

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2012.

Ph.D. (ENVIRONMENTAL TECHNOLOGY)

COURSE CODE : 112

Register Number :

*Signature of the Invigilator
(with date)*

COURSE CODE : 112

Time : 2 Hours

Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each of the question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you -1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. The 'Absolute zero' is equivalent to
(A) -273°C (B) $+273^{\circ}\text{C}$ (C) 300°C (D) 373°C
2. Helium belongs to the group of
(A) Real gas (B) Inert gas (C) Ideal gas (D) Fuel gas
3. The BOD of a water sample is 200 mg l^{-1} . Its COD is likely to be
(A) 160 (B) 180 (C) 190 (D) 240
4. Lignite is a low grade coal found in
(A) Gujarat (B) U.P. (C) Tamil Nadu (D) Karnataka
5. Which of these gases belongs to CFC class of compounds?
(A) Carbon tetrachloride (B) Chloroform
(C) Hydrogen fluoride (D) Freon
6. The most efficient capture of air borne particulates occurs in
(A) Ventury scrubber (B) Gravitational settling chamber
(C) Electrostatic precipitator (D) Cyclone
7. Which of the following parameters reflect the capacity of a water-body to sustain life?
(A) Hardness (B) Acidity
(C) Alkalinity (D) Dissolved oxygen
8. Which gas is commonly used for disinfection in municipal water supply?
(A) Bromine (B) Hydrogen (C) Chlorine (D) Oxygen
9. Binominal nomenclature of scientific names was introduced by
(A) Linnaeus (B) Cassias (C) Claudias (D) Darwin
10. Environment day is celebrated each year on
(A) 5th December (B) 5th June (C) 23rd February (D) 20th July

11. An element has an atomic wt. 23 and atomic number 11. What will be the number of neutrons present in it?
- (A) 12 (B) 23 (C) 11 (D) 34
12. In which reactor the concentration of reactants is the same at all points in the reactor?
- (A) Fluidized bed reactor (B) CSTR
(C) Plug-flow reactor (D) Expanded bed reactor
13. A water sample which does not form lather with soap immediately, is defined as
- (A) hard (B) soft (C) acidic (D) alkaline
14. An _____ is used to denote the end-point of a titration
- (A) catalyst (B) indicator (C) reagent (D) acid
15. Composting is essentially a
- (A) Aerobic process (B) Anaerobic process
(C) Chemical process (D) Toxic process
16. The flame photometer is best suited for the determination of
- (A) Lead (B) Zinc (C) Sodium (D) Iron
17. Which of these metals contribute to the hardness of a water sample?
- (A) Phosphorous (B) Sodium (C) Potassium (D) Calcium
18. Deuterium is an isotope of
- (A) hydrogen (B) oxygen (C) radium (D) carbon
19. Which of the following contribute to air pollution in big cities?
- (A) Vehicular emissions (B) Industries
(C) Burning of waste materials (D) All of the above
20. A diagram depicting wind speeds and directions at a point is called
- (A) Wind petel (B) Wind flower (C) Wind rose (D) Wind shield

21. During composting nitrogen-to-carbon ratio gradually increases because
- (A) A part of the Carbon is lost as bacterial respiration
 - (B) Nitrogen is sucked in form atmosphere by the bacteria
 - (C) There is photosynthesis
 - (D) There is anaerobic fermentation
22. A _____ is used to increase the speed of a chemical reaction
- (A) reagent
 - (B) catalyst
 - (C) inhibitor
 - (D) indicator
23. Name the substance commonly found in antiseptic preparations
- (A) iodine
 - (B) chlorine
 - (C) sodium
 - (D) potassium
24. The probability of a cricket captain winning the toss is
- (A) 25%
 - (B) 50%
 - (C) 75%
 - (D) 100%
25. What is meant by the term 'hygroscopic'?
- (A) absorbs moisture
 - (B) absorbs hydrogen
 - (C) gives off moisture
 - (D) gives off hydrogen
26. Presence of _____ in polluted air accelerates the corrosion of metals
- (A) CO_2
 - (B) SO_2
 - (C) CO
 - (D) NH_4
27. Natural gas consists chiefly of
- (A) methane
 - (B) arsene
 - (C) stilbene
 - (D) astetine
28. Which of the following is a 'green house gas'?
- (A) O_2
 - (B) N_2
 - (C) CO_2
 - (D) H_2
29. When oxygen in the tissue becomes inadequate, the condition is called
- (A) dyspnoea
 - (B) asphyxia
 - (C) hypoxia
 - (D) anoxia
30. The differential coefficient of the function $f(x) = x^3$ is
- (A) $3x$
 - (B) $2x^3$
 - (C) $3x^2$
 - (D) X^4

31. Alumina is
- (A) Aluminium sulphate (B) Aluminium sulphite
(C) Aluminium nitrate (D) Aluminium oxide
32. "Ozone hole" is caused by
- (A) Oxygen (B) Chlorine
(C) Chlorofluorocarbons (D) Nitrogen
33. Name a simple method for removing temporary hardness of a water sample
- (A) Cooling (B) Boiling (C) Filtration (D) Evaporation
34. Among the following which one is not a source of biomass energy
- (A) Municipal waste (B) Coal
(C) Biogas (D) Agricultural residues
35. Radioisotopes are used in the treatment of
- (A) Cancer (B) Jaundice (C) Night blindness (D) Typhoid
36. Which one of the following gases is implicated with greenhouse effect?
- (A) Chlorine (B) Fluorine (C) Ozone (D) Methane
37. When water is electrolyzed, the products are
- (A) H_2 and O_2 (B) O_2 and N_2 (C) NH_3 and H_2 (D) NO_2 and H_2
38. Incineration of municipal solid waste releases which toxic material of most serious concern
- (A) methyl mercury (B) dioxins (C) heptachlor (D) all the above
39. Name the gas present in aerated drinks like soda water
- (A) O_2 (B) H_2 (C) CO_2 (D) N_2
40. Which among the following is a 'primary standard'?
- (A) HCl (B) H_2SO_4 (C) Na_2CO_3 (D) NaOH

41. Bacteria in milk are killed by the process called
 (A) fermentation (B) freezing
 (C) preservation (D) pasteurization
42. Which of the following is not a greenhouse gas?
 (A) Carbon dioxide (B) Water vapor (C) Methane (D) Hydrogen
43. The most favourable habitat of a plant is called
 (A) Ecological system (B) Ecological habitat
 (C) Ecological type (D) Ecological niche
44. Who among the following was associated with 'chipko movement'?
 (A) Medha Patkar (B) Sunita Narayan
 (C) Sunderlal Bahuguna (D) Arundhati Roy
45. Which of the following 'pollutant' can cause eutrophication in a water body?
 (A) Mercury (B) Copper (C) Iron (D) Phosphorous
46. BOD level of a water sample is indicative of
 (A) Concentration of pathogens (B) Concentration of organic matter
 (C) Concentration of trace elements (D) Concentration of facultative bacteria
47. An 'ammeter' is used for measurement of
 (A) current (B) voltage (C) power (D) noise
48. Name the metal does not which exhibit radioactivity
 (A) Rubidium (B) Rhodium
 (C) Tantalum (D) None of the above
49. LPG consists of mostly
 (A) methane + propane (B) propane + acetylene
 (C) acetylene + butane (D) butane + propane
50. 'Vermicomposting' employs _____ for bio-degradation of waste
 (A) Insects (B) Annelids (C) Amphibians (D) Pisces

51. Which of these metals contribute to toxicity in the aquatic environment?
(A) Na (B) Ca (C) Hg (D) K
52. Insulin is produced by
(A) liver (B) stomach (C) pancreas (D) gall bladder
53. Trees planted on the top of landfill sites often die even when there is thick layer of soil on top, the reason for this is
(A) toxicity of leachate
(B) heavy metal ions coming to the top of landfill
(C) toxicity of gases coming to the top
(D) all the above
54. Penicillin was discovered by
(A) Pasteur (B) Edward Jenner
(C) Fleming (D) Ehrlich
55. The factor most responsible for soil erosion is
(A) Wind (B) Deforestation (C) Overgrazing (D) Rain
56. A luxmeter is used for measurement of
(A) cleanliness (B) sound (C) sunlight (D) power
57. Which one among the following is not a method of air pollution control at source?
(A) Raw materials changes (B) Scrubbing of flue gases
(C) Change in process (D) Modification in equipments
58. When B.O.D of a water-body is high, how does it affect its D.O.?
(A) D.O. increases (B) D.O. decreases
(C) D.O. remains the same (D) No relationship
59. High volume sampler is used to measure
(A) Particles in air (B) Pollutants in water
(C) Both (D) None

60. The presence of pesticides in drinking water and colas was brought to public attention by
- (A) Sunita Narayan (B) Amartya Sen
(C) Sir Vidhyadhar Naipaul (D) Vandana Shiva
61. The place or physical space occupied by an organism in an ecosystem is called
- (A) Niche (B) Habit (C) Home (D) All the above
62. The ozone layer in the atmosphere is essential as
- (A) it blocks sun-light (B) it blocks the harmful UV radiation
(C) it increases the oxygen supply (D) it reduces microbes
63. When the concentration of ionized substances in a water sample increases, its specific conductance
- (A) Increases (B) Decreases
(C) Remains constant (D) No specific relation
64. Aqua regia is a mixture of 1 volume part of _____ and 3 volume parts of _____
- (A) hydrochloric acid, nitric acid (B) hydrochloric acid, sulphuric acid
(C) nitric acid, hydrochloric acid (D) sulphuric acid, hydrochloric acid
65. Sediments are mostly deposited by
- (A) Landslides (B) Rivers (C) Glaciers (D) Sea waves
66. 'Acid rain' is caused by the presence in air of high concentration of
- (A) Sulphur oxides (B) Dust particles (C) CO (D) CO₂
67. Richter scale measures
- (A) wind intensity (B) earthquake intensity
(C) wave intensity (D) tide intensity
68. PCR refers to
- (A) Polymerase chain reaction (B) Pollution control reactions
(C) Polymerized chain reactions (D) None of the above

69. High volume sampler is used in
- (A) Ambient air quality monitoring (B) Water quality monitoring
(C) Soil testing (D) Effluent analysis
70. The presence of excess fluoride in ground water leads to
- (A) cataract (B) skeletal deformity
(C) dementia (D) arthritis
71. The dose or number of organisms that will kill 50% of an experimental group of hosts within a specified time period is
- (A) LC 50 (B) LD 50 (C) ID 50 (D) All the above
72. ATP is
- (A) adenine triphosphate (B) adenosine triphosphate
(C) arginine triphosphate (D) aldehyde triphosphate
73. The instrument used for assessing ionic strength of a water sample is known as
- (A) Conductivity meter (B) pH meter
(C) Turbidimeter (D) Photometer
74. Who among the following was associated, with 'Narmada Bachao Andolan'?
- (A) Sunderlal Bahuguna (B) Medha Patkar
(C) Sunita Narayan (D) Salman Rushdie
75. Reduction of nitrate and nitrite to gaseous products such as nitrous oxide and molecular nitrogen is referred to as
- (A) Nitrification (B) Denitrification
(C) Ammonification (D) Sublimation
76. The biological oxygen demand (BOD) is usually estimated in how many days
- (A) 2 (B) 3 (C) 5 (D) 4
77. Which one among the following is generally the best way to extract energy from biomass having a high moisture content?
- (A) Combustion (B) Gasification
(C) Pyrolysis (D) Anaerobic digestion

78. Goitre is caused due to the deficiency of
(A) Calcium (B) Magnesium (C) Iodine (D) Iron
79. Microscope's capability to deliver a visible image with clear details is called
(A) magnification (B) magnitude (C) focal length (D) resolution
80. The causative agent for malaria is
(A) Male mosquito (B) Dead mosquito
(C) Female mosquito (D) None
81. Brown ring test is done to detect the presence of
(A) nitrite (B) sulphate (C) nitrate (D) chloride
82. Ozone is used in water purification systems for
(A) sedimentation (B) disinfection
(C) irradiation (D) removal of impurities
83. The pH of a water sample is 2. This indicates that the sample is
(A) Acidic (B) Basic
(C) Neutral (D) None of the above
84. Which is a unit used for measuring sound?
(A) Hertz (B) Ohms (C) Siemens (D) Decibel
85. If sewage is released into a lake, what is the effect on its B.O.D?
(A) Increases (B) Decreases
(C) No change (D) None of the above
86. An instrument used for sterilization of culture media is
(A) incubator (B) autoclave
(C) hot air oven (D) centrifuge

87. _____ is a carcinogenic environment pollutant
- (A) CO_2 (B) H_2
(C) N_2 (D) Tobacco smoke
88. Which of the following is a free-floating aquatic weed?
- (A) *Hydrilla verticillata* (B) *Macrocystis periphyra*
(C) *Salvinia molesta* (D) *Ipomea aquatic*
89. Examples of free floating hydrophytes are (i) *Eichhornia* (ii) *Salvinia* (iii) *Pistia* (iv) *Nymphaea*
- (A) i and ii (B) i and iii (C) ii and iv (D) all
90. If $\log x = S$, then $2S$ is equal to
- (A) $\log x^2$ (B) $\log x^3$ (C) $\log (2+x)$ (D) $\log (2x)$
91. Organic substances that are essential to life but not required as energy sources
- (A) proteins (B) fats
(C) carbohydrates (D) vitamins
92. Which of the following is a heavy metal?
- (A) Magnesium (B) Potassium (C) Zinc (D) Selenium
93. Which is a consequence of global warming?
- (A) rise in sea-level (B) acid rain
(C) ozone hole (D) tsunami
94. Deficiency of vitamin C causes
- (A) rickets (B) scurvy (C) goiter (D) diabetes

95. NEERI stands for
- (A) National Environmental Engineering Research Institute
 - (B) National Environment & Ecological Research Institute
 - (C) National Ecological & Environmental Research Institute
 - (D) National Environmental Education Research Institute
96. In the field of environmental analysis, AAS is the acronym for
- (A) Atomic absorption spectrometry
 - (B) Advance atomization system
 - (C) Advanced analytical spectroscopy
 - (D) Alternative analytical solutions
97. Turbidity of water at different depths is assessed by a
- (A) Seechhi disc
 - (B) Turbid disc
 - (C) Lut photometer
 - (D) All the above
98. Anemia is caused by the fall in _____ content of the blood
- (A) blood plasma
 - (B) iron
 - (C) insulin
 - (D) blood sugar
99. Bile is secreted by
- (A) Liver
 - (B) Lungs
 - (C) Pancreas
 - (D) Intestine
100. Which of these is a secondary air pollutant?
- (A) Nitrogen
 - (B) Sulphur dioxide
 - (C) Ozone
 - (D) Hydrogen