

NTA UGC NET

ENVIRONMENTAL SCIENCE

SOLVED SAMPLE PAPER

(English Medium)



- * DETAILED SOLUTIONS
- * NEW SYLLABUS
- * NEW PATTERN



9001894070



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6. Which of these pairs are correctly matched ?

- i Minamata convention : mercury
- ii Stockholm convention : persistent organic pollutants
- iii. Basel convention : lead

Select the correct answer using the codes given below.

- (1) I and ii only
- (2) I and iii only
- (3) ii and iii
- (4) I, ii and iii

7. Environmental Relief Fund was established under the provisions of

- (1) The Environment (Protection) Act, 1986
- (2) The Indian Wild Life (Protection) Act, 1972
- (3) The Public Liability Insurance Act, 1991
- (4) The Forest (Conservation) Act, 1980

8. Which of the following is / are incorrect pairs regarding classification of biodiversity?

- i. Alpha diversity '! Between-community diversity
- ii. Beta diversity '! Within-Community diversity
- iii. Gamma diversity '! Overall Biodiversity

Select the correct option from the codes given below:

- (1) I and ii only
- (2) I and iii only
- (3) ii and iii
- (4) I, ii and iii

9. Which of the following is/are part of the biosphere?

- i. water
- ii. soil
- iii. plants

Select the correct answer using the codes given below.

- (1) I and ii only
- (2) I and iii only
- (3) ii and iii
- (4) I, ii and iii

10. In India audit on conservation and protection of tigers in all 28 Tiger reserves was conducted in

- (1) 2001
- (2) 2004
- (3) 2006
- (4) 2007

11. In context of environment, the term "dirty dozen" refers to

- (1) 12 most harmful greenhouse gases
- (2) 12 ozone depleting substances
- (3) 12 persistent organic pollutants
- (4) none of the above

18. Protection and improvement of environment and safeguarding of forest and wildlife is emphasized in constitution of India under the Article
(1) 48 A (2) 21 (3) 47 (4) 46

19. Increased level of carbon dioxide in the atmosphere would impact the plants in many ways. These can be:
i. decrease in photosynthetic productivity of plants.
ii. Proliferation of weeds.
iii. Increase in number of insects and other pests.

Select the correct answer using the codes given below.

- (1) I and ii only (2) I and iii only
(3) ii and iii (4) I, ii and iii

20. Match the List - I and List - II. Identify the correct answer from the codes given below :

List - I

(Pesticides)

- a. Malathion
b. Metaldehyde
c. Diethyl Tolumide (DEET)
d. Chloroneb

List - II

(Purpose)

- i. Molluscicide
ii. Fungicide
iii. Insecticide
iv. Insect repellent

- (1) a-iv b-ii c-i d-iii
(2) a-i b-iii c-ii d-iv
(3) a-ii b-iv c-iii d-i
(4) a-iii b-i c-iv d-ii

21. **Assertion (A)** : Ocean Thermal Energy Conversion (OTEC) plants have very low efficiencies.

Reason (R) : The temperature difference between warm surface water and cold deeper ocean water is not all that great.

Choose the correct answer :

- (1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).

- (3) (A) is true but (R) is false.
(4) (A) is false but (R) is true.
22. A niche of the species where there is no competition from other species is called
(1) hyper volume niche (2) habitat
(3) fundamental niche (4) realized niche
23. The highest rate at which individuals can be harvested without reducing the population size is called maximum sustainable yield of a
(1) Population (2) Community
(3) Ecosystem (4) Landscape
24. Among the forest types of India, which category of forest covers maximum geographical area :
(1) Tropical grassland (2) Mangrove forest
(3) Tropical deciduous forest (4) Temperate evergreen forest
25. Percentage of tropospheric ozone in relation to total atmospheric ozone is about
(1) 90% (2) 10%
(3) 50% (4) 80%
26. Leslie matrix population model is generally used to determine
a. the growth of population.
b. the age distribution within population over time.
c. the prey-predator interactions.
Choose the correct answer :
(1) a only (2) a and c only
(3) b and c only (4) a and b only
27. Give n below are two statements. One labelled as Assertion (A) and the other labelled as Reason (R) :
Assertion (A) : Temperature in stratosphere increases with increase in altitude.
Reason (R) : Photodissociation of O_2 in stratosphere makes the lapse rate positive.
Choose the correct answer :
(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).

- (3) (A) is true but (R) is false.
(4) (1) is false but (R) is true.
28. With respect to sea, increase in CO_2 abundance is not responsible for which of the following ?
(1) Increase in pH of sea water.
(2) Increase in concentration of bicarbonate ions.
(3) Coral bleaching.
(4) Enhanced dissolution of calcareous materials.
29. Which of the following is not a property for controlling noise ?
(1) Absorption (2) Damping
(3) Interference (4) Diffraction
30. Marine pollution is caused by
a. Sewage b. Land runoff
c. Oil spills d. Ocean mining
Choose the correct code :
(1) a, c, and d only (2) c and d only
(3) a, b, c and d (4) d, c, b only
31. Air quality standards are based on:
(1) Climate and topography (2) Ambient air quality alone
(3) Dose of a pollutant (4) Method of measurement
32. The unleaded petrol, as an automotive fuel, should not have the lead levels exceeding:
(1) 0.05 g/L (2) 0.15 g/L
(3) 0.25 g/L (4) 0.50 g/L
33. A major part of air pollution load lies in:
(1) Troposphere (2) Stratosphere
(3) Thermosphere (4) Ionosphere
34. Which is the correct order of the degree of weathering of the following rocks:
(1) Dunite > Basalt > Granite > Rhyolite
(2) Basalt > Dunite > Granite > Rhyolite
(3) Rhyolite > Granite > Dunite > Basalt
(4) None of these

35. The criteria indicates the water pollution are:
- (1) pH, COD, BOD, DO (2) pH, Coliform, COD, DO
 (3) Coliform, COD, BOD (4) BOD, DO, Coliform
36. Intake of lead may primarily cause the damage of
- (1) Brain (2) Lung
 (3) Liver (4) Kidney
37. Air Pollution Tolerance Index (APTI) of vegetation is calculated using:
- (1) Pb content, SO₂ content and NO_x content in air
 (2) Ascorbic acid, total chlorophyll and pH of
 (3) SPM, pH of water and soil types of the area
 (4) Landscape of the area; SO₂ and NO_x levels in air
38. The state having the largest forest cover in India is:
- (1) Andhra Pradesh (2) Orissa
 (3) Maharashtra (4) Chattisgarh
39. Coal mine workers are prone to victims of one of the following diseases:
- (1) Pneumoconiosis (2) Byssinosis
 (3) Asbestosis (4) Silicosis
40. Which one of the following is necessary for the growth and maintenance of animal bones and teeth:
- (1) Hydrogen (2) Oxygen
 (3) Phosphates (4) Sulphur
41. Which of the following organisms are used as components of biofertilisers ?
- (1) Blue green algae only (2) Coliform bacteria and mushrooms
 (3) N-fixing bacteria only (4) Blue green algae and N-fixing bacteria
42. Which one of the following photochemical reactions is correct:
- (1) $SO_2 \xrightarrow{h\nu} SO_2^*$ (2) $N_2O + h\nu \longrightarrow N_2 + O^*$
 (3) $O_3 + h\nu \longrightarrow O + O_2$ (4) $O_2 + h\nu \longrightarrow O_2 + e$

