

THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA, VADODARA

Ph. D. ENTRANCE TEST (PET) – 7th August 2022

Signature of Invigilator

Paper - II
Environmental Sciences
(22/30)

Roll.
No.

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Maximum Marks: 50

No. Of Printed Pages: 8

Instruction for the Candidate:

1. This paper consists of **FIFTY (50)** multiple choice type questions. Each Question carries **ONE (1)** mark.
2. There is no Negative Marking for Wrong Answer.
3. A separate OMR Answer Sheet has been provided to answer questions. Your answers will be evaluated based on your response in the OMR Sheet only. No credit will be given for any answering made in question booklet.
4. Defective question booklet or OMR if noticed may immediately replace by the concerned invigilator.
5. Write roll number, subject code, booklet type, category and other information correctly in the OMR Sheet else your OMR Sheet will not be evaluated by machine.
6. Select most appropriate answer to the question and darken appropriate oval on the OMR answer sheet, with black / blue ball pen only. **DO NOT USE PENCIL** for darkening. In case of over writing on any answer, the same will be treated as invalid. Each question has exactly one correct answer and has four alternative responses (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
Example: (A) (●) (C) (D) where (B) is correct response.
7. Rough Work is to be done in the end of this booklet.
8. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. Calculators, Log tables any other calculating devices, mobiles, slide rule, text manuals etc are **NOT** allowed in the examination hall. If any of above is seized from the candidates during examination time; he/ she will be immediately debarred from the examination and corresponding disciplinary action will be initiated by the Center Supervisor as deemed fit.
10. **DO NOT FOLD** or **TEAR** OMR Answer sheet as machine will not be able to recognize torn or folded OMR Answer sheet.
11. **You have to return the OMR Answer Sheet to the invigilator at the end of the examination compulsorily** and must not carry it with you outside the Examination Hall. You are however, allowed to carry original question booklet on conclusion of examination.

Paper - II
Environmental Sciences (22/30)

Note: This paper contains **FIFTY (50)** multiple-choice questions. Each Question carries **ONE (1)** mark.

- 01) The Pourbaix or eh-pH diagram depicts -----
A) Thermodynamic form of an element as a function of potential and pH
B) The least predominant form of an element under a given set of conditions
C) Only the oxidizing and not the reducing abilities of the major stable compounds of an element
D) Displays thermodynamically and kinetically preferred species
- 02) Using microbes to extract metals from mines and wastes is called
A) Biomining
B) Biosparging
C) Bioventing
D) Bioconcentration
- 03) The excess of which ion in drinking water can lead to blue baby syndrome?
A) Fluoride ion
B) Nitrate ion
C) Chromate ion
D) Phosphate ion
- 04) In West-Gaeke colorimetric procedure, the intensity of a red purple color proportional to concentration of SO₂ is measured photometrically. The red purple colored compound is -----
A) Sodium tetrachloromercurate complex
B) Dichlorosulphitomercurate complex
C) Pararosanilinemethyl sulphonic acid
D) Formaldehyde mercury complex
- 05) Which microwave band is most suitable for height measurement of trees by remote sensing?
A) X
B) C
C) S
D) L
- 06) The class of pesticides with very low biodegradability are
A) Organochlorines
B) Organophosphates
C) Pyrethroids
D) Triazines
- 07) A structure with hundreds of species non-linearly interlinked for their livelihood is called :
A) Guild
B) Food chain
C) Food web
D) Pyramid
- 08) The common dissolved carbon dioxide species present in sea water is -----
A) Carbonate species
B) Bicarbonate
C) Carbonic acid
D) Aqueous carbon dioxide
- 09) Which of the following air pollutants are NOT responsible for photochemical smog ?
A) Oxides of nitrogen
B) Ozone
C) Unburnt hydrocarbons
D) Sulphur dioxide
- 10) Zeroth law of thermodynamics establishes
A) Mechanical equilibrium
B) Chemical Equilibrium
C) Thermal equilibrium
D) Mechanical and chemical equilibrium
- 11) Head Space analysis is used in Gas Chromatography -----
A) To assay volatile components of a solution containing both volatile and non-volatile components
B) To assay non-volatile components of a solution containing both volatile and non-volatile components
C) To assay both volatile and non-volatile components of a solution containing both components
D) To assay volatile components of a solution containing volatile components only
- 12) Which of the following phenomena are due to low air surface pressure in the eastern Pacific?
A) La Nina
B) El Nino
C) Tornado
D) Typhoons
- 13) Which is the first mammal species recognized as extinct due to climate change?
A) The Dodo
B) Rabb's fringe-limbed tree frog
C) The humble bramble Cay Melomys
D) The rare female Columbia Basin Pygmy Rabbit
- 14) The Indian Biodiversity hotspot is at
A) Western Ghats
B) Aravali Hills
C) Pap Ghats
D) Red hills

