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| Seat No. | |
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M.Phil./Ph.D. Entrance Examination, September - 2019
ENVIRONMENTAL SCIENCE & ENGINEERING

Day and Date : Thursday, 19 - 09 - 2019
Time : 1.00 p.m. to 3.00 p.m.

Total Marks : 100

- Instructions :**
- 1) All questions are compulsory.
 - 2) Each question carries 2 marks.
 - 3) Answers should be marked in the given OMR answer sheet by darkening the appropriate option.
 - 4) Use black ball point pen only for marking the circle. Do not make any stray mark on the OMR Answer Sheet.
 - 5) Follow the instructions given on OMR Sheet.
 - 6) Rough work shall be done on the sheet provided at the end of question paper.
 - 7) Only non programmable calculators are allowed.

- 1) Gases which are generally evolved during aerobic decomposition of sewage are
 - A) $\text{CO}_2 + \text{NH}_3 + \text{H}_2\text{S}$
 - B) $\text{CO}_2 + \text{NH}_3 + \text{H}_2\text{S} + \text{CH}_4$
 - C) $\text{CO}_2 + \text{NH}_3 + \text{SO}_2$
 - D) $\text{CO}_2 + \text{NH}_3 + \text{SO}_2 + \text{CH}_4$

- 2) The amount of oxygen consumed by sewage from an oxidizing agent like potassium dichromate is termed as
 - A) B.O.D.
 - B) C.O.D.
 - C) Relative stability
 - D) None of these

- 3) The specific gravity of sewage is
 - A) Zero
 - B) Slightly less than 1
 - C) Equal to 1
 - D) Slightly greater than 1

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- 4) Most of the bacteria in sewage are
- A) Anaerobic B) Saprophytic
C) Parasitic D) Pathogenic
- 5) Standard 5 day BOD at 20 degree C, when compared to ultimate BOD is about
- A) 58% B) 68%
C) 98% D) None of these
- 6) For large sewers, the maximum distance between manholes should be
- A) 75m B) 150m
C) 200m D) 300m
- 7) In a rapid sand Filter, the filter head varies from
- A) 1 to 1.5m B) 1.5 to 2m
C) 2 to 4m D) 4 to 5m
- 8) The effective size of sand particles for Rapid sand filters varies from
- A) 0.30-0.35mm B) 0.35-0.5mm
C) 0.50-0.65mm D) 0.65-0.75mm
- 9) The most commonly used chemical for dechlorination of water is
- A) Sodium thiosulphate
B) Sodium sulphite
C) Potassium permanganate
D) All of these

- 10) Bleaching powder is
A) Slaked lime
B) Chlorides of lime
C) Hypo-chloride of lime
D) Hypo-chlorite of lime
- 11) An arrangement for back washing is provide in
A) Slow sand filter
B) Rapid sand filter
C) Sedimentation tank
D) All of these
- 12) Sphere shaped Bacteria are called
A) Spirilla
B) Bacilli
C) Cocci
D) Trichobacteria
- 13) Rate of filtration in slow sand filter ranges from
A) 10-100 litres/h/m²
B) 100-200 litres/h/m²
C) 200-400 litres/h/m²
D) 400-1000 litres/h/m²
- 14) Which of the following is not a coagulating agent
A) Ferric sulphate
B) Ferric chloride
C) Aluminum sulphate
D) Copper sulphate
- 15) In the process of screening, the screen should be inclines at an angle of
A) 10' to 20'
B) 30' to 40'
C) 45' to 60'
D) 70' to 85'

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- 16) The total count of bacteria per cubic centimeter for domestic purposes varies from
- A) 0-100
 - B) 100-150
 - C) 150-200
 - D) 200-250
- 17) The maximum permissible fluorine content in water for domestic supplies should be
- A) 0.15 ppm
 - B) 1.5 ppm
 - C) 150 ppm
 - D) 15 ppm
- 18) The commercial osmoscope is graduated with pO values from
- A) 0-5
 - B) 5-10
 - C) 10-15
 - D) 15-20
- 19) The Presence of _____ causes red colour in water.
- A) iron
 - B) manganese
 - C) sodium fluoride
 - D) calcium carbonate
- 20) The Process of Dechlorination is followed by
- A) Pre Chlorination
 - B) Post Chlorination
 - C) Super Chlorination
 - D) Double Chlorination
- 21) The presence of sodium chloride in water
- A) Causes bad taste
 - B) Softens the water
 - C) Increases hardness of water
 - D) Stops epidemic