43. **Assertion (A)** : CFCs destroy ozone molecules in stratosphere

Reason (R) : CFCs have very high global warming potential

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (3) (A) is true; (R) is false
- (4) (A) is false; (R) is true

44. Match the List I and II. Select the correct answer using the codes given below the lists:

List - I

- (a) Environmental Protection Act
- (b) Air (Prevention and Control of Pollution) Act
- (c) Water (Prevention and Control of Pollution) Act
- (d) Public Liability Insurance Act

List - II

- (i) 1991
- (ii) 1974
- (iii) 1981
- (iv) 1986

- (1) a- (i) b-(ii) c-(iv) d-(iii)
- (2) a-(iv) b-(iii) c-(ii) d-(i)
- (3) a-(ii) b-(iv) c-(i) d-(iii)
- (4) a-(iii) b-(i) c-(ii) d-(iv)

45. 1 kW-hour of energy is equivalent to:

- (1) 460 KCal
- (2) 1250 KCal
- (3) 860 KCal
- (4) 760 KCal

46. The dominant gas in biogas is:

- (1) CH_4
- (2) C_2H_5
- (3) CO_2
- (4) NO_2

47. Match the following lists I and II and select the correct answer using the code given below the lists:

List-I

- (a) Fluvial
- (b) Shallow Marine
- (c) Glacial
- (d) aeolian

List-II

- (i) Moraines
- (ii) Loess
- (iii) Oxbow lake
- (iv) Spits and Bar

- (1) a-(iii) b-(iv) c-(i) d-(ii)
(2) a-(i) b-(ii) c-(iii) d-(iv)
(3) a-(iv) b-(iii) c-(ii) d-(i)
(4) a-(iii) b-(iv) c-(ii) d-(i)
- 48.** Which of the following pairs is not correctly matched:
(1) Tropical zone – Hot, winterless
(2) Sub-tropical zone – Hot with cool winter
(3) Temperate zone – Warm summer with pronounced winter
(4) Alpine zone – Long summer with short severe winter
- 49.** The hydraulic conductivity or the coefficient of permeability of which of the following media is the highest:
(1) Clay (2) Sand (3) Gravel (4) Sandstone
- 50.** Aquatic organisms are very sensitive to:
(1) Salinity (2) pH
(3) Temperature (4) Dissolved oxygen
- 51.** Which of the following acts as a trigger for a landslide to occur:
(1) Vegetation loss (2) Rainfall
(3) Animal movement (4) Vehicular movement
- 52.** After sodium chloride, which of the following compounds has the maximum concentration in sea water:
(1) Magnesium sulphate (2) Calcium sulphate
(3) Magnesium chloride (4) Potassium sulphate
- 53.** The directions for the regulation, prohibition or the closure of any industry are given by:
(1) State government (2) Central government
(3) State Pollution Control Board (4) Central Pollution Control Board

54. Match the lists I and II. Select the correct answer using the code given below the lists :

List-I (Category of Area)

- (a) Commercial area
- (b) Residential area
- (c) Industrial area
- (d) Silence zones

List-II (Daytime Noise standards in dB)

- (i) 75
- (ii) 50
- (iii) 65
- (iv) 55

- (1) a-(i) b-(ii) c-(iv) d-(ii)
- (2) a-(iii) b-(iv) c-(i) d-(ii)
- (3) a-(iv) b-(iii) c-(ii) d-(i)
- (4) a-(ii) b-(i) c-(iv) d-(iii)

55. Liquid ammonia can be used in refrigeration because of its

- (1) High basicity
- (2) High dipole moment
- (3) High heat of vaporization
- (4) Non-toxic nature

56. Which of the following methods is suitable for hypothesis testing:

- (1) Two way analysis of variance
- (2) t-test
- (3) Cluster Analysis
- (4) Correlation and regression

57. Box model is mainly employed for analyzing the:

- (1) Dispersal of atmospheric pollutions
- (2) Predictor and Prey populations
- (3) Birth and death rates
- (4) Discharge of a waste into groundwaters

58. Match the List I and II. Select the correct answer using the code given below the lists :

List-I

- a. Tropical forest
- b. Conifer forest
- c. Mangroves
- d. Deciduous forest

List-II

- (i) Sunderbans
- (ii) Himachal Pradesh
- (iii) Rajasthan
- (iv) Silent valley

- (1) a-(i) b-(ii) c-(iv) d-(iii)
- (2) a-(ii) b-(i) c-(iv) d-(iii)
- (3) a-(i) b-(iv) c-(ii) d-(iii)
- (4) a-(iv) b-(ii) c-(i) d-(iii)

59. A solar cell is basically a:

- (1) a type semiconductor
- (2) n type semiconductor
- (3) p-n diode
- (4) p-n-p transistor

60. The information system useful to identify the location of a point is:

- (1) CIS
- (2) GPS
- (3) Clinometer
- (4) Compass

61. Landfill sites can be permitted in:

- (1) Wetlands
- (2) Flood plains
- (3) Habitats of endangered species and recharge zones for local drinking water supplies
- (4) Abandoned mines with impermeable barrier at the bottom with a leachate recycling system

62. The atmosphere is chemically homogenous upto an altitude of:

- (1) 10km
- (2) 30km
- (3) 50km
- (4) 80km

63. At which stage of an ecological succession, an ecosystem exhibits total photosynthesis equal to respiration?

- (1) Pioneer
- (2) Climax
- (3) Virgin
- (4) Mid-seral

64. Methamoglobinemia is actually caused by water pollution containing
 (1) NO_2 (2) NO_3^- (3) NH_4^+ (4) NO_2^-
65. Which is the best and simple method to determination of fluorine in ground water?
 (1) Atomic Absorption spectrometry
 (2) Spectrophotometry
 (3) Flame photometry
 (4) Ion-selective electrode
66. The twin- sun theory of the origin of the earth was advanced by
 (1) Fred Hoyle (2) Jeans and Jeffrey's
 (3) Kuliper (4) Von Schmidt
67. When axial planes of folds dip directly down the axial surface they are termed as
 (1) Homoclines (2) Generative folds
 (3) Accordion fold (4) Reclined fold
68. A cavity lined with minerals identical with those of the host rock is called
 (1) Geode (2) Agate
 (3) Druse (4) Septarian
69. Vindhyan occupy the time period between
 (1) 1400 - 900 M.Y (2) 900 - 570 M.Y
 (3) 1600 - 900 M.Y (4) 2500 - 1600 M.Y1
70. Country rocks for Bauxite in Katni area are
 (1) Vindhyan (2) Gondwanas
 (3) Deccan trap (4) Precambrian
71. Tectonic disturbance is associated with
 (1) Orthoconglomerate (2) Paraconglomerate
 (3) Petromict conglomerate (4) Intraformational conglomerate
72. The most common minerals of banded iron ore are
 (1) Magnetite and Haematite (2) Haematite and Jasper
 (3) Haematite and chert (4) Magnetite and Chert
73. Back - arc basins are Geosyncline
 (1) Andean (2) Meriterarreanean
 (3) Himalayan (4) Japan sea