- 15) In which of the following places, riparian forests are found?
 A) Along the banks of the rivers and other wetland
 B) The tarai region on the foothill of Himalayas
 C) On the foothills of eastern slopes of western ghats
 D) On the foothills of eastern slopes of eastern ghats
- 16) Which of the following act as a natural sink for carbon?
 A) Trees
 B) Trees and Oceans
 C) Oceans and soil
 D) Trees, Ocean and soil
- 17) The organism likely to be most similar to the first life form that evolved on the earth is :
 A) Blue - green algae
 B) Methane producing bacteria
 C) Protozoan
 D) Red algae
- 18) The theme 'Transforming our world : 2030 Agenda' pertains to :
 A) Protection of ozone layer
 B) Climate change - Action plans
 C) Sustainable development goals
 D) Millennium development goals
- 19) The descent of oceanic lithosphere into the mantle is the process of _____?
 A) Accretion
 B) Subduction
 C) Divergence Zone
 D) Contraction fault
- 20) In the rock cycle, what causes sedimentary rock to form?
 A) Red hot magma
 B) Heat and pressure
 C) Erosion
 D) Flood
- 21) Chemosynthesis involves CO₂ fixation using energy derived from -----
 A) Sunlight
 B) Infrared radiation
 C) UV-radiation
 D) Inorganic and Organic compounds
- 22) Which of the following biofuels is produced from acidification and distillation of woody crops ?
 A) Methanol
 B) Ethanol
 C) Esters
 D) Producer gas
- 23) Which of the following has highest calorific value
 A) Hydrogen
 B) Methane
 C) Liquefied petroleum gas
 D) Ethanol
- 24) Energy resources derived from natural organic materials are called _____.
 A) Fossil fuels
 B) Biomass
 C) Geo energy
 D) Chemical
- 25) The Chernobyl nuclear power plant mishap was caused due to the primary reason -----
 A) Failure of weir control inundating turbine base equipment
 B) Steam explosion destructing the reactor
 C) Tsunami causing loss of cooling
 D) Partial meltdown of reactor
- 26) Which of the following is not an example of insitu soil bioremediation
 A) Biosparging
 B) Bioreactor
 C) Bioaugmentation
 D) Bioslurping
- 27) Which of the following is not an Advanced Oxidation Process for the treatment of waste water ?
 A) PhotoFenton Process
 B) Photocatalytic TiO₂ Process
 C) UV/H₂O₂ Process
 D) Acidified K₂Cr₂O₇Oxidation Process'
- 28) Green Muffler is related to
 A) Noise Pollution
 B) Soil pollution
 C) Air Pollution
 D) Water Pollution
- 29) Which of the following is NOT one of the criteria air pollutants monitored by the U.S.-EPA?
 A) Mercury
 B) Nitrogen Oxides
 C) Particulate matter
 D) Ozone
- 30) Red coloured containers in the hospitals are used to dump :
 A) Waste from laboratory cultures
 B) House keeping waste
 C) Human anatomical waste
 D) Waste sharps

