ENTRANCE EXAMINATION FOR ADMISSION, MAY 2010.

M.Phil. / Ph.D. (ENVIRONMENTAL TECHNOLOGY)

COURSE CODE : 248/112

Register Number :

Signature of the Invigilator
(_with date_)

COURSE CODE : 248/112

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 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 BOD of a water sample is 200 mg l^{-1}. Its COD is likely to be

   (A) 160   (B) 180   (C) 190   (D) 240

2. The most efficient capture of air borne particulates occurs in

   (A) Ventury scrubber   (B) Gravitational settling chamber

   (C) Electrostatic precipitator   (D) Cyclone

3. Binominal nomenclature of scientific names was introduced by

   (A) Linnaeus   (B) Cassias   (C) Claudias   (D) Darwin

4. 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

5. Composting is essentially a

   (A) Aerobic process   (B) Anaerobic process

   (C) Chemical process   (D) Toxic process

6. Deuterium is an isotope of

   (A) hydrogen   (B) oxygen   (C) radium   (D) carbon

7. 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

8. The probability of a cricket captain winning the toss is

   (A) 25%   (B) 50%   (C) 75%   (D) 100%

9. Natural gas consists chiefly of

   (A) methane   (B) arsene   (C) stilbene   (D) astetine

10. The differential coefficient of the function $f(x) = x^3$ is

    (A) $3x$ (B) $2x^3$ (C) $3x^2$ (D) X4

11. Which of the following values of HRT represents the fastest reactor

   (A) 4 hour   (B) 3 hour   (C) 2 hour   (D) 1 hour

12. Lotic water bodies are those

   (A) where water is flowing   (B) which dry periodically

   (C) where water is stagnant   (D) none of the above

13. Hardness in water is due to

   (A) monovalent anions   (B) monovalent cations

   (C) divalent anions   (D) divalent cations

14. Which category of wastewater doesn't require seeding during a BOD test

   (A) Distillery spentwash   (B) Dyeing unit effluent

   (C) Domestic sewage   (D) Pulp and paper mill effluent

15. In the atmosphere, ozone is found primarily in the

   (A) Troposphere   (B) Stratosphere

   (C) Mesosphere   (D) Thermosphere

16. The electrical conductivity of a water sample is indicative of its

   (A) suspended solids   (B) dissolved solids

   (C) biological solids   (D) volatile solids

17. Adsorption is a

   (A) Purely surface phenomena   (B) Purely internal phenomena

   (C) Purely biological phenomena   (D) Purely arbiterary phenomena

18. When the temperature of a water-body increases, the dissolved oxygen ——————

   (A) increases   (B) decreases

   (C) remains the same   (D) none of the above

19. Nitrification is a process in which

   (A) Ammonia is converted to Nitrate

   (B) Ammonia is converted into nitrogen

   (C) Nitrogen is converted into Ammonia

   (D) Nitrate is converted into Ammonia

20. The ideal reactor to which a trickling filter most closely approximates is:

(A) A batch reactor

(B) A plug flow reactor

(C) A CSTR

(D) A fluidized bed reactor

21. Which of these is not a natural pollutant in the air?

(A) Sulphur dioxide

(B) Dioxane

(C) Nitrogen oxide

(D) Particulate matter

22. Which one is not a coagulant?

(A) $FeCl_3$

(B) $Fe_2(SO_4)_3$

(C) Na_2SO_4

(D) $Al_2(SO_4)_3.18H_2O$

23. Which of the following is not used for filtering municipal water supplies?

(A) Pressure filters

(B) Rapid gravity filters

(C) Slow sand filters

(D) Membrane filters

24. The Settling velocity of a pollutant particle in a liquid medium will depend on

(A) Its chemical composition

(B) Its density

(C) Its colour

(D) None of the above

25. Among the following devices which one is the most suitable for controlling emission of particulates having diameter less than 1 μ?