74. Oceanic ridges are called are oceanic ridges when they are
(1) Spreading centres (2) Extinct
(3) Bounded by Volcanoes (4) Seismically active
75. Blanket sands are associated with
(1) Quartz - arenite (2) Arkoses
(3) Graywackes (4) Calc – arenite
76. The two leading solvents in supergene enrichment are
(1) Ferric sulphate / Ferrous sulphate
(2) Ferrous sulphate / Sulphuric acid
(3) Ferric sulphate / Sulphuric acid
(4) Nitric acid / Sulphuric acid
77. The biggest linear basin of the Dharwar type in India is
(1) Sandur (2) Shimoga
(3) Chitradurga (4) Singhbhum
78. Magmatic carbonates are termed
(1) Carbonatites (2) Kimberlites
(3) Komatiite (4) Harzburgite
79. Channel bars indicate
(1) Graded streams (2) Valley flats
(3) Braided streams (4) Flood plains
80. The present day atmosphere and ocean are result of
(1) Cosmic precipitation
(2) Volcanic exhalation
(3) Primordial ocean and atmosphere evolution
(4) None of the above
81. When two continental plate weld, it is described as
(1) Suture zone (2) Andesite line
(3) Island arc (4) Subduction zone
82. The oldest sediments are of the age
(1) 100 mya (2) 200 mya
(3) 2000 mya (4) 400 mya

83. An objective of environmental audit is
- (1) Raw material & waste minimization
 - (2) Energy conservation & monitoring
 - (3) To improve technical competency
 - (4) All of the above
84. The reservoir of Bombay High oil field is in
- (1) Limestones
 - (2) Sandstones
 - (3) Shales
 - (4) None of the above
85. Which of the following is not a place for the occurrence of diamond?
- (1) Golconda
 - (2) Rewa
 - (3) Panna
 - (4) Sivalik
86. Which of the following is used in steel hardening?
- (1) Manganese
 - (2) Chromium
 - (3) Nickel
 - (4) Zinc
87. Indian iron and manganese deposits are mostly found in
- (1) Palaeozoic
 - (2) Precambrian
 - (3) Mesozoic
 - (4) Cenozoic
88. East coast bauxite is mostly found in
- (1) A.P
 - (2) Orissa
 - (3) A.P and Orissa
 - (4) A.P, Orissa and Tamilnadu
89. Assay value of gold is calculated in
- (1) Percentage
 - (2) Gm / tonne
 - (3) Parts per million
 - (4) Any of the above
90. The Precambrian boundary in Kashmir is located
- (1) Above Iolab Formation
 - (2) Below Iolab Formation
 - (3) In the middle of Iolab Formation
 - (4) None of the above
91. Diesel oil is a fraction obtained between
- (1) 40-120 °C
 - (2) 180-250 °C
 - (3) 250 – 320 °C
 - (4) 280 – 360 °C

92. The formation Coral Limestone is found in
(1) Lower Baghs (2) Upper Baghs
(3) Badhora beds (4) None of the above
93. Magnesite deposits are commonly associated with
(1) Sandstones and Quartzites
(2) Peridotites and limestone/ dolomite
(3) Ultrabasic rocks only
(4) Granites and granodiorites
94. If a tourmaline plate is placed over a dot the observer sees two dots, this is due to
(1) refraction (2) reflection
(3) double refraction (4) polarization
95. The approximate density of the Earth is
(1) 5.5 (2) 5.8 (3) 5.1 (4) 5.2
96. In a trickling filter biological method of domestic waste treatment a layer of biological community growing on the substrate is
(1) Algal film (2) Bacterial layer
(3) Protozon community (4) Zoogloea film
97. Which of the following is a fresh water lake?
(1) Wular (2) Chilka
(3) Pulicat (4) Dal
98. Calcium carbonate is generally formed due to
(1) Evaporation of water (2) Precipitation
(3) Loss of CO₂ (4) All of the above
99. Which of the following is associated with subduction zones?
(1) Blueschists (2) Amphibolites (3) Eclogites (4) Graywackes
100. The joints are perpendicular to the axial planes of fold axial planes of folds are described as
(1) Cross joint (2) Strike joint
(3) Dip joint (4) Diagonal joint

ANSWER KEY

PAPER-II

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Answer	3	3	3	2	2	1	3	1	4	3	3	2	4	3	4	2	3	1	3	4
Question	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Answer	1	3	3	3	2	4	3	1	4	3	2	1	1	3	2	4	1	4	4	3
Question	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Answer	4	1	1	2	3	1	1	4	4	4	1	1	4	2	2	4	1	4	1	2
Question	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Answer	3	2	3	2	1	1	4	3	2	2	4	3	4	4	1	3	1	1	3	2
Question	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Answer	1	2	4	1	4	1	2	3	2	3	3	2	2	3	1	1	1	1	1	1

HINTS AND SOLUTIONS

PAPER-II

- 1.(3)** India will be the Global Host for World Environment Day (WED) 2018 which is observed annually on 5 June. The central theme for this year is 'Plastic Pollution. World Environment Day (WED) observed annually on 5 June for encouraging worldwide awareness and action for the protection of our environment..
- 2.(3)** The most potent greenhouse gas is water vapour, which causes about 36-70% of the greenhouse effect.
Carbon dioxide (9-26%), methane (4-9%) and Ozone (3-7%) are other major greenhouse gases.
- 3.(3)** The interior structure of the Earth is layered in spherical shells, like an onion. Earth's internal structure is based on observations of topography and bathymetry, observations of rock in outcrop, samples brought to the surface from greater depths by volcanic activity, analysis of the seismic waves that pass through Earth, measurements of the gravity field of Earth, and experiments with crystalline solids at pressures and temperatures characteristic of Earth's deep interior.
- 4.(2)**
- 5.(2)** Around the mid latitude, the surface winds are generally Geostrophic
There is an internal battle, between the pressure gradient force moving air from high toward low-pressure and the deflection of the Coriolis effect 90° from its

pressure gradient path: the Coriolis effect keeps the wind from blowing directly down a pressure gradient, whereas the pressure gradient force prevents the Coriolis effect from turning the wind back up the pressure slope.

