

# UGC NET - Environmental Science

## MOCK TEST PAPER

- **PAPER - I**      *This paper contains 50 objective type questions.*  
*Each question carries 2 marks.*  
***Attempt all the questions.***
- **PAPER - II**      *This paper contains 100 objective type questions.*  
*Each question carries 2 marks.*  
***Attempt all the questions.***
- *Pattern of questions*                         :    ***MCQs***
- *Total marks (PAPER I & II)*             :    ***300***
- *Duration of test*                                 :    ***Paper I - 1 Hour***  
   :    ***Paper II - 2 Hours***

### **PAPER-I**

1. In union budget 2018-19, the government announced setting up Ekalavya Model Residential School, Consider the following statement about it.  
(i) It will provide the best quality education to the tribal children in their own environment  
(ii) by 2022 it will be build in every block with more than 50% ST population.  
(iii) It will focus on preserving local art and culture.  
Which of the statement given above is/are correct?  
Select the answer using the codes given below:  
(1) i and ii only   (2) ii and iii only  
(3) iii only   (4) i, ii and iii
2. Which of the following statement is correct about the RISE by 2022 announced by government in Union budget 2018-19?  
(1) It is to step up investments in Education.  
(2) It is to step up investments in health.  
(3) It is to step up investments in telecommunication.

- (4) It is to step up investments in sports.
3. Which country to host the World Sustainable Development Summit – 2018 ?  
(1) South Africa (2) Nepal  
(3) Brazil (4) India
4. Which HRD Ministry-appointed committee is drafting new National Education Policy (NEP)?  
(1) Ram Shanker Kureel committee  
(2) K Kasturirangan committee  
(3) V G S Rathore committee  
(4) KJ Alphonse committee
5. With reference to Paris agreement on climate change, consider the following statements :
- I. It was signed by 195 nations in Dec 2015 at Paris  
II. The main aim is to keep a global temperature rise this century well below 3 degrees Celsius  
III. It further aims to drive efforts to limit the temperature increase even further to 1.5 degrees Celsius above pre-industrial levels
- Which of the above statements are correct ?  
(1) I and II (2) II and III  
(3) I, II and III (4) I and III
6. Which of the following statements are correct?
- a. Parliament cannot alter the name and territory of J&K without the consent of the State legislature  
b. The Union shall have the power to suspend the State Constitution on the ground of failure to comply with the directions given by the Union.  
c. No proclamation of Emergency can be made by the President under Article 352 on the ground of “internal disturbance” in J&K without the concurrence of J&K Government
- Which of the above statements are correct ?  
(1) (1) and (2) (2) (2) and (3)  
(3) (1) and (3) (4) (1), (2), (3)

7. **Assertion (1):** Global warming is the increase in Earth's near-surface air and ocean temperatures.

**Reason (R):** The greenhouse effect is when water and carbon dioxide absorb outgoing infrared radiation, increasing the planet's temperature

Choose the correct code:

- (1) Both (1) and (R) are correct      (2) Both (1) and (R) are incorrect,  
(3) (1) is true and (R) is true      (4) (1) is false and (R) is true

8. Which of these pairs are correctly matched ?

- a. The Vienna Convention : Protection of Ozone Layer  
b. Montreal Protocol : Substances that Deplete the Ozone Layer  
c. The Minamata Convention : Lead

- (1) a only  
(2) a and b only  
(3) c only

9. Representation of the People (Amendment and Validation) Bill, 2013, brought two key changes. These changes were :

- Even if a person is prohibited from voting due to being in police custody or in jail, he can file nomination for an election.
- Definition of "disqualified" in the Act has been amended. disqualification has to be due to conviction for certain specified offences and can be on no other ground.
- Anyone in prison or on the lawful custody of the police (other than preventive detention) is not entitled to vote.

Select the correct answer using the codes given below.

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

10. Match List – I and List – II and identify the correct code:

- |                         |                   |
|-------------------------|-------------------|
| a. World Health Day     | i. 16th September |
| b. World Population Day | ii. 1st December  |
| c. World Ozone Day      | iii. 11th July    |
| d. World AIDS Day       | iv. 7th April     |

**Codes:**

	<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>
(1)	i	ii	iii	iv
(2)	iv	iii	i	ii
(3)	ii	iii	iv	i
(4)	iii	iv	ii	i

**11. Assertion (1):** Water Borne diseases are largely caused by micro-organisms present in human or animal waste

**Reason (R):** Typhoid fever is a Water Borne diseases.

Choose the correct code:

- (1) Both (1) and (R) are correct
- (2) Both (1) and (R) are incorrect,
- (3) (1) is true and (R) is true
- (4) (1) is false and (R) is true

**12.** Which of the following statements regarding the meaning of research are correct

- a. Research refers to a series of systematic activity or activities undertaken to find out the solution of a problem
- b. It is a systematic, logical and an unbiased process wherein verification of hypothesis data analysis, interpretation and formation of principles can be done
- c. It is an intellectual enquiry or quest towards truth
- d. It leads to enhancement of knowledge

- (1) (1), (2) and (3)                      (2) (2), (3) and (4)
- (3) (1), (3) and (4)                      (4) (1), (2), (3) and (4)

**13.** Below are given two set – research methods (Set-I) and data collection tools (Set-II). Match the two sets and indicate your answer by selecting the correct code:

- |                             |                                   |
|-----------------------------|-----------------------------------|
| A Experimental method       | i Using primary secondary sources |
| B Ex post-facto method      | ii Questionnaire                  |
| C Descriptive survey method | iii Standardized tests            |
| D Historical method         | iv Typical characteristics tests  |

**Codes:**

A B C D

1. ii i iii iv
2. iii iv ii i
3. ii iii i iv
4. ii iv iii i

**14.** Consider the following statements :

- a. Teaching is the stimulation, guidance, direction and encouragement of learning
- b. Good teaching is as much about passion as it is about reason
- c. Good teaching is also about bridging the gap between theory and practice

Which of the above statements are correct ?

- |             |                |
|-------------|----------------|
| (1) a and b | (2) b and c    |
| (3) a and c | (4) a, b and c |

**15.** Consider the following statements about NITI Aayog :

- a. The National Institution for Transforming India, also called NITI Aayog, was formed via a resolution of the Union Cabinet on January 1, 2015
- b. NITI Aayog fosters Cooperative Federalism
- c. The President is its Chairman

Which of the statements given above is/are correct ?

- |                  |                  |
|------------------|------------------|
| (1) a and b only | (2) b and c only |
| (3) a and c      | (4) a, b and c   |

**16.** Imagine you are working in an educational institution where people are of equal status. Which method of communication is best suited and normally employed in such a context?

- |                              |                            |
|------------------------------|----------------------------|
| (1) Horizontal communication | (2) Vertical communication |
| (3) Corporate communication  | (4) Cross communication    |

**17.** An unsolicited e-mail message sent to many recipients at once is a

- |            |           |
|------------|-----------|
| (1) Worm   | (2) Virus |
| (3) Threat | (4) Spam  |

**18.** If the proposition 'All thieves are poor' is false, which of the following propositions can be claimed certainly to be true?

### Propositions :

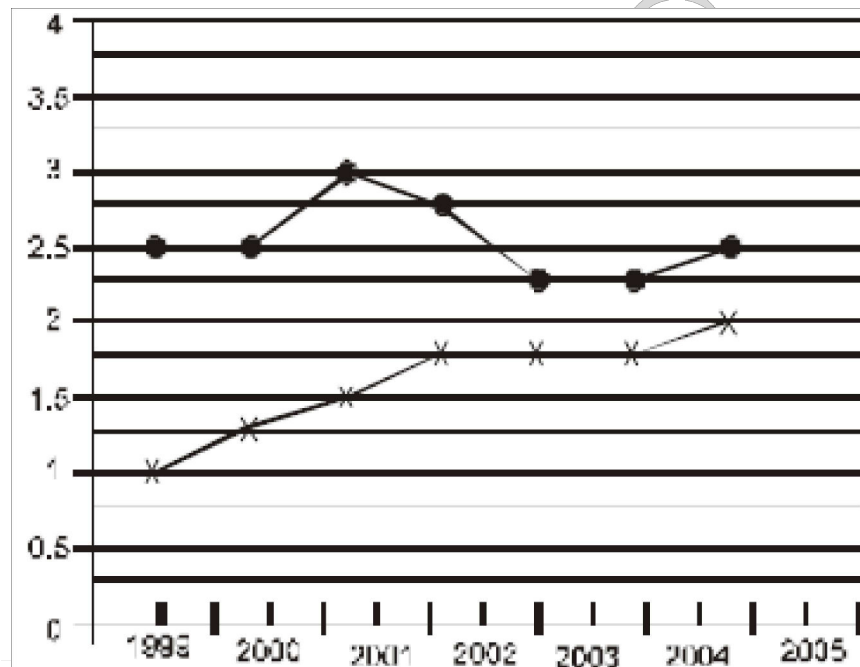
- (1) Some thieves are poor.                      (2) Some thieves are not poor.  
(3) No thief is poor.                              (4) No poor person is a thief.

19. It is communication of feelings, emotions, attitudes, and thoughts through body movements / gestures / eye contact, etc.” which type of communication is this?

- (1) Oral communication                      (2) Written communication  
(3) Non verbal communication              (4) None

Questions 20-24 Study the following graph carefully to answer the given questions.

PRODUCTION OF TWO COMPANIES A AND B ( IN CRORE UNITS) OVER THE GIVEN YEARS



20. For Company A, how much is the percent increase in production in 2000 from 1999?

- (1) 0.25    (2) 2.5  
(3) 25     (4) 12.5

21. How many units is the total production of Company A for the given years?

- (1) 9 crores                                         (2) 17.75 crores  
(3) 12.25 crores                                 (4) 11 crores

22. What is the difference in units produced by the two companies in 1999?

- (1) 1,50,000,000                                 (2) 15,00,00,000

- (3) 15,00,000 (4) 15,000
23. How many units is the approximate average production of Company B for the given years?
- (1) 3 crores (2) 2.55 crores  
(3) 2.75 crores (4) 2.25 crores
24. In which year did both the companies have no change in production from the previous year?
- (1) 2000 (2) 2002  
(3) 2003 (4) 2004
25. Which of the following collection techniques were used as the primary research methods for this study?
- (1) Qualitative (2) Quantitative  
(3) Both (1) and (2) (4) None
26. Which of the following problems was India faced with after Independence ?
- (1) Military attack from a country across the border.  
(2) Lack of coordination between the Central and State Governments.  
(3) Improper coordination of various Government policies  
(4) Increasing the production from a very low level
27. Which of the following issues was not appropriately realized by the Central Government.
- (1) Ethnic diversity of the people  
(2) A national language for the country  
(3) Implementation of the formulated policies  
(4) Centre -State relations
28. Why was central economic planning found to be difficult?
- (1) Multiplicity of States and Union Territories  
(2) Lack of coordination in different Government departments  
(3) Autonomy given to the States in certain matters  
(4) Lack of will in implementing land reforms
29. Why was the linguistic reorganization of the State accepted?
- (1) The States were not cooperating with the Central Government

(2) Non- Congress Governments in the States demanded such a reorganization of the States

(3) No common national language emerged

(4) Strong pressure from the States was exerted on the Central Government to create such States

30. Which, according to the passage, can be cited as an exercise in democratic practice in India before Independence?

(1) The handing over of power by the British to India

(2) The Indianisation of the Indian Civil Service

(3) A neutral role played by the Army

(4) None of the above

31. The information to be collected in survey method are related to

(1) Present Position

(2) Aims of the research

(3) The attainment of aim of research

(4) All of the above

32. One of the essential characteristics of research is

(1) Sensitivity

(2) Generalizability

(3) Usability

(4) Replicability

33. Identify the main Principle on which the Parliamentary System operates.

(1) Responsibility of Executive to Legislature

(2) Supremacy of Parliament

(3) Supremacy of Judiciary

(4) Theory of Separation of power

34. Match list I with list II and select the correct from the code given below :

**List I ( Institutions)**

1. Indian Veterinary Research Institute

2. Institute of Armament Technology

3. Indian Institute of Science

4. National Institute for Educational Pannesi and Administrators

(1) 1-ii, 2-i, 3-iv, 4-iii

(2) 1-ii, 2-iv, 3-ii, 4-iii

**List II (Locations)**

i. Pune

ii. Izat Nagar

iii. Delhi

vi. Bangalore

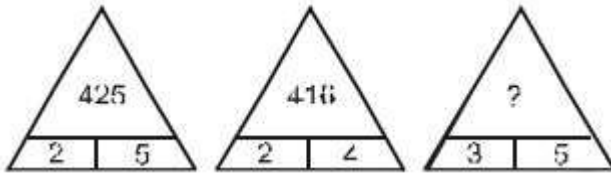


(3) 1-ii, 2-iii, 3- I, 4- iv                      (4) 1-iv, 2-iii, 3-ii, 4-i

- 35.** The prime minister of India is appointed from \_\_\_\_\_  
(1) The leading Party in Lok Sabha  
(2) The Leading Party in Rajya Sabha  
(3) The leading party in Lok Sabha and Rajya Sabha combined  
(4) None of the above
- 36.** The study of interrelations between Organism and their environment is called \_\_\_\_  
(1) Biosphere    (2) Ecology  
(3) Synecology    (4) Autecology
- 37.** The term ICT is now also used to refer to the convergence of  
(1) Audio visual    (2) Telephone network  
(3) Both (1) and (2)    (4) None
- 38.** Fossil Fuels include  
(1) Oil    (2) Natural Gas  
(3) Coal    (4) All of the above
- 39.** Noise in excess of \_\_\_\_\_ is called noise pollution  
(1) 40-65 db    (2) 60-70 db  
(3) 80-100 db    (4) None of the above
- 40.** Effectiveness of teaching depends on \_\_\_\_  
(1) Handwriting of Teacher                      (2) Speaking ability of Teacher  
(3) Qualification of the Teacher              (4) Subject Understanding of the Teacher
- 41.** The participation of students will be maximum if \_\_\_\_ method is used for teaching.  
(1) Text Books    (2) Discussion Method  
(3) Conference Method                              (4) Lectures
- 42.** In following questions, number series is given. One of the numbers in each series is wrong. After searching wrong number find the correct number in its place.  
510, 254, 126, 64, 30, 14, 6  
(1) 252    (2) 62  
(3) 130    (4) 9
- 43.** Which reasoning determines whether the truth of a conclusion can be determined for that rule, based solely on the truth of the premises?

- (1) Deductive (2) Inductive  
 (3) Abductive (4) All

44. Insert the missing number or letter from among the given alternatives.



- (1) 140 (2) 280  
 (3) 875 (4) 925

45. In the following question assuming the given statements to be true, find out which of the two assumptions I and II given below them is/are definitely true give answer as.

- (1) Only assumption I is implicit  
 (2) Only assumption II is implicit  
 (3) Either I or II is implicit  
 (4) Neither I nor II is implicit  
 (E) Both I and II are implicit

Statement: The State government has decided to appoint four thousand primary school teachers during the next financial year.

Assumptions:

- I. There are enough schools in the state to accommodate four thousand additional primary school teachers.  
 II. The eligible candidates may not be interested to apply as the government may not finally appoint such a large number of primary school teachers.

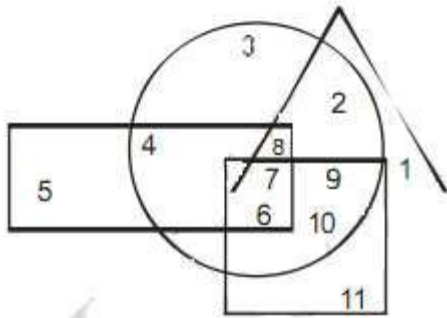
46. What is the latest write-once optical storage media?

- (1) Digital paper (2) Magneto-optical disk  
 (3) WORM disk (4) CD- ROM disk

47. Which of the following identifies a specific web page and its computer on the Web?

- (1) Web site (2) Web site address  
 (3) URL (4) Domain Name

Direction (48-49) In the following figure, rectangle, square, circle and triangle represents the regions of wheat gram, maize and rice cultivation respectively. On the basis of the figure, answer the following questions.



48. Which of the area is cultivated for wheat and maize only?
- (1) 8 (2) 6  
(3) 5 (4) 4
49. Which of the area is cultivated for maize only?
- (1) 10 (2) 2  
(3) 3 (4) 4
50. Pointing to a photograph. Bajpai said, " He is the son of the only daughter of the father of my brother." How Bajpai is related to the man in the photograph?
- (1) Nephew (2) Brother  
(3) Father (4) Maternal Uncle

## PAPER-II

1. Which country will be the global host for World Environment Day (WED) 2018 ?  
(1) USA (2) UK  
(3) India (4) China
2. The most potent greenhouse gas among the following is \_\_\_?  
(1) Carbon dioxide (2) Methane  
(3) Water Vapor (4) Ozone
3. Interior of the earth is inferred through:  
(1) Deep continental drilling  
(2) Deep ocean drilling  
(3) Seismic soundings  
(4) Heat flow measurements
4. Which of the following Environmentalists first gave the concept of Biodiversity 'hotspots' ?  
(1) Gaylord Nelson (2) Norman Myers  
(3) John Muir (4) Julia "Butterfly" Hill
5. Around the mid latitude, the surface winds are generally  
(1) Gradient (2) Geostrophic  
(3) Subgeostrophic (4) Cyclonic
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

12. With reference to ecosystem stability, consider the following statements:

- i. A diverse and complex ecosystem is more stable.
- ii. Ecosystem stability increases with decrease in number of links in food web.

Which of the statements given above is/are correct?

- (1) I and ii
- (2) I only
- (3) ii only
- (4) Neither I nor ii

13. Photo ionization of gas molecules maintain the temperature profile of which atmospheric layer ?

- (1) Troposphere
- (2) Stratosphere
- (3) Mesosphere
- (4) Thermosphere

14. How many biogeographic regions are reported to exist in India ?

- (1) Five
- (2) Seven
- (3) Ten
- (4) Three

15. Atmospheric nitrogen can undergo nitrogen fixation by

- i. cyanobacteria
- ii. lightning
- iii. ultraviolet rays

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

16. Biodiversity hotspots are regions of high

- (1) stationary population of common species
- (2) richness of endemic species
- (3) migratory population
- (4) richness of dominant species

17. Consider the following statements :

- i No human activity is allowed inside tiger reserves.
- ii. Tourism is allowed in national parks.

Which of the statements given above is/are correct ?

- (1) I and ii
- (2) I only
- (3) ii only
- (4) Neither I nor ii

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

**Codes :**

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

21. **Assertion (1)** : 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 (1) and (R) are correct and (R) is the correct explanation of (1).
- (2) Both (1) and (R) are correct and (R) is not the correct explanation of (1).
- (3) (1) is true but (R) is false.
- (4) (1) 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. Given below are two statements. One labelled as Assertion (1) and the other labelled as Reason (R) :
- Assertion (1)** : Temperature in stratosphere increases with increase in altitude.  
**Reason (R)** : Photo dissociation of  $O_2$  in stratosphere makes the lapse rate positive.
- Choose the correct answer :
- (1) Both (1) and (R) are correct and (R) is the correct explanation of (1).  
(2) Both (1) and (R) are correct and (R) is not the correct explanation of (1).  
(3) (1) 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, SO<sub>2</sub> content and NO<sub>x</sub> 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; SO<sub>2</sub> and NO<sub>x</sub> 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 (1)** : CFCs destroy ozone molecules in stratosphere  
**Reason (R)** : CFCs have very high global warming potential
- (1) Both (1) and (R) are true and (R) is the correct explanation of (1)
  - (2) Both (1) and (R) are true but (R) is not the correct explanation of (1)
  - (3) (1) is true; (R) is false
  - (4) (1) 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

- (1) Environmental Protection Act
- (2) Air (Prevention and Control of Pollution) Act
- (3) Water (Prevention and Control of Pollution) Act
- (4) Public Liability Insurance Act

List - II

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

**Code: (1) (2) (3) (4)**

- (1) (i) (ii) (iv) (iii)
- (2) (iv) (iii) (ii) (i)
- (3) (ii) (iv) (i) (iii)
- (4) (iii) (i) (ii) (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<sub>4</sub>
- (2) C<sub>2</sub>H<sub>5</sub>
- (3) CO<sub>2</sub>
- (4) NO<sub>2</sub>

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

List-I

- (1) Fluvial
- (2) Shallow Marine
- (3) Glacial
- (4) aeolian

List-II

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

**Code: (1) (2) (3) (4)**

- (1) (iii) (iv) (i) (ii)
- (2) (i) (ii) (iii) (iv)
- (3) (iv) (iii) (ii) (i)
- (4) (iii) (iv) (ii) (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)**

- (1) Commercial area
- (2) Residential area
- (3) Industrial area
- (4) Silence zones

**List-II (Daytime Noise standards in dB)**

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

**Code: (1) (2) (3) (4)**

- (1) (i) (ii) (iv) (ii)
- (2) (iii) (iv) (i) (ii)

(3) (iv) (iii) (ii) (i)

(4) (ii) (i) (iv) (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

**Code: (1) (2) (3) (4)**

(1) (i) (ii) (iv) (iii)

(2) (ii) (i) (iv) (iii)

(3) (i) (iv) (ii) (iii)

(4) (iv) (ii) (i) (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)  $\text{NO}_2$                       (2)  $\text{NO}_3^-$                       (3)  $\text{NH}_4^+$                       (4)  $\text{NO}_2^-$
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

Read the passage below and answer questions that follow based on your understanding of the passage:

Forests in India are fast disappearing at a rate of about 0.6% per year equivalent to about 7.3 million ha. This renders all the closed tropical forests disappear within 177 years, At this rate of destruction of tropical forests, about 20-25% of the

worlds plant species would have been lost by the year 2000. By another estimate 90% of tropical forest area containing about 505 varieties of world plant species will be destroyed during the next 20 years. By another estimate 1000 species/year would become extinct. This figure is expected to rise to 10,000 species/year. During the next 20 years, about one million species are likely to disappear. Loss of biodiversity is severe in agricultural ecosystems too. During green revolution, thousands of wild crop varieties were replaced with a few hybrid species. This resulted in slight disappearance of genetic resources of crop plants, especially of wheat and rice. With the disappearance of the plants, the associated microorganism and fauna were also lost. Further indiscriminate use of fertilizers and insecticides reduced the microbial species diversity live stock populations are already homogenized and their diversity is extinct.

Much of the fragile breeding and feeding grounds of almost 2/3rd of the world's oceanic fish have been destroyed. Endangered marine life in India lists about 8 species of marine mammals, 5 species of marine turtles, 1 species of hemichordate, 3 species of cephalochordate, 10 species of crab etc.

Major cause of loss of biodiversity is the expansion of agricultural practices.

Biological diversity is replaced by biological uniformly or monoculture in the name of green revolution in agriculture, white revolution in dairying and blue revolutions is to ensure food security and prevent "hunger disaster".

Biodiversity is also lost due to reclamation for building dams, factories highways, mining operations etc. In the forested regions. Illegal trade and poaching of wild life also damaged biodiversity. Thus, biodiversity is destroyed by anthropogenic activities.

**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. Vindhya occupy the time period between  
 (1) 1400 - 900 M.Y (2) 900 - 570 M.Y  
 (3) 1600 - 900 M.Y (4) 2500 - 1600 M.Y
70. Country rocks for Bauxite in Katni area are  
 (1) Vindhya (2) Gondwana  
 (3) Deccan trap (4) Precambrian
71. Tectonic disturbance is associated with  
 (1) Orthoconglomerate (2) Paraconglomerate  
 (3) Petroclastic 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) Meriterarrenean  
 (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 environment 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) Maganese
  - (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 calculate 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 lolab Formation  
(2) Below lolab Formation  
(3) In the middle of lolab 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 CO<sub>2</sub> (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-I

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Answer	4	1	4	2	4	3	1	2	1	2	1	4	3	4	1	1	4	2	3	3
Question	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Answer	4	1	2	4	1	4	1	3	4	2	4	3	1	1	1	2	3	4	3	4
Question	41	42	43	44	45	46	47	48	49	50										
Answer	2	2	1	4	1	4	4	4	3	4										

## 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-I

1.(4) Eklavya schools will be established for scheduled caste (SC) and schedule tribe students by 2022 on the lines of Navodaya schools.

They will be model residential schools set up in each Block. It will in areas with more than 50% tribal areas and 20,000 tribal people.

These schools will be part of Navodaya Vidyalayas. It will provide training in sports and skill development.

It has special facilities for preserving local art and culture.

2.(1) Revitalising Infrastructure and Systems in Education (RISE) Scheme :

RISE scheme aims to lend low-cost funds to government higher educational institutions. It will be launched with a total investment of Rs. 1 lakh crore in the next four years. It will be financed via restructured higher education financing agency

(HEFA), a non-banking financial company.

**3.(4)** The World Sustainable Development Summit–2018 was held in New Delhi on February 16.

The summit will address a wide variety of issues, including combating land degradation and air pollution, effective waste management and create financial mechanisms to enable effective climate change mitigation.

The theme of the 2018 Summit is–Partnerships for a Resilient Planet, which seeks to create action frameworks to resolve some of the most urgent challenges facing developing economies in the backdrop of climate change.

It seeks to bring together on a common platform, global leaders and thinkers in the fields of sustainable development, energy and environment sectors.

**4.(2)** The 9-member committee, headed by former ISRO chief K Kasturirangan, was constituted by the Union HRD Ministry to draft new National Education Policy (NEP) on June 2017. The committee will submit its report by March 31, 2018. The existing NEP was framed in 1986 and revised in 1992.

**5.(4)** An historic agreement to combat climate change and unleash actions and investment towards a low carbon, resilient and sustainable future was agreed by 195 nations in Paris in Dec 2015.

The Paris Agreement for the first time brings all nations into a common cause based on their historic, current and future responsibilities.

The universal agreement's main aim is to keep a global temperature rise this century well below 2 degrees Celsius and to drive efforts to limit the temperature increase even further to 1.5 degrees Celsius above pre-industrial levels.

The 1.5 degree Celsius limit is a significantly safer defense line against the worst impacts of a changing climate.

**6.(3)** Under Part XXI of the Constitution of India, which deals with “Temporary, Transitional and Special provisions”, the State of Jammu and Kashmir has been accorded special status under Article 370. Even though included in 1st Schedule as 15th state, all the provisions of the Constitution which are applicable to other states are not applicable to J&K.

Special Features- J&K is the only state in India which has a Constitution of its own.

The Constitution of J&K was enacted by a separate Constituent Assembly set up by the State and it came into force on 26th January 1957.

**7.(1)** Global warming is the increase in Earth's near-surface air and ocean temperatures.

The greenhouse effect is when water and carbon dioxide absorb outgoing infrared radiation, increasing the planet's temperature. Greenhouse gases contribute to global warming. What is determined to be a greenhouse gas is any heat-trapping gas present in the Earth's atmosphere.

The two most common greenhouse gases are water vapor and carbon. These gases help absorb infrared radiation and regulate the Earth's climate. However, the increase in industrial production has increased the amount of greenhouse gases present in the atmosphere.

The increase in carbon dioxide emissions has made it difficult for heat to escape the atmosphere which in turn contributes to the warming effect.

**8.(2) The Vienna Convention** for the Protection of the Ozone Layer is a Multilateral Environmental Agreement. It was agreed upon at the Vienna Conference of 1985 and entered into force in 1988.

It acts as a framework for the international efforts to protect the ozone layer.

**The Montreal Protocol** on Substances that Deplete the Ozone Layer (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion.

**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.

The Convention was signed by delegates representing close to 140 countries on 19 January 2013 in Geneva and adopted later that year on 10 October 2013 on a Diplomatic Conference held in Kumamoto, Japan. The Convention is named after the Japanese city Minamata.

**9.(1)** In July 2013, Supreme Court had ruled that a person, who is in jail or in police custody, cannot contest elections to legislative bodies.

Representation of the People (Amendment and Validation) Bill, 2013 however, brought two key changes:

Firstly, even if a person is prohibited from voting due to being in police custody or in jail, as long as his name is entered on the electoral roll he shall not cease to be an elector. This implies that he can file nomination for an election. Secondly, definition of “disqualified” in the Act has been amended.

Prior to this act, the definition of disqualified means disqualified for either being chosen as or being a MP or MLA.

Secondly, definition of “disqualified” in the Act has been amended.

The amendment adds a ground to the definition that the disqualification has to be due to conviction for certain specified offences and can be on no other ground.

Conviction for only these certain offences would result in the person’s name being removed from the electoral roll and he would cease to be an elector.

#### **10.(2)**

**11.(1)** Water Borne diseases are largely caused by micro-organisms present in human or animal waste, which find their way into human body.

These diseases are infectious, which means that they can spread from one person to another.

So high standards of hygiene and sanitation are needed to stop the disease from spreading.

Waterborne diseases include:

- (i) Typhoid fever
- (ii) Giardia
- (iii) Dysentery
- (iv) Cholera
- (v) Diarrhoea (caused by a variety of pathogens)
- (vi) Hepatitis
- (vii) Polio
- (viii) Worms

**12.(4)** Research has been defined in a number of different ways.

A broad definition of research is given by Godwin Colibao: “In the broadest sense

of the word, the definition of research includes any gathering of data, information, and facts for the advancement of knowledge.”

Another definition of research is given by John W. Creswell, who states that “research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue”.

It consists of three steps: pose a question, collect data to answer the question, and present an answer to the question.

The Merriam-Webster Online Dictionary defines research in more detail as “a studious inquiry or examination; especially investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws.

**13.(3) In descriptive survey method-** we’ve to use questionnaires (Because it’s ‘survey).

Descriptive research is all about describing people who take part in the study.

There are three ways a researcher can go about doing a descriptive research project, and they are: Observational, Case study and Survey, defined as a brief interview or discussion with an individual about a specific topic

**Historical method-** we have to use primary and secondary sources.

Historical method comprises the techniques and guidelines by which historians use primary sources and other evidence, including the evidence of archaeology, to research and then to write histories in the form of accounts of the past.

In **experimental method-** we can collect data in a way that permit standardized tests. The experimental method is a systematic and scientific approach to research in which the researcher manipulates one or more variables, and controls and measures any change in other variables.

**An ex post facto research design** is a method in which groups with qualities that already exist are compared on some dependent variable.

Also known as “after the fact” research, an ex post facto design is considered quasi-experimental because the subjects are not randomly assigned - they are grouped based on a particular characteristic or trait.

**14.(4)** According to Burton, Teaching is the stimulation, guidance, direction and



encouragement of learning.

Good teaching requires some basics that a teacher should follow to achieve the main goal of teaching.

Good teaching is as much about passion as it is about reason. It's about not only motivating students to learn, but teaching them how to learn, and doing so in a manner that is relevant, meaningful, and memorable.

It's about caring for your craft, having a passion for it, and conveying that passion to everyone, most importantly to your students. Good teaching is also about bridging the gap between theory and practice. It is about listening, questioning, being responsive, and remembering that each student and class is different. It is about caring, nurturing, and developing minds and talents.

Diagnosis, Remedy, Direction and Feedback are required for good teaching.

**15.(1)** The National Institution for Transforming India, also called NITI Aayog, was formed via a resolution of the Union Cabinet on January 1, 2015.

NITI Aayog is the premier policy 'Think Tank' of the Government of India, providing both directional and policy inputs. While designing strategic and long term policies and programmes for the Government of India, NITI Aayog also provides relevant technical advice to the Centre and States.

The Government of India, in keeping with its reform agenda, constituted the NITI Aayog to replace the Planning Commission instituted in 1950.

An important evolutionary change from the past, NITI Aayog acts as the quintessential platform of the Government of India to bring States to act together in national interest, and thereby fosters Cooperative Federalism.

**The Prime minister is its Chairperson.**

**16.(1)** Horizontal communication is the communication where information or messages flows among the similar or same level statuses of people in the organizational structure.

Horizontal communication is the communication that flows laterally within the organization, involves persons at the same level of the organization. Horizontal communication normally involves coordinating information and allows people with the same or similar rank in an organization to cooperate or collaborate. Thus in

terms of statuses horizontal method is used.

**17.(4)** Spam is an irrelevant or unsolicited messages sent over the Internet, typically to large numbers of users, for the purposes of advertising, phishing, spreading malware, etc.

Spam is flooding the Internet with many copies of the same message, in an attempt to force the message on people who would not otherwise choose to receive it. Most spam is commercial advertising, often for dubious products, get-rich-quick schemes, or quasi-legal services.

**18.(2)** Propositions are contradictory when the truth of one implies the falsity of the other, and conversely.

if 'All thieves are poor' is false, then the proposition 'Some thieves are not poor' must be true.

**19.(3)** Non verbal communication is communication of feelings, emotions, attitudes, and thoughts through body movements / gestures / eye contact, etc.

$$\begin{aligned} \text{20.(3) \% increase} &= \frac{0.25 \text{ crore}}{1 \text{ crore}} \times 100 \\ &= 25\% \end{aligned}$$

**21.(4)** For company A

$$\begin{aligned} &1 + 1.25 + 1.5 + 1.75 + 1.75 + 1.75 + 2 \\ &= 11 \text{ crore} \end{aligned}$$

$$\begin{aligned} \text{22.(1)} \quad (2.5 - 1) \text{ crores} &= 1.5 \times 100 \text{ 00 000} \\ &= 150 \text{ 00 000} \end{aligned}$$

**23.(2)** Total production of B

$$\begin{aligned} &= 2.5 + 2.5 + 3 + 2.75 + 2.25 + 2.25 + 2.5 \\ &= 17.75 \end{aligned}$$

$$\text{Average production} = \frac{17.75}{7} = 2.55$$

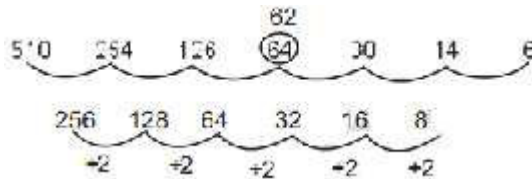
**24.(4)** In year 2004.

**25.(1)** Qualitative data collection techniques were used as the primary research methods for this study. Participant and direct observation plus note taking were the most important techniques used.

- 26.(4)** Production was at very low level.
- 27.(1)** Ethnic diversity of the people was not appropriately realized by the Central Government.
- 28.(3)** Central economic planning found to be difficult because autonomy was given to the States in certain matters
- 29.(4)** Because that time no common language emerged.
- 30.(2)** “The Indianisation of the Indian Civil Service” , can be cited as an exercise in democratic practice in India before Independence
- 31.(4)** The information to be collected in survey method are related to present position, aims of the research & the attainment of aim of research. Exposure units must be defined, must be considered in developing DQOs for project, or results may not be accepted.
- Sufficient samples are required 8-10 samples when contaminant concentrations vary within a narrow range 10-15 sample when concentrations are less predictable  
Calculate 90th Upper Confidence Limit ( UCL)
- 32.(3)** One of the essential characteristics of research is usability.
- 33.(1)** A parliamentary system is a system of democratic government in which the ministers of the Executive Branch derive their legitimacy from and are accountable to a Legislature or parliament; the Executive and Legislative branches are interconnected. It is a political system in which the supreme power lies in a body of citizens who can elect people to represent them.
- 34.(1)** IVRI is situated in Izat Nagar.  
IAT is situated in Pune  
IISc is situated in Bangalore  
NIEPA is situated in Delhi.
- 35.(1)** The prime minister of India is appointed from the leading Party in Lok Sabha.
- 36.(2)** The study of interrelations between Organism and their environment is called ecology.
- 37.(3)** The term ICT is now also used to refer to the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system.
- 38.(4)** Fossil fuels are fuels made by natural processes such as anaerobic decomposition of buried dead organisms. Ex. Oil, Natural gas, coal etc.

- 39.(3) Noise in excess of 80-100DB is called noise pollution.
- 40.(4) Effectiveness of teaching depends on Subject Understanding of the Teacher
41. (2) The participation of students will be maximum if Discussion Method is used for teaching.

42.(2)



"30, 64 is wrong & must be replaced by 62.

- 43.(1) Deductive reasoning determines whether the truth of a conclusion can be determined for that rule, based solely on the truth of the premises.
- 44.(4)  $(2)^2 = 4$ ,  $(5)^2 = 25 \Rightarrow 425$   
 $(2)^2 = 4$ ,  $(4)^2 = 16 \Rightarrow 416$   
 $(3)^2 = 9$ ,  $(5)^2 = 25 \Rightarrow 925$ .
- 45.(1) Such decisions as given in the statement are taken only after taking the existing vacancies into consideration. So, I implicit while II does not implicit.
- 46.(4) CD-ROM disk is the latest write-once optical storage media
- 47.(4) Domain Name identifies a specific web page and its computer on the Web.
- 48.(4) The required region is the one which is common only to the rectangle and circle and is not a part of either the triangle or square
- 49.(3) The required region is the one which lies inside the circle but outside the rectangle, square and triangle,
- 50.(4) The man in the photo is the son of the sister of Bajpai. Hence, Bajpai is the maternal uncle of the man in the photograph.

## 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 world wide 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  $90^\circ$  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)** Photo ionization 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, *Azoto bacteraceae*, 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<sub>2</sub> will increase photosynthesis. Increased CO<sub>2</sub> 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.

**Metoldehyde** 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<sub>2</sub> (nitrogen) and O<sub>2</sub> (oxygen) molecules. Collision with an O<sub>2</sub> molecule can lead to a combination of O<sub>2</sub> 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<sub>2</sub>) 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<sub>3</sub>).

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, SO<sub>2</sub> content and NO<sub>x</sub> 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:  $SO_2 \xrightarrow{h\nu} SO_2^*$

**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 kWh =  $3.6 \times 10^6$  J = 859.9 kcal =  $2.656 \times 10^6$  ft lb<sub>f</sub> (foot pound force) =  $3.412 \times 10^3$  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<sub>4</sub>.
- 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, 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)<sup>[3]</sup>**

Component	Concentration (mol/kg)
H <sub>2</sub> O	53.6
Cl <sup>-</sup>	0.546
Na <sup>+</sup>	0.469
Mg <sup>2+</sup>	0.0528
SO <sub>4</sub> <sup>2-</sup>	0.0282
Ca <sup>2+</sup>	0.0103
K <sup>+</sup>	0.0102
C <sub>T</sub>	0.00206
Br <sup>-</sup>	0.000844
B <sub>T</sub>	0.000416
Sr <sup>2+</sup>	0.000091
F <sup>-</sup>	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**

**List-II**

A. Tropical forest

(iv) Silent valley

B. Conifer forest

(ii) Himachal Pradesh

C. Mangroves

(i) Sunderbans

D. Deciduous forest

(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.
- 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 of 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 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 from 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 ( $\text{Fe}_3\text{O}_4$ ) or hematite ( $\text{Fe}_2\text{O}_3$ ), 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 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 manganiferous 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 as Carbonatites. Carbonatites are intrusive or extrusive igneous rocks defined by mineralogic composition consisting of greater

than 50 percent carbonate minerals.

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 environmented 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 ( $\text{CaCO}_3$ ), 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 .