(A) Cyclone

(B) Venturi Scrubber

(C) Bag filter

(D) Electrostatic precipitator

26. Which of the following is not a part of physical environment?

(A) Climate

(B) Energy

(C) Human beings

(D) Housing

27. The indicator used in the determination of hardness of a water sample

(A) Phenolphthalein

(B) Methyl orange

(C) Eriochrome Black T

(D) Starch

28. Which EIA technique is not dependent on opinion gathering?

(A) Delphi   (B) Overlay (McHarg's)

(C) Matrix   (D) Interviews

29. Denitrification is a process in which

(A) Nitrite is converted into Nitrogen gas

(B) Nitrate is converted into Ammonia gas

(C) Nitrate is converted into N_2O and NO gases

(D) Ammonia is converted into N_2 gas

30. The titrimetric determination of hardness belongs to which class?

(A) Acid-alkali   (B) Oxidation-reduction

(C) Complexometeric   (D) None of the above

31. For a city dweller the major source of lead in body is

(A) respiratory air   (B) drinking water

(C) absorption by skin   (D) food

32. In spectrophotomoter the detector is a

(A) Thermoelectric couple   (B) Photocell

(C) Galyanometer   (D) Ammeter

33. Which of these is a by-product of anaerobic digestion?

(A) Oxygen   (B) Hydrogen   (C) Methane   (D) Nitrogen

34. Blast furnaces are used in producing which metal from ore?

(A) Aluminum   (B) Copper   (C) Iron   (D) Zinc

35. Aerosols are

(A) Small solid particles suspended in air

(B) Small liquid particles suspended in air

(C) Smoke particles floating in the atmosphere

(D) Small liquid or solid particles that remain suspended in the air

36. The substance responsible for the 'Minamata' disaster was

    (A) Copper   (B) Chromium   (C) Mercury   (D) Zinc

37. What is the disadvantage In using electrostatic precipitators for air pollution control?

    (A) small particles can't be removed   (B) high pressure drop

    (C) problem in handling hot gases   (D) high initial cost

38. For controlling S O_x emissions through stacks which of the following equipments is not used

    (A) Venturi Scrubber   (B) Cyclone Scrubber

    (C) Electrostatic Precipitator   (D) Mechanical Scrubber

39. Hollow cathode lamps are used in

    (A) UV-visible speotrophotometers

    (B) NMR spectrometers

    (C) Gas chromatograph

    (D) Atomic Absorption Spectrophotmeter

40. During settling in a sedimentation tank which factor has a positive effect on it?

    (A) deep settling tank   (B) flocculation of particles

    (C) decrease in detention period   (D) high velocity f water in tank

41. In an ideal plug flow reactor there should be complete mixing in the

    (A) axial direction   (B) transverse direction

    (C) reverse direction   (D) horizontal direction

42. Flame ionisation detectors (FID) are used in

    (A) Atomic absorption spectrometers   (B) NMR spectrometers

    (C) UV-visible spectrophotometers   (D) Gas liquid chromatographs

43. Cost-benefit analysis of a project evaluates the

    (A) net profit or loss of the project   (B) net costs of the project

    (C) total benefits of the project   (D) social cost of the project

44. Reuse is

   (A) recycling of resources for gaining energy and materials

   (B) using a product again & again in its original form

   (C) extracting resources from waste for secondary purposes

   (D) converting waste materials into raw material for manufacturing

45. Which of the following parameters indicates the organic pollution of a waste water sample?

   (A) pH   (B) Turbidity   (C) Hardness   (D) COD

46. Which among the following is not a suspended cell aerobic treatment process?

   (A) Activated sludge process   (B) Oxidation pond

   (C) Trickling filter   (D) Aerated lagoon

47. Which of the following is a 'toxic" gas?

   (A) O_2 (B) H_2 (C) N_2 (D) Cl_2