Where these two factors are in balance - as is usually the case in the upper atmosphere - wind moves parallel to the isobars. We call this **Geostrophic wind**. Because Earth rotates, any object moving freely near Earth's surface appears to deflect to the right in the northern hemisphere and to the left in the southern hemisphere. **This is known as Coriolis effect.**

Most winds in the atmosphere are geostrophic because the winds flow nearly parallel to the isobars. Only near the surface is another factor significant.

6.(1) The Basel Convention is for the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

It was designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less developed countries (LDCs).

It does not, however, address the movement of radioactive waste.

The Minamata Convention on Mercury is an international treaty designed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.

Stockholm Convention on Persistent Organic Pollutants is an international environmental treaty that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs).

7.(3) The Public Liability Insurance (PLI) Act, 1991 makes it obligatory upon the user industries handling 179 types of chemicals and compounds and other classes of flammable substances to subscribe a special insurance policy to cover the liabilities likely to arise on account of any chemical (industrial) disaster/accident and payable to those affected people who are not the workers on 'no fault basis' / 'absolute liability'.

The Act establishes an Environment Relief Fund (ERF), which is subscribed by all such user industries by an amount equal to the annual premium amount of such insurance policies.

8.(1) Alpha-diversity (Within-Community diversity) refers to the diverse organisms sharing the same community/habitat.

Beta-diversity (Between-community diversity) refers to the rate of replacement of species along a gradient of habitats or communities.

Gamma diversity (Overall) refers to the diversity of habitats over the total landscape or geographical area.

9.(4) Many people mistakenly believe that biosphere only comprises of the living components. But this is not true.

Biosphere, relatively thin life-supporting stratum of Earth's surface, extending from a few kilometres into the atmosphere to the deep-sea vents of the ocean.

The biosphere is a global ecosystem composed of living organisms (biotic) and the abiotic (nonliving) factors.

10.(3) Audit of biodiversity has included audit of wildlife conservation programmes in India as well as conservation and protection of forests in India.

In 2006, audit of „Conservation & protection of Tiger in Tiger Reserves in India was conducted in 28 tiger reserves all across India.

The audit revealed that relocation of the people living within the Tiger Reserves as well as removal and prevention of encroachment was essential to ease the biotic pressure on the tiger population.

11.(3) These were the 12 initial compounds that were listed under the Stockholm convention.

Initially, twelve Persistent organic pollutants (POPs) have been recognized as causing adverse effects on humans and the ecosystem

Persistent organic pollutants (POPs) are organic compounds that are resistant to environmental degradation through chemical, biological, and photolytic processes.

The effect of POPs on human and environmental health was discussed, with intention to eliminate or severely restrict their production, by the international community at the Stockholm Convention on Persistent Organic Pollutants in 2001.

12.(2) Diversity increases the resilience of the system to outside invasions of exotic organisms.

A large number of interacting feeding links provide alternative channels for energy

flow and this generates a wide variety of adjustments of population to environment changes and stresses within the ecosystem.

Therefore, ecosystem stability increases with increase in number of links in food web.

- 13. (4)** Photoionization of gas molecules maintain the temperature profile of thermosphere. From 400 km upwards in the thermosphere region, temperature values become relatively constant.

Photo ionization is the ionization of molecules (and atoms) caused by radiation.

The thermosphere has extremely high temperatures, coinciding with the prefix in its name, *thermo*, which means temperature. Temperatures can reach over 3,600 degrees Fahrenheit, and the high heat comes from the intense light rays, or **radiation**, from the sun.

Since there is little to no atmospheric gases above the thermosphere, there is no absorption of the heat from solar radiation, and so temperatures soar.

There is an extremely low concentration of oxygen, and gas particles are very thin and spread out over long distances. Gases that do exist in the thermosphere are mostly **ionized**, meaning the molecules of gases are gaining or losing charged particles.

This happens because there is so much energy in the radiation, such as UV or X-rays, coming from our sun that the gases split apart into charged particles. The thermosphere and exosphere both exhibit this effect and, together, are known as the **ionosphere**.

- 14.(3)** In terms of Biogeography, India has been divided into 10 biogeographic zones:

- Trans Himalayan zone.
- Himalayan zone
- Desert zone.
- Semiarid zone.
- Western ghat zone.
- Deccan plateau zone.
- Gangetic plain zone.
- North east zone.

- Coastal zone.
- Islands present near the shore line.

15.(4) Nitrogen fixation (NF) is a process in which nitrogen (N_2) in the atmosphere is converted into ammonium (NH_4^+).

Nitrogen fixation occurs naturally in the air by means of lightning.

Biological nitrogen fixation is carried by cyanobacteria (e.g. the highly significant *Trichodesmium* and *Cyanothece*), green sulfur bacteria, *Azotobacteraceae*, rhizobia and *Frankia*.

NF also takes place in presence of UV rays.

16.(2) A biodiversity hotspot is a biogeographic region with a significant reservoir of biodiversity that is under threat from humans.

To qualify as a biodiversity hotspot on Myers 2000 edition of the hotspot-map, a region must meet two strict criteria:

it must contain at least 0.5% or 1,500 species of vascular plants as endemics, and it has to have lost at least 70% of its primary vegetation.

Biodiversity hotspots are areas that support natural ecosystems that are largely intact and where native species and communities associated with these ecosystems are well represented. They are also areas with a high diversity of locally endemic species, which are species that are not found or are rarely found outside the hotspot.

17.(3) A tiger reserve has two zones – core and buffer. In the buffer zone, human activity is allowed.

According to the Wild Life (Protection) Amendment Act of 2006, a tiger reserve must have a core or critical habitat and a buffer zone peripheral to it.

While the critical habitat is supposed to be kept inviolate for conservation, a buffer zone is needed to ensure the integrity of the habitat with adequate space for dispersal of tigers.

It is aimed at promoting co-existence between wildlife and human activity.

18.(1) Article 48(1) Protection and improvement of environment and safeguarding of forests and wildlife.

“ State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country.”

Article 48A was added by the Constitution (42nd Amendment) Act, 1976

19.(3) Increase in CO_2 will increase photosynthesis. Increased CO_2 concentration in the atmosphere may increase photosynthetic productivity of plants. This in turn produces more organic matter.

It may seem a positive effect. But, weeds may proliferate rapidly and that too at the expense of useful plants. Insects and other pests that feed on plants may also increase in number.

Survival of other organisms also gets affected.