- 22) Dissolved impurities consist of
- A) Fungi B) Chlorine
C) Bacteria D) Silt
- 23) In Orthotolodine test, safe residual for drinking water is indicated by
- A) Yellow colour B) Lemon Yellow colour
C) Green colour D) None of these
- 24) The layers such as lime stone and sand stone which do not allow the water to pass through them are known as
- A) Aquifers B) Acquiclude
C) Acuifuge D) None of these
- 25) The correct relationship between Total Organic Carbon (TOC), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) is given by
- A) $TOC > BOD > COD$
B) $TOC > COD > BOD$
C) $COD > BOD > TOC$
D) $BOD > COD > TOC$
- 26) Which of the set of activities best indicate the cyclic nature of action research strategy
- A) Reflect, Observe, Plan, Act
B) Observe, Act, Reflect, Plan
C) Act, Plan, Observe, Reflect
D) Plan, Act, Observe, Reflect

- 27) In which of the following arrangements a wider spectrum of ideas and issues may be made possible
- A) Research article
 - B) Workshop mode
 - C) Conference
 - D) Symposium
- 28) The First step of research is
- A) Identification of Problem
 - B) Searching a Problem
 - C) Selecting a Problem
 - D) Finding a Problem
- 29) The issue of research ethics may be considered pertinent at which stage of research
- A) At the stage of problem formulation and its definition
 - B) At the stage of defining the population of research
 - C) At the stage of data collection and interpretation
 - D) At the stage of reporting the findings
- 30) The depth of any research can be judged by
- A) Title of the research
 - B) Total expenditure on research
 - C) Duration of research
 - D) Objectives of research
- 31) Which of the following is an initial mandatory requirement for pursuing research?
- A) Developing a research design
 - B) Formulating a research question
 - C) Deciding about the data analysis procedure
 - D) Formulating a research hypothesis

- 32) A ratio represents the relation between
- A) Part and part
 - B) Part and whole
 - C) Whole and whole
 - D) All the above
- 33) Which of the following statements is not true in the context of participatory research?
- A) It recognizes knowledge as power
 - B) It emphasizes on people as experts
 - C) It is a collective process of enquiry
 - D) Its sole purpose is production of knowledge
- 34) To test Null Hypothesis, a researcher uses
- A) T test
 - B) ANOVA
 - C) X²
 - D) Factorial Analysis
- 35) Which of the following are the characteristics of a seminar
- a) It is form of academic instruction
 - b) It involves questioning, discussion and debates
 - c) It involves large group of individuals
 - d) It needs involvement of skilled persons.
- Select correct answer from the codes given below
- A) (b) and (c)
 - B) (b) and (d)
 - C) (c), (b) and (d)
 - D) (a), (b) and (d)

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- 36) A researcher is interested in studying the prospects of a particular political party in an urban area. What tool should he prefer for the study?
- A) Rating Scale
B) Interview
C) Questionnaire
D) Schedule
- 37) Ethical norms in research do not involve guidelines for
- A) Thesis Format
B) Copyright
C) Patenting policy
D) Data sharing policies
- 38) A definition that has a meaning that is deliberately assigned to some symbol is called
- A) Lexical
B) Persuasive
C) Stipulative
D) Precising
- 39) A cluster of propositions with a structure that exhibits some inference is called
- A) An inference
B) An argument
C) An expansion
D) A Valid argument
- 40) We use Factorial Analysis
- A) To know the relationship between two variables
B) To test the hypothesis
C) To know the difference between two variables
D) To know the difference among many variables

- 41) Research is
- A) Searching again and again
 - B) Finding solution to any problem
 - C) Working in a scientific way to search for truth of any problem
 - D) None of the above
- 42) Which one of the following is not a source of data
- A) Population data
 - B) GIS
 - C) Census
 - D) Administrative records
- 43) Research is considered not ethical if
- A) Tries to prove a particular point
 - B) Does not ensure privacy of the respondent
 - C) Does not investigate the data scientifically
 - D) Is not of very high standard
- 44) Newton gave three basic laws of motion
- A) Descriptive research
 - B) Sample survey
 - C) Fundamental Research
 - D) Applied research
- 45) Which of the following is susceptible to the issue of research ethics
- A) Inaccurate application of statistical technique
 - B) Faculty research design
 - C) Choice of sampling technique
 - D) Reporting of research findings

- 46) In qualitative research paradigm, which of the following features may be considered critical
- A) Data collection with standardized research tool
 - B) Sampling design with probability sample techniques
 - C) Data collection with bottom-up empirical evidences
 - D) Data gathering to take with top down systematic evidences
- 47) Which of the following is an initial mandatory requirement for pursuing research
- A) Developing a research design
 - B) Formulating a research question
 - C) Deciding about the data analysis procedure
 - D) Formulating a research hypothesis
- 48) Controlled group condition is applied in
- A) Survey research
 - B) Historical research
 - C) Experimental research
 - D) Descriptive research
- 49) Field Work based research is classified as
- A) Empirical
 - B) Historical
 - C) Experimental
 - D) Biographical
- 50) The format of the thesis is same as in
- A) Preparation of research paper
 - B) Writing of seminar presentation
 - C) A research dissertation
 - D) Presenting a workshop



Rough Work

Rough Work