ENTRANCE EXAMINATION FOR ADMISSION, MAY 2011.
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. Screening is a part of the following stage of wastewater treatment
   (A) Primary treatment       (B) Secondary treatment
   (C) Tertiary treatment      (D) Reverse treatment

2. Reaction vessels that are subjected to identical procedures as the samples in a given batch, but have no sample added are called
   (A) Duplicates             (B) Batch mode
   (C) Blanks                 (D) Borosil vessels

3. Newton is the SI unit of
   (A) pressure               (B) force
   (C) work                   (D) energy

4. The units of radioactivity are (i) Curie (ii) Rutherford (iii) Roentgen (iv) Joule
   (A) (i) (ii), (iii) only   (B) (i) & (iii) only
   (C) (ii) & (iv) only       (D) all

5. Plastic is considered an environmental hazard because it is
   (A) durable                (B) flexible
   (C) transparent            (D) non-biodegradable

6. Frequent formation of algal blooms in a lake indicates
   (A) Lack of herbivores     (B) Lack of carnivores
   (C) Nutrient deficiency    (D) Nutrient enrichment

7. "Silent Spring" is a famous name in the history of environmental awareness. It Represents
   (A) A song                  (B) A painting
   (C) A person                (D) A book

8. Of the following, which category of animals face highest possibility of extinction?
   (A) Threatened             (B) Endangered
   (C) Vulnerable             (D) Rare

9. The greatest risk to humans due to ozone hole is
   (A) AIDS                    (B) Infertility
   (C) Deformity               (D) Skin cancer
10. Which of the following atoms form cations: (i) K  (ii) Ca  (iii) Na  (iv) La
   (A)  (i) (ii) & (iii) only  (B)  (ii) & (iii) only
   (C)  All  (D)  (i) & (ii) only

11. Photochemical smog formation in urban area is mainly due to the presence in the atmosphere of
   (A) Ozone, PAN and Nitrogen dioxide
   (B) Fog and smoke
   (C) Particulates and fog
   (D) Winter climate and high humidity

12. Study of life of past ages is
   (A) Pedology  (B) Genealogy
   (C) Paleontology  (D) Ethnology

13. During ambient air quality monitoring, normally the flow-rate through the high volume air sampler is maintained at
   (A) 1.7m$^3$/min  (B) 6.3m$^3$/min
   (C) 17m$^3$/min  (D) 20.2m$^3$/min

14. Which one is a proven carcinogen?
   (A) Lignin  (B) Methanol
   (C) Vinyl chloride  (D) Acetic acid

15. A blood protein present in the plasma involved in clotting.
   (A) Plasminogen  (B) Glycogen
   (C) Fibrinogen  (D) Elastogen

16. Symbiotic nitrogen fixation is undertaken by
   (A) Usnea  (B) Rhizobium
   (C) Chlorella  (D) Volvox

17. Global warming will not cause
   (A) Rise in sea level  (B) Extinction of some species
   (C) Change in weather  (D) AIDS
18. Organism that absorb nutrients from dead tissues are called
   (A) bulk-feeders                  (B) phototrophs
   (C) saprophytes                  (D) chemotrophs

19. ‘Chipko Movement’ was started in which area?
   (A) Narmada valley                (B) Rajasthan desert
   (C) Western ghats jungles         (D) Garhwal Himalayas

20. Carnivorous plants fulfill the requirement of which element by carnivory?
   (A) S                                (B) N
   (C) B                                (D) P

21. In India the most commonly used method for sewage treatment is
   (A) Oxidation ponds                  (B) Trickling filters
   (C) Rotating biological contractor   (D) Activated sludge process

22. Compounds that have the same molecular formula but different structural formulae
    are called
   (A) polymers                        (B) monomers
   (C) isomers                         (D) isotopes

23. The ambient air is stable when the ambient lapse rate is
   (A) Subadiabtic                     (B) Superadiabatic
   (C) Neutrally stable                (D) Hyperadiabatic

24. The sum total of DNA that a cell contain is the
   (A) Gene                           (B) Genome
   (C) All                            (D) Chromosome

25. The science of improving the human race by improving environment is termed as
   (A) Euthenics                      (B) Eugenics
   (C) Environmental biotechnology   (D) None

26. UV radiation can cause
   (A) Low Bp                         (B) Respiratory illness
   (C) Skin cancer                    (D) Arthritis
27. Limestone is
   (A) Mg \( \text{SO}_4 \)  
   (B) Ca \( \text{SO}_4 \)
   (C) Na\( _2 \text{CO}_3 \)  
   (D) Ca \( \text{CO}_3 \)

28. Which of the following is the commonly used indicator for the presence of pathogens in water?
   (A) algae  
   (B) coliforms
   (C) protozoa  
   (D) amoeba

29. Which of these is a ‘primary air pollutant’?
   (A) Oxygen  
   (B) Hydrogen
   (C) Nitrogen  
   (D) Sulphur dioxide

30. Which one among the following is the most common indoor air pollutant in India?
   (A) Ozone  
   (B) Radon
   (C) Formaldehyde  
   (D) CO

31. Plants that grow on saline soils are called
   (A) xerophytes  
   (B) hydrophytes
   (C) psammophytes  
   (D) halophytes

32. ‘Survival of the fittest’ was put forth by
   (A) Lamarck  
   (B) Darwin
   (C) De vries  
   (D) Roentgen

33. Rapid mixing and dilution of pollutants in the atmosphere will occur when
   (A) actual air temperature drops slower then the adiabatic lapse rate
   (B) actual air temperature drops faster then the adiabatic lapse rate
   (C) actual air temperature drops at the rate of adiabatic lapse rate
   (D) an inversion layer covers the area.

34. Which of the following is not used for disinfection of water?
   (A) Chlorine  
   (B) Potassium permanganate
   (C) Sodium chloride  
   (D) Iodine

35. Gases react in the ratio of their volumes. This is called
   (A) Gay-Lussac’s law  
   (B) Charle’s law
   (C) Henery’s law  
   (D) Boyle’s law
36. Dissolved oxygen is removed from boiler feed water to prevent
   (A) Growth of microorganisms     (B) Corrosion of metal
   (C) Formation of bubbles         (D) Loss in boiler efficiency

37. A disease which may be prevented by wearing shoes is caused by:
   (A) tapeworm                     (B) scaly worm
   (C) trichina worm                (D) hookworm

38. The substance responsible for the 'Minimata' disaster was
   (A) Copper                       (B) Chromium
   (C) Mercury                      (D) Zinc

39. The prescribed Indian Standard method for estimating Nitrogen Oxides uses solution
   of which compound as absorbing reagent
   (A) Hydrogen Peroxide            (B) Sodium sulphate
   (C) Sulphurous acid              (D) Dichlorosulphitomercurate

40. In the field of pollution control ASP stands for
   (A) Active scale prevention      (B) Activated sludge process
   (C) Alternative sludge production (D) Ammonia stripping polarimetry

41. In the Ammonia stripping method of Nitrogen removal the pH of wastewater should
    be more than
   (A) 5                             (B) 7
   (C) 8                             (D) 10

42. The median of 1,2,3,4,5 is
    (A) 1                             (B) 2
    (C) 3                             (D) 4

43. __________ is used for measuring conductivity of a solution
   (A) Conductometer                 (B) Coulometer
   (C) Ammeter                       (D) Nanometer

44. Process in which a species slowly or rapidly becomes better suited to survive is
    (A) adoption                     (B) adaptation
    (C) variation                    (D) addiction

45. Fine bubble air diffusers are used in
    (A) Trickling filter             (B) Activated sludge process
    (C) Rotating biological contactor (D) Oxidation pond
46. Vehicular traffic introduces which of the following pollutant in the environment
   (A) E. Coli    (B) Ozone    (C) Lead    (D) Heptachlor

47. Peptide bonds are present in
   (A) amino acid    (B) glucose    (C) fatty acid    (D) lactic acid

48. Which of the following are examples of light microscope?
   (A) phase-contrast    (B) fluorescence
   (C) dark field    (D) all the above

49. Human beings have ———— homologous pairs of chromosomes
   (A) 23    (B) 46    (C) 43    (D) 26

50. Montreal protocol was signed for the control of
   (A) Mercury pollution    (B) Greenhouse effect
   (C) Ozone hole    (D) Great-lake pollution

51. Composting is essentially a
   (A) Aerobic process    (B) Anaerobic process
   (C) Chemical process    (D) Toxic process

52. In a relation between two individuals, the individual which receives benefit at the expense of other individual is called
   (A) host    (B) parasite    (C) predator    (D) prey

53. Measurement of pH is based on
   (A) Coulometry    (B) Cibductometry
   (C) Nephaleometry    (D) Potentiometry

54. 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

55. Name the gas which is used in fire extinguisher?
   (A) O₂    (B) N₂    (C) Cl₂    (D) CO₂
56. The metal sodium imparts which colour to a flame
   (A) orange  (B) golden yellow
   (C) blue  (D) green

57. Adsorption is a
   (A) Purely surface phenomena  (B) Purely internal phenomena
   (C) Purely biological phenomena  (D) Purely arbitrary phenomena

58. What is the pH of 0.001 M NaOH solution?
   (A) 3  (B) 2  (C) 11  (D) 8

59. Foreign proteins that set off a defense reaction in the host are known as
   (A) antigen  (B) antibody
   (C) interferon  (D) phagocytes

60. 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

61. The work of IPCC has its focus on:
   (A) Global warming  (B) Ozone hole
   (C) Acid rain  (D) Tsunami

62. The estimation of dissolved oxygen by the titrimetric method involves
   (A) Acid-base titration  (B) Precipitation
   (C) Iodimetric titration  (D) Compleximetric titration

63. 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

64. Amalgamation is a process for extracting metals from their ores by dissolving them in
   (A) sulphuric acid  (B) mercury
   (C) nitric acid  (D) hydrochloric acid

