Marks : 100*

GENERAL INSTRUCTIONS

1. All questions are **compulsory**. Each question carries **1** mark.
2. No cell phones, calculators, books, slide-rules, notebooks or written notes, etc. will be allowed inside the examination hall.
3. You should follow the instructions given by the Centre Superintendent and by the Invigilator at the examination venue. If you violate the instructions, you will be disqualified.
4. Any candidate found copying or receiving or giving assistance in the examination will be disqualified.
5. The Question Booklet and the OMR Response Sheet (Answer Sheet) would be supplied to you by the Invigilators. After the examination is over, you should hand over the OMR Response Sheet and Question Booklet to the Invigilator before leaving the examination hall. Any candidate who does not return the OMR Response Sheet will be disqualified and the University may take further action against him/her.
6. All rough work is to be done on the question paper itself and not on any other paper. Scrap paper is not permitted. For arriving at answers you may work in the margins, make some markings or underline in the test booklet itself.
7. The University reserves the right to cancel the result of any candidate who impersonates or uses/adopts other malpractices or uses any unfair means. The University may also follow a procedure to verify the validity of scores of all examinees uniformly. If there is substantial indication that your performance is not genuine, the University may cancel your result.

How to fill up the information on the OMR Response Sheet

(Examination Answer Sheet)

1. Write your complete Enrolment No. in 10 digits. This should correspond to the enrolment number indicated by you on the OMR Response Sheet. Also write your correct name, address with pin code in the space provided. Put your signatures on the OMR Response Sheet with date. Ensure that the Invigilator in your examination hall also puts his signatures with date on the OMR Response Sheet at the space provided.

2. On the OMR Response Sheet student's particulars are to be filled in by blue/black ball pen also. Use blue/black ball pen for writing the Enrolment No. and Examination Centre Code as well as for blackening the circle bearing the correct answer number against the serial number of the question.

3. Do not make any stray remarks on this sheet.

4. Write correct information in numerical digits in Enrolment No. and Examination Centre Code Columns. The corresponding circle should be dark enough and should be filled in completely.

5. Each question is followed by four probable answers which are numbered (1), (2), (3) and (4). You should select and show only one answer to each question considered by you as the most appropriate or the correct answer. Select the most appropriate answer. Then by using blue/black ball pen, blacken the circle bearing the correct answer number against the serial number of the question.

6. No credit will be given if more than one answer is given for one question. Therefore, you should select the most appropriate answer.

7. You should not spend too much time on one question. If you find any particular question difficult, leave it and go to the next. If you have time left after answering all the questions, you may go back to the unanswered question.

8. There is no negative marking for wrong answers.

1. _____data are obtained by applying interval or ratio scales of measurement.

   (1) Non- parametric

   (2) Parametric

   (3) Ranked

   (4) Non ranked

2. In_____data the ordinal scale of measurement is used.

   (1) Non- parametric

   (2) Parametric

   (3) Ranked

   (4) Non ranked

3. _____data describe an empirical event or phenomenon in a numerical system with the help of different scales of measurement.

   (1) Qualitative

   (2) Quantitative

   (3) Administrative

   (4) Variable

4. _____are obtained by adding successively the individual frequencies of class-intervals.

   (1) Frequencies

   (2) Percentages

   (3) Cumulative percentage frequencies

   (4) Frequency polygon

5. _____ is drawn by plotting the mid-point of each class-interval at a height proportional to its respective frequency and then joining the points by straight lines.

   (1) Frequencies

   (2) Percentages

   (3) Ogive

   (4) Frequency polygon

6. The arithmetic average of a distribution is known as its _____.

(1) Mean

(2) Median

(3) Mode

(4) Assumed mean

7. The_____is defined as the most frequently occurring measure of an observation in a distribution.

(1) Mean

(2) Mode

(3) Median

(4) Frequency

8. The arithmetic logic unit and the control unit is known as the

(1) Central processing unit

(2) Electronic unit

(3) System bus

(4) Supercomputer

9. Graphic display is made up of a series of dots known as

(1) Pixels

(2) CRT

(3) LCD

(4) LED

10. The statement 'Research is an organized and systematic enquiry' was given by _____.

(1) Marshall

(2) Young PV

(3) Emory

(4) Kerlinger

11. Ethical Neutrality is a feature of _____.

(1) Deduction

(2) Observation

(3) Personal experiences

(4) Scientific method

12. A system of systematically interrelated concepts definitions and propositions that are advanced to explain and predict phenomena is_____.

(1) Facts

(2) Values

(3) Theory

(4) Generalization

13. Research conducted to find solution for an immediate problem is_____ research.

(1) Fundamental

(2) Action

(3) Basic

(4) Survey

14. The author of "The Grammar of Science" is _____.

(1) Ostle

(2) Richard

(3) Karl Pearson

(4) Kerlinger

15. The first step in formulating a problem is _____.

(1) Survey

(2) Statement of the problem

(3) Gathering the data

(4) Methodology

16. Concept is of two types _____.

(1) Abstract and Coherent

(2) Concrete and Coherent

(3) Abstract and Concrete

(4) Cross-sectional

17. A Hypothesis from which no generalization can be made is known as _____.

(1) Null hypothesis

(2) Barren hypothesis

(3) Descriptive hypothesis

(4) Analytical hypothesis

18. A_____ from theory lead to a hypothesis.

(1) Logical deduction

(2) Induction

(3) Observation

(4) Deduction

19. SPSS is known as _____.

(1) Statistical package for sciences

(2) Statistical package for social sciences

(3) Statistical package for scientific skills.

(4) Statistical package for statistics and sciences

20. The Report submitted when there is a time lag between data collection and presentation of Result is called as _____.

(1) Thesis

(2) Summary report

(3) Article

(4) Interim report

21. In a_____observation researcher is a part of observation.

(1) Participant

(2) Non-participant

(3) Structured

(4) Non structured

22. Probability sampling is otherwise referred to as _____.

(1) Multiple choice

(2) Bi-variate analyses

(3) Uni-variate analyses

(4) Random sampling

23. The type of a sample population that is divided into different strata and when the sample is taken from different strata is known as_____ sampling.

(1) Quota

(2) Snowball

(3) Purposive

(4) Stratified

24. All the following are true about action research, except _____.

(1) Data is systematically analyzed.

(2) Data is collected systematically.

(3) Results are generalizable.

(4) Results are used to improve practice.

25. Which of the following is a Non parametric test?

(1) Z-test

(2) F-test

(3) Chi-square

(4) ANOVA

26. A researcher intends to explore the effect of possible factors for the organization of effective mid- day meal interventions. Which research method will be most appropriate for this study?

(1) Historical

(2) Experimental

(3) Descriptive

(4) Ex-post-facto method.

27. Which of the following would generally require the largest sample size?

(1) Cluster sampling

(2) Systematic sampling

(3) Simple random sampling

(4) Proportional stratified sampling

28. In a Gaussian distribution curve, which one of the following statements is incorrect?

(1) 68% of the scores is within 1 standard deviation of the mean

(2) 58% of the scores is within 1 standard deviation of the mean

(3) 95% of the scores is within 2 standard deviations of the mean

(4) 99% of the scores is within 3 standard deviations of the mean

29. Which one of the following relations between mean, median and mode in asymmetrical distribution is correct?

(1) Mean-Median= 2(Mean -Mode)

(2) Mode= 2Median- 3Mean

(3) Mean-Mode= 2 (Mean -Median)

(4) Mode= 3Median -2Mean

30. The value the product moment correlation coefficient always lies in the range of _____.

(1) $-\infty$ to ∞

(2) -1 to 1

(3) -1 to 0

(4) 0 to 1

31. Which one of the following states that "regardless of the nature of the distribution of the population, the distribution of the sample mean approaches the normal distribution as the sample size increases"?