48. What is the normality of a solution containing 8 gm of NaOH in 100 ml?

   (A) 1 N   (B) 2 N   (C) 0.1 N   (D) 0.2 N

49. Among the following which is least damaging to environment?

   (A) Nuclear power   (B) Hydroelectricity

   (C) Electricity from coal   (D) Hydrogen energy

50. Which greenhouse gas is released by lakes and water reservoirs?

   (A) CO   (B) CO_2 (C) CH_4 (D) CFC's

51. Mangroves are situated in

   (A) costal area   (B) ponds and lakes

   (C) forests in arid areas   (D) all of the above

52. Acute lead poisoning is also known as

   (A) Itai-Itai   (B) Plumbism

   (C) Bysinnosis   (D) Neuralgia

53. The deadly pollutant dioxan is a

    (A) Organic compound   (B) Heavy metal

    (C) Virus   (D) Bacteria

54. At present world's largest source of energy is

    (A) coal   (B) oil

    (C) natural gas   (D) hydropower

55. Atomic absorption spectroscopy is used to analyse

    (A) heavy elements   (B) dissolved organic compounds

    (C) dissolved gases   (D) particle size

56. For composting the maximum moisture contant of the mixture should be

    (A) 40%   (B) 65%   (C) 30%   (D) 35%

57. Two isotopes of the same element have the same

    (A) atomic number   (B) atomic weight

    (C) number of neutrons   (D) physical properties

58. A pure or nearly pure water contains a BOD of approximately

    (A) 30 mg/L   (B) 20-30 mg/ L

    (C) 0-3 mg/L   (D) 10-12 mg/L

59. The use of living organisms (primarily micro organisms) to degrade environmental pollutants or to prevent pollution through waste treatment is known as

    (A) Biotechnology   (B) Bioremediation

    (C) Biodegradation   (D) All the above

60. What is the pH of 0.1 M HCl solution?

    (A) 1   (B) 2   (C) 3   (D) 4

61. The absence of which of the following will make life impossible four fish in a water body

    (A) Hardness   (B) Acidity

    (C) Alkalinity   (D) Dissolved oxygen

62. The most widespread source of air pollution is

   (A) Thermal power plants   (B) Industries

   (C) Transportation   (D) Tourism

63. How much of NaOH should be weighed out in order to make a 1 M solution of NaOH

   (A) 40 gm   (B) 4 gm   (C) 400 gm   (D) 0.4 gm

64. During composting maximum degradation and stabilization of organic matter occurs during which stage?

   (A) mesophilic   (B) thermophilic

   (C) starting   (D) cooling

65. In automobile exhaust, lead is emitted mostly as

   (A) tetra alkyl lead   (B) metallic lead

   (C) lead sulphide   (D) lead bromochloride

66. Estimation of chloride in water samples by Mohr's method is essentially a

   (A) Compleximetric titration   (B) Precipitation titration

   (C) Redox titration   (D) Acid-base titration

67. Rotating biological contactors are used for

   (A) reducing BOD of wastewaters   (B) biofiltration of wastewaters

   (C) removing colour of textile effluents   (D) removing pathogens from sewage

68. Which one is not a major source of soil pollution?

   (A) Automobile exhaust   (B) Night soil

   (C) Phytoremediation   (D) Oxidation Ponds

69. The material used for making cuvettes for use in UV spectroptometers

   (A) Glass   (B) Polythene

   (C) Quartz   (D) Fibreglass

70. Effluent from modern tanneries contains which toxic heavy metal?

   (A) Ni   (B) Zn   (C) Cr   (D) Pb

71. Ozone hole is caused by
    (A) DDT   (B) PET   (C) CDC   (D) CFC

72. The distribution of animal life in biosphere is called as
    (A) Biogeography   (B) Zoogeography
    (C) Zoology   (D) Biography

73. Which of the following is an inert gas?
    (A) H_2 (B) O_2 (C) Cl_2 (D) He

74. Among the following cleanest fuel is
    (A) Coke   (B) Gasoline/Petrol
    (C) Natural Gas   (D) Diesel

75. Methanogenic bacteria are
    (A) Facultative aerobes   (B) Strict anaerobes
    (C) Strict aerobes   (D) Facultative anaerobes

76. During summers the coldest zone of a lake is
    (A) thermooline   (B) epilimnon
    (C) hypolimnon   (D) mesolimnon

77. An element has atomic number 6 & atomic weight 14. The number of protons present in it is
    (A) 6   (B) 12   (C) 14   (D) 8

78. Mineral water bottles are made up of which compound
    (A) Poly vinyl chloride   (B) Polyethylene teraphthalate
    (C) Polyethylene triphthalate   (D) Polyethytene

79. Which among the following is most expected in 'acid rain'?
    (A) H_2SO_4 (B) HF   (C) Acetic acid   (D) Benzoic acid

80. Among the following which one is the best method for treating sewage sludge?
    (A) Land disposal   (B) Anaerobic digestion
    (C) Incineration   (D) Pisciculture

81. Bhopal gas tragedy was caused by

    (A) CFC   (B) MIC   (C) LIC   (D) PVC

82. At a traffic junction which of the following pollutants is likely to be at the highest concentration

    (A) NO_x (B) SO_x (C) CO   (D) Cl_2

83. Bio-gas consists of main

    (A) O_2 & N_2 (B) H_2 & O_2 (C) Cl_2 & H_2 (D) CH_4 & CO_2

84. 'Decibel' is the unit of measurement of

    (A) Pressure   (B) Density   (C) Sound   (D) Current

85. Ferric salts impart ——————— colour to water

    (A) green   (B) blue   (C) yellow   (D) reddish

86. ——————— is used to prevent knocking in internal combustion engines

    (A) lead oxide   (B) particulate lead

    (C) tetra ethyl lead   (D) lead monoxide

87. UASB is based on

    (A) aerobic treatment of waste water   (B) air pollution monitoring method

    (C) anaerobic treatment of waste water   (D) noise pollution controlling device

88. Anaerobic processes of wastewater treatment are most suitable for

    (A) low BOD wastewaters   (B) high BOD wastewaters

    (C) toxic waste waters   (D) electroplating effluents

89. Aerobic bacteria can survive only

    (A) in the presence of O_2 (B) in the presence of N_2

    (C) in the presence of CO_2 (D) none of the above

90. The water which is held by the surface forces of the soil particles is termed as

    (A) Combined water   (B) Hygroscope water

    (C) Capillary water   (D) All the above

91. The presence of pesticides in drinking water and colas was brought to public attention by
    (A) Sunita Narayan
    (B) Amartya Sen
    (C) Sir Vidyadhar Naipaul
    (D) Vandana Shiva

92. 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

93. Penicillin was discovered by
    (A) Pasteur
    (B) Edward Jenner
    (C) Fleming
    (D) Ehrlich

94. Which of these metals contribute to toxicity in the aquatic environment?
    (A) Na
    (B) Ca
    (C) Hg
    (D) K

95. Name the metal does not which exhibit radioactivity
    (A) Rubedium
    (B) Rhodium
    (C) Tantalum
    (D) None of the above

96. Which of the following 'pollutant' can cause eutrophication in a water body?
    (A) Mercury
    (B) Copper
    (C) Iron
    (D) Phosphorous

97. Which of the following is not a greenhouse gas?
    (A) Carbon dioxide
    (B) Water vapor
    (C) Methane
    (D) Hydrogen

98. Name the gas present in aerated drinks like soda water
    (A) O_2
    (B) H_2
    (C) CO_2
    (D) N_2

99. Which one of the following gases in implicated with greenhouse effect?
    (A) Chlorine
    (B) Fluorine
    (C) Ozone
    (D) Methane

100. Name a simple method for removing temporary hardness of a water sample
    (A) Cooling
    (B) Bailing
    (C) Filtration
    (D) Evaporation