65. Over-exploitation of ground water resources in coastal areas leads to
   (A) Floods  (B) Earthquake
   (C) Tsunami  (D) Sea water intrusion

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66. The probability of a cricket captain winning the toss is
   (A) 25%  (B) 50%  (C) 75%  (D) 100%

67. A disease caused by the deficiency of vitamin D is
   (A) Beriberi  (B) Night blindness
   (C) Scurvy  (D) Rickets

68. The most commonly present metal in tannery effluents is
   (A) Mercury  (B) Calcium  (C) Chromium  (D) Arsenic

69. The electrical conductivity of a water sample is indicative of its
   (A) suspended solids  (B) dissolved solids
   (C) biological solids  (D) volatile solids

70. Which of the following is the most environment-friendly fabric?
   (A) Nylon  (B) Terelene  (C) Wool  (D) Polythene

71. Photosynthesis takes place in the epilimnion of the lakes because:
   (A) It is the zone of light penetration
   (B) It has the maximum nutrient availability
   (C) It has the largest number of herbivores
   (D) It has high population of carnivores

72. 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

73. High albedo means
   (A) high degree of reflection of sunlight
   (B) high degree of absorption of sunlight
   (C) high degree of polarization of sunlight
   (D) high degree of resolution of sunlight

74. Which vitamin is abundant in lemon?
   (A) Vitamin A  (B) Vitamin B  (C) Vitamin C  (D) Vitamin D

75. Which of the following values of HRT represents the fastest reactor?
   (A) 4 hour  (B) 3 hour  (C) 2 hour  (D) 1 hour
76. Anaerobic bacteria are so called because
   (A) They can't survive without free oxygen
   (B) They can't survive with free oxygen
   (C) They can't survive in cold climate
   (D) They can't react with water

77. The metal which is present in the pigment chlorophyll present in plants
   (A) Ni   (B) Zn   (C) Fe   (D) Mg

78. 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

79. An anemometer is used for measurement of
   (A) sound  (B) rain
   (C) current  (D) wind velocity

80. Which of the following is a product of anaerobic digestion of biomass?
   (A) HCL  (B) CH4  (C) N2  (D) O2

81. Gentrification is a process in which
   (A) Nitrite is converted into Nitrogen gas
   (B) Nitrate is converted into Ammonia gas
   (C) Nitrate is converted into N2O and NO gases
   (D) Ammonia is converted into N2 gas

82. Which of the following is a pollutant present in automobile exhaust fumes?
   (A) Ca  (B) Na  (C) Pb  (D) K

83. Microaerophiles are microbes that grow best when
   (A) Oxygen is present in low concentration  (B) Oxygen is absent
   (C) Anaerobic conditions  (D) All the above

84. Hardness in water is due to
   (A) monovalent anions  (B) monovalent cations
   (C) divalent anions  (D) divalent cations
85. Which equipment releases ozone gas?
   (A) Refrigerator
   (C) Photocopier
   (B) Gas stove
   (D) Microwave oven

86. “The fall of a sparrow” was written by
   (A) A.P.J. Abdul Kalam
   (C) Salim Ali
   (B) Zakir Hussain
   (D) Nafeesa Ali

87. Which of the following is not used for filtering municipal water supplies?
   (A) Pressure filters
   (C) Slow sand filters
   (B) Rapid gravity filters
   (D) Membrane filters

88. Phenol is less acidic than
   (A) ethanol
   (C) methanol
   (B) o-nitrophenol
   (D) p-methylphenol

89. Odour in a pulp and paper industry is mostly due to the presence of
   (A) Dioxins
   (C) Ammonia
   (B) Mercaptans
   (D) Sulphides

90. For a city dweller the major source of lead in body is
   (A) respiratory air
   (C) absorption by skin
   (B) drinking water
   (D) food

91. Which of the following is not a component of city-level municipal solid waste management in India?
   (A) collection
   (C) transportation
   (B) segregation
   (D) nitrification

92. A teratogenic pollutant is the one which causes:
   (A) Cancer
   (C) Colds
   (B) Mutation
   (D) Fever

93. 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
94. The December 2004 Tsunami was caused by
   (A) Global warming               (B) Ozone hole
   (C) Earthquake                   (D) Hurricane

95. Animal starch is stored in the liver in the form of
   (A) glycogen                    (B) glucose
   (C) sucrose                     (D) lactogen

96. 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

97. Cholera is caused by
   (A) Vibrio choleri                (B) Salmonella choleri
   (C) Cholera choleri               (D) Escherichia coli

98. The distance between celestial bodies is measured in which unit?
   (A) solar year                    (B) solar day
   (C) light year                    (D) light day

99. Which of the following is a “toxic” gas?
   (A) O₂                            (B) H₂
   (C) N₂                            (D) Cl₂

100. If \( x \) is the logarithm of \( a \) to the base \( b \), then it implies that
    (A) \( ax = b \)                    (B) \( bx = a \)
    (C) \( xa = b \)                    (D) \( ba = x \)