(1) Decision theory

(2) Probability models

(3) Large sample theory

(4) Central Limit Theorem

32. Which of the following sampling methods is the best way to select a group of people for a study if you are interested in making statements about the larger population?

(1) Convenience sampling

(2) Quota sampling

(3) Purposive sampling

(4) Random sampling

33. You asked five of your classmates about their height. On the basis of this information, you stated that the average height of all students in your university or college is 67 inches. This is an example of _____.

(1) Descriptive statistics

(2) Inferential statistics

(3) Parameter statistics

(4) Population statistics

34. Which of the following is not based on all the observations?

(1) Arithmetic mean

(2) Mode

(3) Harmonic mean

(4) Geometric mean

35. The weights of students in a college/ school is a_____variable.

(1) Discontinuous

(2) Continuous

(3) Discrete

(4) Qualitative

36. Sample statistics are also represented as _____.

(1) Lower case Greek letters

(2) Roman letters

(3) Upper case Greek letters

(4) Associated Roman alphabets

37. The mean of a distribution is 23, the median is 24, and the mode is 25.5. It is most likely that this distribution is_____.

(1) Symmetrical

(2) Asymptotic

(3) Negatively Skewed

(4) Positively Skewed

38. A chance variation in an observational process is_____.

(1) Instrument error

(2) Dispersion

(3) Measurement error

(4) Random error

39. Graphical and numerical methods are specialized processes utilized in_____ statistics.

(1) Social

(2) Descriptive

(3) Education

(4) Business

40. The branches of statistics include_____statistics.

(1) Applied

(2) Mathematical

(3) Industrial

(4) Applied and Mathematical

41. Calculate the Standard deviation for the following sample data 2,4,6,8,10 and 12.

(1) 4.42

(2) 2.42

(3) 3.42

(4) 5.42

42. Standard deviation is always_____.

(1) Negative

(2) Positive

(3) Zero

(4) None of the above

43. The arithmetic average of the absolute deviation of a series known as the_____.

(1) Standard deviation

(2) Regression

(3) Coefficient of mean deviation

(4) Mean deviation

44. Which is a method of measuring correlation?

(1) Graphic correlations

(2) Scatter diagrams

(3) None of these

(4) Both (A) and (B)

45. Which of the following measurement scales is required for the valid calculation of Karl Pearson's correlation coefficient?

(1) Nominal

(2) Interval

(3) Ordinal

(4) Ratio

46. Which of the following is the highest range of r?

(1) 0 and 1

(2) -1 and 0

(3) -1 and 1

(4) -2 and 0

47. Which of the following is most likely to be an inverse relationship?

(1) Between income and expenditure on education

(2) Between price increase and demand for a certain product

(3) Between average number of hours studied per day and the performance of the students in the examination

(4) Between advertising expenditure and sales of a product.

48. When a multiple correlation coefficient r 1.2=1, then it shows _____.

(1) Reasonably good relationship.

(2) Lack of linear relationship.

(3) Perfect relationship

(4) Imperfect relationship

49. A scatter diagram is_____.

(1) Curvilinear

(2) A graph showing x and y values.

(3) Linear

(4) A statistical test

50. UGC in India is known as_____.

(1) University Grants Commission

(2) Universal Grants Commission

(3) Interuniversity Grants Commission

(4) Universal Geological Commission

51. Autecology deals with_____.

(1) Ecology of species

(2) Ecology of many species

(3) Ecology of communities

(4) All the above

52. In the whole Earth, the four most common elements are oxygen, silicon, magnesium and _____.

(1) Copper

(2) Lead

(3) Iron

(4) Zinc

53. Within the sea floor, the rate of geothermal heat flow is greatest_____.

(1) Along midoceanic ridges

(2) Along fracture zones

(3) At the edges of ocean basins

(4) In the center of abyssal plains

54. Natural glass is not considered a mineral because it_____.

(1) Is not homogenous

(2) Is organic

(3) Does not have a fixed crystalline structure

(4) Can be made synthetically as well as being a naturally occurring substance

55. The internal ordering of mineral crystals was first detected using_____.

(1) Magnetic resonance imaging

(2) X-ray diffraction

(3) A scanning electron microscope (SEM)

(4) Cathodized axial tomography

56. Which soil horizon has the greatest proportion of organic matter?

(1) A- horizon

(2) B- horizon

(3) C- horizon

(4) O-horizon

57. Gases that are abundantly emitted by volcanoes include_____

(1) Water vapour, carbon dioxide and sulphur dioxide

(2) Oxygen, ozone and water vapour

(3) Oxygen, hydrogen and neon

(4) Carbon dioxide, carbon monoxide and oxygen

58. Burning of fossil fuels drastically affects one of the following cycles:

(1) Nitrogen cycle

(2) Phosphorous cycle

(3) Carbon cycle

(4) Water cycle

59. Sinkholes occur in regions containing _____.

(1) Carbonate rocks

(2) Sulphate rocks

(3) Phosphate rocks

(4) Rock salt

60. The Geiger- Muller detectors are employed to detect_____.

(1) Ultraviolet radiation

(2) Infrared radiation

(3) Nuclear radiation

(4) None of the above

61. The Chernobyl disaster was caused by a_____.

(1) Nuclear test

(2) Nuclear reactor accident

(3) Nuclear waste disposal leak

(4) Nuclear weapon accident

62. To qualify as a desert, the region must be_____.

(1) Hot, with a mean annual temperature greater than 25°C (77°F)

(2) Arid, with less than 25 cm annual precipitation and very low relative humidity

(3) Both hot and arid

(4) Either hot or arid

63. _____are a set of scenarios that have been used in IPCC Fifth Assessment Report (AR5)for predicting future climate scenario based on climate models.

(1) IS92 Scenarios

(2) SRES scenarios

(3) Greenhouse gases scenarios

(4) Representative Concentration Pathways

64. The Kyoto protocol on climate change was envisaged in_____.

(1) 1992

(2) 1994

(3) 1997

(4) 2002

65. Project tiger was started in_____.

(1) 1973

(2) 1974

(3) 1995

(4) 1996

66. Burning of fossil fuels drastically affects one of the following cycles:

(1) Nitrogen cycle

(2) Phosphorous cycle

(3) Carbon cycle

(4) Water cycle

67. The Global surface air temperature is about _____.

(1) 14°C

(2) 15°C

(3) 16°C

(4) 13°C

68. According to the IPCC special report on the impacts of global warming of 1.5 degrees centigrade, human activities are estimated to have caused approximately _____of global warming above pre-industrial levels.

(1) 0.9°C

(2) l.0°C

(3) 1.5°C

(4) 0.8°C

69. _____ law states that the wavelength of maximum emission varies inversely with the absolute temperature of the radiating body.

(1) Stefan-Boltzmann

(2) Beers

(3) Wien's

(4) Kirchhoff's

70. Which cloud type produces rainstorms?

(1) Cirrus

(2) Cumulus

(3) Cumulonimbus

(4) Stratus

71. The Geiger- Muller detector is employed to detect

(1) Ultraviolet radiation

(2) Infrared radiation

(3) Nuclear radiation

(4) None of the above

72. Which is the acid associated with soil?

(1) Humic acid

(2) Acetic acid

(3) Nitric acid

(4) Sulphuric acid

73. The shape of the earth's orbit oscillates from elliptical to circular orbit with a period of about _____

(1) 11,000 years

(2) 23,000 years

(3) 41,000 years

(4) 1,00,000 years

74. Which of the following radionuclides has maximum half-life period?

(1) C-14

(2) Ra-226

(3) I-131

(4) Th-230

75. The principle of Spectrophotometer is:

(1) Wheat Stone bridge principle

(2) Lambert Beer's Law

(3) Gay- Lussac's Law

(4) Faraday Law

76. The wavelengths of UV-B radiations are in the range

(1) 180-250 nm

(2) 250 - 280 nm

(3) 280 - 320 nm

(4) 320 - 400 nm

77. The entropy of a pure crystalline substance at -273K is

(1) Infinity

(2) Zero

(3) 100 J/K

(4) 373 J/K

78. When a catalyst is added to a system at equilibrium, a decrease occurs in the

(1) Activation energy

(2) Heat of reaction

(3) Potential energy of the reactants

(4) Potential energy of the products

79. The plants of which category will be benefitted by increased concentration of CO_2 in the atmosphere?

(1) C-3 plants

(2) C-4 plants

(3) CAM plants

(4) None of the above

80. Final stage of succession is

(1) Ecesis

(2) Nudation

(3) Invasive

(4) Climax

81. Which of the following microorganisms leach metals out of rock ores and can accumulate silver?

(1) *Pseudomonas aeruginosa*

(2) *Thiobacillus*

(3) *Pseudomonas putida*

(4) *Zoogloearamigera*

82. Which of the following bacteria genus is capable of oxidizing ammonia?

(1) Nitrospina

(2) Nitrobacter

(3) Nitrosococcus

(4) Nitrosobacter

83. The upper limit of tree growth in mountains or northern latitudes is called as_____.

(1) Tree line

(2) Snow line

(3) Timber line

(4) Sea line

84. The use of microorganism metabolism to remove pollutants such as oil spills in the water bodies is known as_____.

(1) Biomagnification

(2) Bioremediation

(3) Biomethanation

(4) Bioreduction

85. In an ecotone, the species which become abundant are called_____.

(1) Edge species

(2) Key stone species

(3) Endemic species

(4) Foster species

86. The word 'ecology' (Ökologie) was coined in 1866 by_____.

(1) Charles Darwin

(2) Robert Whittaker

(3) Arthur Tansley

(4) Ernst Haeckel

87. The Itai- itai disease is caused due to_____ contamination.

(1) Cadmium

(2) Mercury

(3) Strontium

(4) Uranium

88. Which of the following earthworm categories is most suitable for vermicomposting?

(1) Epigeic

(2) Anecic

(3) Endogeic

(4) None of the above

89. Temperature maintained in an incinerator is_____.

(1) ≈100 °C

(2) 200 - 400 °C

(3) > 850 °C

(4) < 500 °C

90. The National Environmental Engineering Research Institute is located at_____.

(1) New Delhi

(2) Karnal

(3) Pune

(4) Nagpur

91. 'Lion-tailedmacaque' is the key faunal species of which Biosphere Reserve?

(1) Nilgiri

(2) Dehang-Debang

(3) Dibru-Saikhowa

(4) Nokrek

92. A decibel is the standard for the measurement of_____.

(1) Noise

(2) temperature

(3) Pressure

(4) None of the above

93. The Logo of Indian Eco mark is the _____.

(1) Lotus

(2) Peacock

(3) Earthen pot

(4) Lion

94. The protection of animals in the national park is called as_____.

(1) Biofriendly

(2) Ecofriendly

(3) Degradation

(4) Conservation

95. The energy flow in an ecosystem is_____.

(1) Multidirectional

(2) Bidirectional

(3) Unidirectional

(4) No direction at all

96. "Sustainability" as an indicator of economic growth means_____.

(1) Elimination of poverty

(2) More productivity

(3) Responsible use of resources

(4) Indiscriminate use of resources

97. Imhoff cone is used to measure the _____.

(1) Unsettleable solids

(2) Settleable solids

(3) Dissolved solids

(4) Total solids

98. The decomposition of sewage takes place, causing a pungent smell. Which of the following causes the pungent smell?

(1) CO_2

(2) H_2SO_4

(3) H_2S

(4) CH_4

99. Which one of the following is the basic indicator of river health?

(1) BOD

(2) DO

(3) COD

(4) ThOD

100. Which of the following device is used for the removal of oil and grease?

(1) Skimming tank

(2) Grit chambers

(3) Flocculator

(4) Tube settlers

Space for Rough Work

Space for Rough Work