20.(4) Malathion is an organophosphate **insecticide** of relatively low human toxicity. It is a pesticide that is widely used in agriculture, residential landscaping, public recreation areas, and in public health pest control programs such as mosquito eradication.

Metalddehyde is used widely around the world as a **molluscicide** to kill slugs and snails, although it is toxic to all animals that ingest it. There is widespread concern that there has been an unacceptable number of poisoning incidents especially involving domestic pets, wild animals and birds.

DEET (chemical name, N,N-diethyl-meta-toluamide) is the active ingredient in many **insect repellent** products. It is widely used to repel biting pests such as mosquitoes and ticks.

Chloroneb (1,4-dichloro-2,5-dimethoxybenzene) is a **fungicide** with moderate systemic properties and selective activity toward certain fungi (e.g., Phytophthora, Pythium, Botrytis, Mucor). Although the compound is metabolized by some fungi to the toxic oxidation products DCMP (2,5-dichloro-4-methoxyphenol) and DCHQ (2,5-dichlorohydroquinone) the fungitoxic principle is chloroneb per se.

21.(1) Ocean Thermal Energy Conversion (OTEC) is a clean, zero-emission and renewable energy technology.

OTEC takes the heat from tropical oceans and converts it to electricity.

Although still largely untapped, OTEC is one of the world's largest renewable energy resources and is available to around 100 countries within their nautical economical zone.

In OTEC, we use the temperature difference between the hot surface of the ocean and the cooler, deeper layers beneath to drive a heat engine in a broadly similar

way—except that no fuel is burned: we don't need to create a difference in temperature by burning fuel because a temperature gradient exists in the oceans naturally.

Since the temperature difference is all-important, we need the biggest vertical, temperature gradient we can possibly find (at least 20° and ideally more like 30–40°).

The biggest problem with OTEC is that it's relatively inefficient. The laws of physics say that any practical heat engine must operate at less than 100 percent efficiency; most operate well below—and OTEC plants, which use a relatively small temperature difference between their hot and cold fluids, have among the lowest efficiency of all: typically just a few percent.

For that reason, OTEC plants have to work very hard (pump huge amounts of water) to produce even modest amounts of electricity.

22.(3) Every species has a role that it plays in nature. That role is defined by a combination of the organism's behaviors, habitat, and interaction with other species. The role that a species plays is called its ecological niche.

A niche includes more than what an organism eats or where it lives. Environmental factors, such as climate, soil chemistry, and elevation, also play a role in defining a niche.

Sometimes other species will compete for the same niche. Lions on the African savanna compete with hyenas for food. Competition from other species for the same niche is called interspecific competition.

A fundamental niche is the term for what an organism's niche would be in the absence of competition from other species

23.(3) The highest rate at which individuals can be harvested without reducing the population size is called maximum sustainable yield of an Ecosystem.

In population ecology and economics, maximum sustainable yield or MSY is theoretically, the largest yield (or catch) that can be taken from a species' stock over an indefinite period.

Fundamental to the notion of ***sustainable harvest***, the concept of MSY aims to maintain the population size at the point of maximum growth rate by harvesting the

individuals that would normally be added to the population, allowing the population to continue to be productive indefinitely.

The key assumption behind all sustainable harvesting models such as MSY is that populations of organisms grow and replace themselves – that is, they are renewable resources. Additionally it is assumed that because the growth rates, survival rates, and reproductive rates increase when harvesting reduces population density, they produce a surplus of biomass that can be harvested. Otherwise, sustainable harvest would not be possible.

Another assumption of renewable resource harvesting is that populations of organisms do not continue to grow indefinitely; they reach an equilibrium population size, which occurs when the number of individuals matches the resources available to the population (i.e., assume classic logistic growth). At this equilibrium population size, called the carrying capacity, the population remains at a stable size.

24.(3) Varied types of forests are found in the Indian subcontinent. Primarily, there are 6 major groups, namely, Moist Tropical, Dry Tropical, Montane Sub Tropical, Montane Temperate, Sub Alpine, and Alpine.

Forests are also classified according to their nature, the type of climate in which they thrive and its relationship with the surrounding environment. Tropical moist evergreen forests are classified as:

- (i) Tropical moist semi-evergreen forests, and
- (iii) Tropical moist deciduous forests.
- (iv) Littoral and swamp forests.

Deciduous forests are of two types: Temperate and Tropical.

Temperate deciduous forests occur in areas of moderate temperature and rainfall with chilly winters. The tropical monsoon deciduous forests are found in areas receiving an annual rainfall of 100 to 200cms in India, with a distinct dry and rainy season and minimum temperature.

The tropical moist deciduous forests are scattered throughout India except in the western and the north-western regions. They are found extensively on the wetter western side of the Deccan Plateau, the north-eastern part of the Deccan Plateau and the lower slopes of the Himalayan Mountain, on the Siwalik Hills from Jammu

in the west to West Bengal.

25.(2) The ozone in this layer of air protects plants, animals, and us by blocking the most harmful rays of the sun. Tropospheric ozone, (ground-level ozone) is found in the troposphere, which is the layer of air closest to the Earth's surface.

Ozone is mainly found in the two regions of the atmosphere that are closest to the earth's surface. **About 10 percent of the atmosphere's ozone is in the lowest-lying atmospheric region, the troposphere.**

Most ozone (about 90%) resides in the next atmospheric layer, the stratosphere.

26.(4) Leslie matrix is a discrete, age-structured model of population growth that is very popular in population ecology. It was invented by and named after P. H. Leslie.

The Leslie Matrix (also called the Leslie Model) is one of the best known ways to describe the **growth of populations (and their projected age distribution)**, in which a population is closed to migration and where only one sex, usually the female, is considered.

This is also used to model the changes in a population of organisms over a period of time. Leslie matrix is generally applied to populations with annual breeding cycle. In a Leslie Model, the population is divided into groups based on age classes.

27.(3) There are several types of short-term variability that affect ozone photochemical process rates in the upper stratosphere. These include diurnal variations, variations in solar ultraviolet radiation, temperature driven variations, and particle precipitation events that originate from electromagnetic storms on the Sun.

Diurnal variations — In the upper stratosphere, above 40 km, where PRTs are less than 1 day, variations in ozone occur with the daily rising and setting of the Sun. These variations are usually termed “diurnal” because they happen each day. Cycle of ozone creation and destruction in the upper stratosphere — To illustrate this, we consider the steps involved in a simple, pure oxygen description of upper stratospheric ozone chemistry.

Photodissociation of oxygen molecules into free oxygen — Ozone is created when ultraviolet light of wavelength less than 240 nm strikes an atmospheric oxygen molecule splitting it into two oxygen atoms.

This process is known as photodissociation or photolysis. The resultant O (oxygen)

atoms undergo numerous collisions with N_2 (nitrogen) and O_2 (oxygen) molecules. Collision with an O_2 molecule can lead to a combination of O_2 and O which has some excess energy of collision. The lifetime of this complex is short and most of the time it will simply fly apart without any additional reaction taking place.

28.(1) When carbon dioxide (CO_2) is absorbed by seawater, chemical reactions occur that reduce seawater pH, carbonate ion concentration, and saturation states of biologically important calcium carbonate minerals.

These chemical reactions are termed “ocean acidification”. It can interfere with the way many marine organisms produce shells or plates from calcium carbonate ($CaCO_3$).

Increasing acidity is thought to have a range of potentially harmful consequences for marine organisms, such as depressing metabolic rates and immune responses in some organisms, and causing coral bleaching.

By increasing the presence of free hydrogen ions, each molecule of carbonic acid that forms in the oceans ultimately results in the conversion of two carbonate ions into bicarbonate ions, thus increasing bicarbonate ions percentage.

29.(4) Basic technologies for noise control :

Sound insulation: prevent the transmission of noise by the introduction of a mass barrier.

Sound absorption: a porous material which acts as a ‘noise sponge’ by converting the sound energy into heat within the material. Common sound absorption materials include decoupled lead-based tiles, open cell foams and fiberglass

Vibration damping: applicable for large vibrating surfaces. The damping mechanism works by extracting the vibration energy from the thin sheet and dissipating it as heat. A common material is sound deadened steel.

Vibration isolation: prevents transmission of vibration energy from a source to a receiver by introducing a flexible element or a physical break.

30.(3) Marine pollution can be defined as anything that contaminates the sea. Common marine pollutants include chemicals, small plastic beads in exfoliants and also toxic bio-matter (such as sewage).

Marine pollution is mainly caused by Toxic chemicals in water, Oil spillages, Plastic,

Litter, and human waste, Sewage, The shipping industry, Dissolved greenhouse gases.

- 31.(2)** Air quality standards are the limits on the quantity of pollutants in air, that are not to be exceeded during a given period in a defined area. These are based on ambient air quality alone.
- 32.(1)** A highly refined unleaded fuel for spark ignition engines blended to meet the requirements of modern automotive engines fitted with catalytic converters and designed to run on unleaded petrol. The unleaded petrol, as an automotive fuel, should not have the lead levels exceeding 0.05 g/L.
- 33.(1)** Air Pollution, addition of harmful substances to the atmosphere resulting in damage to the environment, human health, and quality of life. A major part of air pollution load lies in troposphere. . If the load of pollutants added to the troposphere were equally distributed, the pollutants would be spread over vast areas and the air pollution might almost escape our notice.
- 34.(3)** Weathering breaks rocks into smaller pieces. It is the effect of rainfall and temperature on rocks. Weathering occurs in situ. This means the rocks stay in the same place and are not moved. The correct order of the degree of weathering of these rocks is Rhyolite > Granite > Dunite > Basalt.
- 35.(2)** Water pollution is the contamination of water bodies (e.g. lakes, rivers, oceans, aquifers and groundwater). Water pollution occurs when pollutants are directly or indirectly discharged into water bodies without adequate treatment to remove harmful compounds. The criteria indicates the water pollution are pH, Coliform, COD, DO.
- 36.(4)** Lead poisoning (also known as plumbism, colica pictorum, saturnism, Devon colic, or painter's colic) is a medical condition in humans and other vertebrates caused by increased levels of the heavy metal lead in the body. Lead interferes with a variety of body processes and is toxic to many organs and tissues including the heart, bones, intestines, kidneys, and reproductive and nervous systems.
- 37.(1)** Air Pollution Tolerance Index (APTI) is an index denotes capability of a plant to combat against air pollution. Air Pollution Tolerance Index (APTI) of vegetation is calculated using Pb content, SO₂ content and NO_x content in air.

- 38.(4)** Chhattisgarh has the third largest area under forest cover after Madhya Pradesh and Arunachal Pradesh. In other words, 12 percent of India's forests are in Chhattisgarh. Of this, three percent is under very dense forests, 25.82 percent is moderately dense, 12.28 percent is open forests and 0.09 percent is scrub.
- 39.(4)** Coal mine workers are prone to victims of Silicosis. It is a type of pneumoconiosis caused by inhaling respirable crystalline silica. Quartz is a type of crystalline silica that causes silicosis in coal miners because it is a major component of rocks. Silicosis causes x-ray changes similar to CWP (Coal Workers' Pneumoconiosis) ; and it is especially seen in coal miners who are exposed to rock dust, such as roof bolters in underground mines and drillers in surface mines.
- 40.(3)** The human skeleton is composed mainly of calcium phosphate. Phosphorus accounts for 11 to 12 g per kg body weight. 85% of this phosphorus occurs in bones and teeth. Phosphorus plays an important role in several functions: The transfer of energy;The synthetic of amino acids and proteins;The contribution to the generation of vitamins;The maintenance of bones and teeth.
- 41.(4)** A biofertilizer is a substance which contains living **microorganisms** which, when applied to seed, plant surfaces, or soil, colonizes the **rhizosphere** or the interior of the plant and promotes growth by increasing the supply or availability of primary nutrients to the host plant. Blue green algae and N-fixing bacteria are used as components of biofertilisers.
- 42.(1)** photochemical reactions is: $SO_2 \xrightarrow{hv} SO_2^*$
- 43.(1)** The interim replacements for CFCs are hydrochlorofluorocarbons (HCFCs), which deplete stratospheric ozone, but to a much lesser extent than CFCs. Hydrofluorocarbons are included in the Kyoto Protocol because of their very high Global Warming Potential and are facing calls to be regulated under the Montreal Protocol due to the recognition of halocarbon contributions to climate change.
- 44.(2)** 1986 - The Environment (Protection) Act authorizes the central government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and /or operation of any industrial facility on environmental grounds..

1981 - The Air (Prevention and Control of Pollution) Act provides for the control and

abatement of air pollution. It entrusts the power of enforcing this act to the CPCB (Central Pollution Control Board).

1974 - The Water (Prevention and Control of Pollution) Act establishes an institutional structure for preventing and abating water pollution. It establishes standards for water quality and effluent. Polluting industries must seek permission to discharge waste into effluent bodies.

The CPCB (Central Pollution Control Board) was constituted under this act.

The Public Liability Insurance act, 1991 is an Act to provide for public liability insurance for the purpose of extending immediate relief to the persons affected by accident occurring while handling any hazardous substance in a project, industry or storage and for matters connected therewith or incidental thereto.

45.(3) 1 kW-hour of energy is equivalent to 860 Kcal.

$1 \text{ kWh} = 3.6 \times 10^6 \text{ J} = 859.9 \text{ kcal} = 2.656 \times 10^6 \text{ ft lb}_f$ (foot pound force) = 3.412×10^3 Btu (British thermal unit)

46.(1) Biogas typically refers to a gas produced by the breakdown of organic matter in the absence of oxygen. The gases methane, hydrogen, and carbon monoxide (CO) can be combusted or oxidized with oxygen. The dominant gas in biogas is CH_4 .

47.(1) Oxbow lake is also a type of fluvial lakes, with its unique form drawing people's attention.

Shallow marine environments, from the shoreline to the shelf edge, are complex and result in complex deposits. These sandstones, in both outcrop and subsurface reservoirs, have been interpreted to be offshore shelf bars or ridges, shoreface bodies, and tidally influenced incised-valley fill.

Moraine is material transported by a glacier and then deposited. There are eight types of moraine, six of which form recognisable landforms, and two of which exist only whilst the glacier exists.

Loess is an aeolian sediment formed by the accumulation of wind-blown silt, typically in the 20–50 micrometer size range, twenty percent or less clay and the balance equal parts sand and silt that are loosely cemented by calcium carbonate.

48.(4) Alpine Zone: This climate zone can be experienced in the high altitudes of Himalaya. In this region there are high climatic fluctuations due to steep altitude variations.

Different types of climatic zones can be seen in this region. On the foothills occur subtropical climate whereas on the higher altitudes there is Alpine Tundra Zone. The vegetation is sparse and stunted as rainfall is scanty and the winters are severely cold. Most of the snowfall is in the form of snow during late winter and spring months.

- 49.(4)** Hydraulic conductivity, symbolically represented as K , is a property of vascular plants, soils and rocks, that describes the ease with which a fluid (usually water) can move through pore spaces or fractures. The hydraulic conductivity or the coefficient of permeability of Sandstone is highest among the following.
- 50.(4)** Aquatic organisms are very sensitive to Dissolved oxygen. Oxygen dissolves in water and is also generated during photosynthesis by aquatic plants. Oxygen is soluble in water but varies inversely with increasing water temperature.
- 51.(1)** The term "landslide" describes a wide variety of processes that result in the downward and outward movement of slope-forming materials including rock, soil, artificial fill, or a combination of these. Vegetation loss acts as a trigger for a landslide to occur.

52.(1)

Total Molar Composition of Seawater (Salinity = 35)^[3]

Component	Concentration (mol/kg)
H ₂ O	53.6
Cl ⁻	0.546
Na ⁺	0.469
Mg ²⁺	0.0528
SO ₄ ²⁻	0.0282
Ca ²⁺	0.0103
K ⁺	0.0102
C _T	0.00206
Br ⁻	0.000844
B _T	0.000416
Sr ²⁺	0.000091
F ⁻	0.000068

53.(4) Central Pollution Control Board (CPCB) of India is a statutory organisation under the Ministry of Environment and Forests (MoEF). It was established in 1974 under Water (Prevention and Control of Pollution) Act, 1974. The directions for the regulation, prohibition or the closure of any industry are given by Central Pollution Control Board.

54.(2)

Code		Day time	Night time
A	Industrial area	75	70
B	Commercial area	65	55
C	Residential area	55	45
D	Silence Zone	50	40

55.(2) Liquid ammonia can be used in refrigeration because of its high dipole moment

56.(4) Correlation and regression methods is suitable for hypothesis testing.

57.(1) Box model is mainly employed for analyzing the Dispersal of atmospheric pollutions.

58.(4) List-I

a. Tropical forest

b. Conifer forest

c. Mangroves

d. Deciduous forest

List-II

(iv) Silent valley

(ii) Himachal Pradesh

(i) Sunderbans

(iii) Rajasthan

59.(1) Solar cells (as the name implies) are designed to convert (at least a portion of) available light into electrical energy. solar cells are based on semiconductor physics -- they are basically just P-N junction photodiodes with a very large light-sensitive area. The photovoltaic effect, which causes the cell to convert light directly into electrical energy, occurs in the three energy-conversion layers

60.(2) GPS systems are increasingly used to create and use waypoints in navigation of all kinds. A typical GPS receiver can locate a waypoint with an accuracy of three meters or better when used with land-based assisting technologies such as the Wide Area Augmentation System (WAAS). Waypoints can also be marked on a computer mapping program and uploaded to the GPS receiver, marked on the receiver's own internal map, or entered manually on the device as a pair of coordinates.

61.(3) A **landfill site** (also known as a **tip, dump, rubbish dump or dumping ground** and historically as a **midden**) is a site for the disposal of **waste** materials by burial and is the oldest form of waste treatment. Landfill sites can be permitted in Habitats of endangered species and recharge zones for local drinking water supplies.

62.(2) **High-altitude nuclear explosions (HANE)** have historically been nuclear explosions which take place above altitudes of 30 km, still inside the Earth's atmosphere.

63.(3) At Climax stage of an ecological succession, an ecosystem exhibits total photosynthesis equal to respiration.

64.(2) Methemoglobinemia is a blood disorder caused when nitrite interacts with the hemoglobin in red blood cells. Unlike hemoglobin, the methemoglobin formed in this interaction cannot carry sufficient oxygen to the body's cells and tissues. A

- 65.(1)** Fluorine is one of the most common elements in the Earth's crust. Fluoride is recognized to be the most effective caries-preventive agent. The main sources of fluoride for people are generally food and drinking water. In the determination of fluoride and of Na and K, an ion-meter with a combination-fluoride electrode and a flame photometer were used, respectively. The levels of Cr, Cu, Fe, Mn, Ni and Pb in the drinking waters were determined by flame atomic absorption spectrometry (FAAS) utilizing the method optimized previously, except for the Ca, Mg and Zn contents, which were measured directly by FAAS
- 66.(1)** The twin-sun theory of the origin of the earth was advanced by Fred Hoyle. Sir Fred Hoyle FRS was an English astronomer noted primarily for his contribution to the theory of stellar nucleosynthesis and his often controversial stance on other cosmological and scientific matters.
- 67.(4)** Reclined folds: axes plunge at nearly same angle as the dip of the axial surface, plunge of the axis normal or at high angle to the strike of the axial plane.
- 68.(3)** Druses are small cavities that are lined with crystals of the same minerals that are found in the host rock. "Druse" may also refer to a surface carpeted with crystals, one with a drusy texture. The word is from German.
- 69.(2)** Vindhyan occupy the time period between 900 - 570 M.Y.
- 70.(2)** Country rocks for Bauxite in Katni area are Gondwanas. Katni (also known as Murwara (Katni) or Mudwara) is a town on the banks of the Katni River in Madhya Pradesh, India. The city has an abundance of lime and bauxite. It also has Ordnance Factory Katni of the Ordnance Factories Board which manufactures products for the Indian Armed Forces.
- 71.(4)** Tectonic disturbance is associated with Intraformational conglomerate.
- 72.(3)** Banded iron formations (also known as banded ironstone formations or BIFs) are distinctive units of sedimentary rock that are almost always of Precambrian age. A typical BIF consists of repeated, thin layers (a few millimeters to a few centimeters in thickness) of silver to black iron oxides, either magnetite (Fe_3O_4) or hematite (Fe_2O_3), alternating with bands of iron-poor shales and cherts, often red in color, of similar thickness, and containing microbands (sub-millimeter) of iron oxides.

- 73.(4)** Back - arc basins are Japan Sea Geosyncline Back-arc basins are geologic features, submarine basins associated with island arcs and subduction zones. They are found at some convergent plate boundaries, presently concentrated in the Western Pacific ocean.
- 74.(4)** Oceanic ridges are called are oceanic ridges when they are Seismically active. A Oceanic ridge is a general term for an underwater mountain system that consists of various mountain ranges (chains), typically having a valley known as a rift running along its spine, formed by plate tectonics.
- 75.(1)** Quartz arenites are usually white, but they may be any other colour; cementation by hematite, for example, makes them red. Characteristically, they are ripple-marked or cross-bedded and occur as widespread thin blanket sands.
- 76.(3)** One of the more important ore-forming processes in which microbial action might play an important role is supergene enrichment. It occurs when relatively poor sulfide mineral deposits lie partly within the zone of oxidation above the water table and partly below the water table where molecular oxygen is excluded in the hypogene zone. Iron sulfide minerals in the zone of oxidation are oxidized to sulfuric acid and ferric sulfate.
- 77.(1)** The Western Dharwar craton, a typical Archean lowgrade terrain, is characterized by the mature sediment-dominated greenstone belt of the Dharwar type. Two main divisions, viz. the older igneous Bababudan group and the Chitradurga group composed of conglomerates, quartzites, limestones, greywackes and associated manganese and ferruginous cherts, are identified. These group of sediments are deposited in three basins : the Shimoga, the Chitradurga and the Sandur basins.
- Banded
- 78.(1)** Magmatic carbonates are termed Carbonatites
Carbonatites are intrusive or extrusive igneous rocks defined by mineralogic composition consisting of greater than 50 percent carbonate minerals.
[1] Carbonatites may be confused with marble, and may require geochemical verification.
- 79.(3)** A braided river is one of a number of channel types and has a channel that consists of a network of small channels separated by small and often temporary

islands called braid bars or, in British usage, aits or eyots. Braided streams occur in rivers with high slope and/or large sediment load. Braided channels are also typical of environments that dramatically decrease channel depth, and consequently channel velocity, such as river deltas, alluvial fans and peneplains.

- 80.(2)** The present day atmosphere and ocean are result of Volcanic exhalation. A volcanic exhalation is an emission of gas or ash from a vent in a relatively short burst. The most striking example of a volcanic exhalation were the emissions of gas (smoke) rings from Mt Etna in 2000.
- 81.(1)** Suture zone is the area where two continental plates have joined together through continental collision. Suture zones are marked by extremely high mountain ranges, such as the Himalayas and the Alps.
- 82.(2)** Sediment is a naturally occurring material that is broken down by processes of weathering and erosion, and is subsequently transported by the action of wind, water, or ice, and/or by the force of gravity acting on the particle itself. The age of the oldest sediments recovered by deep-ocean drilling is about 200 million years old.
- 83.(4)** Environmental auditing is a process whereby an organisation's environmental performance is tested against its environmental policies and objectives.
- An objective of environmentaled audit is
- Raw material & waste minimization
 - Energy conservation & monitoring
 - To improve technical competency
- 84.(1)** Different oil and gas reservoirs namely, L-I, L-II, L-III, L-IV, L-V, basal clastics and fractured basement from top to bottom are present on the Mumbai High project field. L-II and LIII are primarily the limestone oil reservoirs of Miocene age, further classified into several layers. Bombay High has in place around 1,659 million tons of total reserves.
- 85.(4)** Sivalik Hills are the range of the southern Himalaya Mountains extending about 1,689 km (1,050 mi) from southwest Kashmir through northern India into southern Nepal. The hills are noted for their extensive fossil remains. Sivalik is not a place for the occurrence of diamond is not a place for the occurrence of diamond.

- 86.(1)** Mangalloy, also called manganese steel or Hadfield steel, is a steel alloy containing an average of around 13% manganese. Mangalloy is known for its high impact strength and resistance to abrasion once in its work-hardened state. Manganese is used in steel hardening.
- 87.(2)** Precambrian rocks are enriched in manganese and iron ore which represents a significant resource of these metals. They are also extensively mineralised with gold most notably the Kolar gold mines located in Kolar.
- 88.(3)** The important bauxite deposits occur with the 'high level' laterites in the following four regions of dissected table lands viz.
- (1) The Eastern Ghats Orissa and Andhra Pradesh (East Coast Bauxite Belt)
 - (2) Plateaus bordering Bihar and Madhya Pradesh
 - (3) Maikala range of Madhya Pradesh (Amarkantak deposits)
 - (4) The Western Ghats
- 89.(2)** Assay ton is a specialized unit of mass used by mineralogists in assaying (testing) ores for the presence of gold, silver, platinum, uranium, or other valuable metals. One assay ton equals 29.1667 grams. Assay value of gold is calculate in Gm / tone.
- 90.(3)** The Precambrian boundary in Kashmir is located In the middle of lolab Formation.
- 91.(3)** Diesel oil is a fraction obtained between 250-320 °C
- 92.(2)** Limestone is a sedimentary rock composed mainly of calcium carbonate (CaCO_3), usually calcite, sometimes aragonite. Additionally it may contain considerable amounts of magnesium carbonate (dolomite). Many limestones are formed by the deposition and consolidation of the skeletons of marine invertebrates. If limestones are built up from corals and coral fragments, they are called coral limestones. The formation Coral Limestone is found in upper baghs.
- 93.(2)** Magnesite can be formed via talc carbonate metasomatism of peridotite and other ultrabasic rocks. Magnesite can also be formed by way of metasomatism in skarn deposits, in dolomitic limestones, associated with wollastonite, periclase, and talc.
- 94.(3)** If a tourmaline plate is placed over a dot the observer sees two dots, this is due to double refraction.
- 95.(1)** The approximate density of the Earth is 5.5.

- 96.(1)** In a trickling filter biological method of domestic waste treatment a layer of biological community growing on the substrate is Algal film.
- 97.(1)** Wular is a fresh water lake.
- 98.(1)** Calcium carbonate is generally formed due to Evaporation of water.
- 99.(1)** Blueschists is associated with subduction zones.
- 100.(1)** The joints are perpendicular to the axial planes of fold axial planes of folds are described as Cross joint .