- 31) Acid mine drainage occurs due to:
- the combined action of O_2 , H_2O and certain bacteria cause sulphur in coal to form H_2SO_4 .
 - the combined action of SO_2 , and certain bacteria cause sulphur in coal to form H_2SO_4 .
 - the combined action of O_2 , and certain bacteria cause S in coal to form H_2SO_4
 - the combined action of H_2O and certain bacteria cause S in coal to form H_2SO_4 .
- 32) Which of the following is not a land filling method of solid waste?
- Area method
 - Trench method
 - Depression method
 - Bangalore method
- 33) Which of the following combustion technology can destroy persistent chlorinated hydrocarbons
- Rotary Kiln
 - Rotary Furnace
 - Fluidised bed
 - Pyrolysis
- 34) The issue with incineration as a technique for hazardous waste management is
- Release of dioxins
 - Release of carbonaceous compounds
 - Release of sulphurous compounds
 - Release of nitrogenous compounds
- 35) Integrated solid waste management does not include activities such as
- Recycling
 - Composting
 - Waste reduction
 - Disinfection
- 36) Which of the following activities are permitted under the coastal regulatory Zone
- Dumping of city waste for land filling
 - Discarding ash from thermal power stations
 - Sand and Rock Mining
 - Creation of storm water drains
- 37) The National Ganga River Basin Authority was constituted under which act?
- Water Prevention and Control of Pollution Act, 1974
 - Environment Protection Act, 1986
 - National Water Policy, 2002
 - National Environmental Policy, 2006
- 38) Which among the following are NOT The Millennium Development Goals established following the Millennium Summit of the United Nations in 2000?
- Promoting Gender Equality and Empowering
 - Ensuring Environment Sustainability
 - A global partnership for development
 - Encouraging Tourism
- 39) The power to declare any trees / class of trees in a protected forest to be reserved is with;
- Ministry of Environment Forest and Climate Change
 - Ministry of Biodiversity
 - State Government
 - Central Government
- 40) Category 'B' projects in the EIA notification 2006, needs environmental clearance from:
- Expert Appraisal Committee
 - Ministry of Environment Forests
 - State Environmental Impact Assessment Authority
 - Central Environmental Impact Assessment Authority
- 41) LotkaVolterra model for an ecosystem cannot be used to study
- Fluctuations in prey-predator population
 - Effect of predator on prey population
 - Effect of prey on predator population
 - Effect of predator and prey on ecosystem
- 42) Which of the following is a feature of normal distribution
- It is asymmetrical distribution
 - The mean median and mode are equal
 - The mean is always zero
 - The area under the curve equals two
- 43)

- 45) The degree to which numerical data tend to spread out about an average value is called
- A) Flatness
 - B) Skewness
 - C) Sharpness
 - D) Kurtosis
- 46) Which of the following changes in climate has NOT already occurred?
- A) 0.74°C increase in average global temperature over the last century
 - B) 0.17m rise in sea level during the 20th century
 - C) A decrease in the ice around Antarctica
 - D) Fewer cold days and more frequent heat waves over the last 50 years
- 47) Certified emission reduction(CER) unit is equivalent to the emission of ____ of carbon dioxide.
- A) 1 ton
 - B) 10 ton
 - C) 1 Kg
 - D) 10Kg
- 48) Which of the following has been declared as the mascot of NamamiGangeProgramme
- A) Bheem
 - B) Pran
 - C) ChachaChaudhary
 - D) Hanuman
- 49) With reference to "Olive ridley sea turtle", which of the following statement is/are correct?
- 1) Olive ridley is a medium-sized sea turtle species found in warm and tropical waters.
 - 2) In India, sea turtles are protected under the Indian Wildlife Protection Act of 1972.
 - 3) Olive ridley turtles are best known for their behavior of synchronized nesting in mass numbers, termed
 - 4) The coast of Odisha in India is the largest mass nesting site for the olive ridley.
- A) Statements 1 and 2 only
 - B) Statements 1, 2 and 3 only
 - C) Statements 2 and 3 only
 - D) Statement 1, 2, 3 and 4 only
- 50) What is the Tag line of “Swachh Bharat Abhiyan” ?
- A) SabkaKadamSwachhataki ore
 - B) EkKadamSwachhataki ore
 - C) HarekKadamSwachhataki ore
 - D) Swachh Bharat Swasth Bharat

Rough Work: