SUBJECT CODE	SUBJECT
A-28-18	ENVIRONMENTAL SCIENCES

HALL TICKET NUMBER	PAPER
	II

OMR SHEET NUMBER	NUMBER OF QUESTIONS
	100

DURATION	MAXIMUM MARKS	NUMBER OF PAGES
2 HOURS	200	24

QUESTION BOOKLET NUMBER

This is to certify that, the entries made in the above portion are correctly written and verified.

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Instructions for the Candidates

1. Write your Hall Ticket Number in the space provided on the top of this page.
2. This paper consists of hundred multiple-choice type of questions.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested **to open the booklet and compulsorily examine it as below** :
   (i) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.
   (ii) **Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.**
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4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
   Example : (A) (B) ● (D)
   where (C) is the correct response.
5. Your responses to the items are to be indicated in the **OMR Answer Sheet given to you**. If you mark at any place other than in the circle or half circle or semi circle in the Answer Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. **The candidate must handover the OMR Answer Sheet to the invigilators at the end of the examination compulsorily** and must not carry it with you outside the Examination Hall. The candidate is allowed to take away the carbon copy of OMR Sheet and used Question paper booklet at the end of the examination.
10. **Use only Blue/Black Ball point pen.**
11. **Use of any calculator or log table etc., is prohibited.**
12. **There is no negative marks for incorrect answers.**

అభ్యర్థికి సూచనలు

1. ఈ పుట పై భాగంలో ఇవ్వబడిన స్థలంలో మీ హాల్‌టికెట్ నంబరు రాయండి.
2. ఈ ప్రశ్న పత్రము నంద (100) బహుళైచ్ఛిక ప్రశ్నలను కలిగి ఉంది.
3. పరీక్ష ప్రారంభమున ఈ ప్రశ్నాపత్రము మీకు ఇవ్వబడుతుంది మొదటి ఐదు నిమిషములలో **ఈ ప్రశ్నాపత్రమును తెరిచి కింద తెలిపిన అంశాలను తప్పనిసరిగా పరిచూసుకోండి.**
   (i) ఈ ప్రశ్న పత్రమును చూడడానికి కవర్ పేజి అంచున ఉన్న కాగితపు సీలును చించండి. కాగితపు సీలులేని మరియు ఇదివరకే తెరిచి ఉన్న ప్రశ్నాపత్రమును మీరు అంగీకరించవద్దు.
   (ii) **కవరు పేజి పై ముద్రించిన సమాచారం ప్రకారం ఈ ప్రశ్న పత్రములోని పేజీల సంఖ్యను మరియు ప్రశ్నల సంఖ్యను సరిచూసుకోండి.పేజీల సంఖ్యకు సంబంధించి గానీ లేదా సూచించిన సంఖ్యలో ప్రశ్నలు లేకపోవుట లేదా నిజప్రతి కాకపోవుట లేదా ప్రశ్నలు క్రమపద్ధతిలో లేకపోవుట లేదా ఏవైనా తేడాలుండుట వంటి దోషపూరితమైన ప్రశ్న పత్రాన్ని పెంటనే మొదటి ఐదు నిమిషాల్లో పరీక్షా పర్యవేక్షకునికి తిరిగి ఇచ్చివేసి దానికి బదులుగా సరిగ్గా ఉన్న ప్రశ్నపత్రాన్ని తీసుకోండి. తదనంతరం ప్రశ్నపత్రము మార్చబడదు అదనపు సమయం ఇవ్వబడదు.**
   (iii) పై విధంగా సరిచూసుకొన్న తర్వాత ప్రశ్నాపత్రం సంఖ్యను OMR పత్రము పై అదేవిధంగా OMR పత్రము సంఖ్యను ఈ ప్రశ్నాపత్రము పై నిర్దిష్ట స్థలంలో రాయవలెను.
4. ప్రతి ప్రశ్నకు నాలుగు ప్రత్యామ్నాయలు (A), (B), (C) మరియు (D) లుగా ఇవ్వబడ్డాయి. ప్రతి ప్రశ్నకు సరైన జవాబును ఎన్నుకొని OMR పత్రములో ప్రతి ప్రశ్నా సంఖ్యకు ఇవ్వబడిన నాలుగు వృత్తాల్లో సరైన జవాబు సూచించే వృత్తాన్ని బాల్ పాయింట్ పెన్‌తో కింద తెలిపిన విధంగా పూరించాలి
   ఉదాహరణ : (A) (B) ● (D)
   (C) సరైన ప్రతిస్పందన అయితే.
5. ప్రశ్నలకు జవాబును ఈ ప్రశ్నపత్రముతో ఇవ్వబడిన OMR పత్రము పైన ఇవ్వబడిన వృత్తాల్లోనే పూరించి గుర్తించాలి. అలాకాక సమాధాన పత్రం పై వేరొక చోట గుర్తించిన లేక సగ వృత్తం లేదా అసంపూర్ణ వృత్తాన్ని నింపిన మీ జవాబు మూల్యాంకనం చేయబడదు.
6. ప్రశ్న పత్రము లోపల ఇచ్చిన సూచనలను జాగ్రత్తగా చదవండి.
7. చిత్తుపనిని ప్రశ్నపత్రము చివర ఇచ్చిన ఖాళీ స్థలములో చేయాలి.
8. OMRపత్రము పై నిర్ణీత స్థలంలో సూచించబడిన వివరాలు తప్పించి ఇతర స్థలంలో మీ గుర్తింపును తెలిపే విధంగా మీ పేరు రాయడం గానీ లేదా ఇతర చిహ్నాలను పెట్టడం గానీ చేసినట్లయితే మీ అనర్హతకు మీరే బాధ్యులవుతారు.
9. **పరీక్ష పూర్తయిన తర్వాత OMR పత్రాన్ని తప్పనిసరిగా పరీక్ష పర్యవేక్షకుడికి ఇవ్వాలి.** వాటిని పరీక్ష గది బయటకు తీసుకువెళ్ళకూడదు. పరీక్ష పూర్తయిన తరువాత అభ్యర్థులు ప్రశ్న పత్రాన్ని OMR పత్రం యొక్క కార్బన్ కాపీని తీసుకువెళ్ళవచ్చు
10. **నీలి/నల్ల రంగు బాల్ పాయింట్ పెన్ మాత్రమే ఉపయోగించాలి.**
11. **లాగరిథమ్ టేబుల్స్, క్యాలిక్యులేటర్‌లు, ఎలక్ట్రానిక్ పరికరాలు మొదలగునవి పరీక్ష గదిలో ఉపయోగించడం నిషేధం.**
12. **తప్పు సమాధానాలకు మార్కుల తగ్గింపు లేదు.**

ENVIRONMENTAL SCIENCES

Paper – II

1. The components dealt in the convention on biodiversity are

I. TRIPS

II. Country of origin

III. Prior informed consent

IV. Protection of forests

Codes :

(A) I and II are correct

(B) I and III are correct

(C) II and IV are correct

(D) II and III are correct

2. **Assertion (A)** : In a watershed, water balance is influenced by precipitation (Pn) and evapotranspiration (Et) ratio or meteorological balance.

Reason (R) : When precipitation (Pn) is more than evapotranspiration (Et), there is a water surplus which is discharged as a surface runoff.

Codes :

(A) (A) and (R) are true and (R) is correct explanation for (A)

(B) Both (A) and (R) are true, but (R) is not correct explanation of (A)

(C) (A) is true, but (R) is false

(D) (A) is false, but (R) is true

3. The objectives of environmental auditing includes

i. Evaluation of environmental performance of the industry

ii. Evaluation of actual performance of the industry

iii. Evaluation of financial performance of the industry

iv. Compliance of company standards and legal requirements

Codes :

(A) (i), (ii) and (iii) are correct

(B) (ii), (iii) and (iv) are correct

(C) (i), (ii) and (iv) are correct

(D) (i), (iii) and (iv) are correct

4. The most important social impact assessment indicator

a. Demographic characteristics

b. Livestock and housing pattern

c. Habitat and fauna

d. Soil and water quality

Codes :

(A) (a) and (c) are correct

(B) (b) and (d) are correct

(C) (a) and (b) are correct

(D) (b) and (c) are correct

5. Solve $\frac{1}{3}(X+Y)=\frac{1}{5}(X-Y), 3X+11Y=4.$

(A) X = 1, Y = 4

(B) X = 5, Y = 6

(C) X = 16, Y = –4

(D) X = –4, Y = 16

6. The standard order for following and complying with the environmental requirements.

I. CFE (Consent For Establishment)

II. Environmental Audit

III. EIA (Environmental Impact Assessment)

IV. Environmental Clearance

V. CFO (Consent For Operation)

Codes :

(A) I, III, II, IV, V

(B) III, I, IV, V, II

(C) III, IV, I, V, II

(D) I, IV, III, II, V

7. Rank the following plastics according to their property for recyclability.

I. Polystyrene

II. Polyvinyl chloride

III. Polyethylene Terephthalate

IV. Polypropylene

V. Polycarbonate

Codes :

(A) III, II, IV, I, V

(B) V, III, I, II, IV

(C) III, V, I, IV, II

(D) V, II, III, IV, I

8. Match the following :

List – I	**List – II**
I. Oil spill	i. Soil pollution
II. Garbage	ii. Marine pollution
III. El Nino	iii. Accumulation of Zn-65
IV. Oyster	iv. Impact on Indian monsoon

Codes :

	I	**II**	**III**	**IV**
(A)	(i)	(ii)	(iii)	(iv)
(B)	(iv)	(ii)	(iii)	(i)
(C)	(iii)	(iv)	(i)	(ii)
(D)	(ii)	(i)	(iv)	(iii)

9. High level radioactive waste can be managed in which of the following way ?

(A) Composting

(B) Store indefinitely

(C) Incineration

(D) Neutralization

10. Which of the following is the major source of energy for cooking food in rural India ?

(A) Electricity

(B) Agricultural waste

(C) Kerosene

(D) Fuel wood

11. What is not true about hydroelectric energy ?

(A) It is cheaper than the electricity produced by thermal power plants

(B) Hydro-power generation comes under re-newable energy as the energy is produced from the kinetic energy of water

(C) Hydro-power plants are a threat to environment as they cause high level of radioactive pollution

(D) Hydro-power plants are non-polluting and environment friendly energy generation units

12. **Assertion (A)** : Evaluation of soil for site selection can improve the response to many resource concerns.

Reason (R) : Evaluation is done for site selection is based on loss of soil by erosion, nutrient loss imbalance, pesticide carry over, loss of organic matter, unfavourable pH, and reduced water quality.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(C) (A) is false and (R) is true

(D) (A) is true and (R) is false

13. Arrange the following elements present in sea water in increasing concentration.

I. Chloride

II. Calcium

III. Magnesium

IV. Sulphate

V. Sodium

Codes :

(A) I $\rightarrow$ IV $\rightarrow$ III $\rightarrow$ V $\rightarrow$ II

(B) I $\rightarrow$ V $\rightarrow$ IV $\rightarrow$ III $\rightarrow$ II

(C) I $\rightarrow$ V $\rightarrow$ III $\rightarrow$ IV $\rightarrow$ II

(D) II $\rightarrow$ IV $\rightarrow$ V $\rightarrow$ III $\rightarrow$ I

14. The equation

A_t/A_{t-1} explains the efficiency of

(Where,

A = Assimilation

t = Present trophic level

t – 1 = Preceeding trophic level)

(A) Trophic level production efficiency

(B) Trophic level assimilation efficiency

(C) Assimilation efficiency

(D) Ecological growth efficiency

15. The area of productive ecosystems (Crop and forest land, bodies of water and undeveloped natural areas) outside a city that is required to support life in the city is the

(A) Ecological economics

(B) Ecological foot print

(C) Ecological capital

(D) Ecological succession

16. Peroxyacetyl Nitrate (PAN) is formed by oxidation of

1. Hydrocarbons
2. Isoprene
3. Terpene
4. Arsenic

The correct answer is :

(A) 1 and 4

(B) 2 and 4

(C) 3 and 4

(D) 1, 2 and 3

17. Which of the following activities are responsible for spreading radioactivity in the atmosphere ?

1. Nuclear explosions
2. Defensive weapon explosion
3. Deforestation
4. Nuclear accidents

Codes :

(A) 1, 3 and 4 are correct

(B) 1, 2 and 3 are correct

(C) 1, 2 and 4 are correct

(D) 2, 3 and 4 are correct

18. The term allopatric speciation refers to

(A) Sexual isolation

(B) Geographical isolation

(C) Psychological isolation

(D) Behavioral isolation

19. Identify the correct statements.

I. Biological richness of the environment is the valuable resource and its preservation is vital for sustainable development.

II. Biosphere reserves integrate human needs and aid indigenous communities.

III. Ecotourism destroys the environment and is not ecologically and socially sustainable.

IV. The natural biogeographical area must be managed as a unit to preserve all its values.

Codes :

(A) I, III

(B) II, III, IV

(C) I, II, IV

(D) III, IV

20. **Assertion (A)** : Eutrophication is the accumulation of nutrients into aquatic bodies due to anthropogenic activities.

Reason (R) : The excess amount of sulphates, phosphates and nitrates in aquatic systems are responsible for eutrophication.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(C) (A) is false but (R) is true

(D) (A) is true but (R) is false

21. The lake Hussain Sagar is a

(A) Oligotrophic

(B) Mesotrophic

(C) Hypotrophic

(D) Eutrophic

22. Who developed a simple interaction matrix for impact identification ?

(A) Dawson (1994)

(B) Hill et al (2005)

(C) Leopold et al (1971)

(D) Johnson and Bell (1973)

23. Calculate the resultant noise of four equipments emitting equal sound of 60 dB(A).

(A) 120 dB(A)

(B) 63 dB(A)

(C) 69 dB(A)

(D) 66 dB(A)

24. The following are the fat content found in 5 samples of each of two brands of Baby food :

A : 5.7 4.5 6.2 6.3 7.3

B : 6.3 5.7 5.9 6.4 5.1

Which of the following procedures is appropriate to test the hypothesis of equal average fat content in the two types of baby food ?

(A) Two sample t-test with 9 d.f.

(B) Two sample t-test with 8 d.f.

(C) Paired t-test with 4 d.f.

(D) Paired t-test with 5 d.f.

25. Match the following :

List – I	**List – II**
I. Public Liability Insurance Act	1. 2002
II. Motor Vehicle Act	2. 1974
III. Water (Prevention and Control of Pollution) Act	3. 1991
IV. Biological Diversity Act	4. 1988

Codes :

	I	**II**	**III**	**IV**
(A)	3	2	1	4
(B)	2	3	1	4
(C)	2	1	4	3
(D)	3	4	2	1

26. **Assertion (A)** : Increased carbon concentrations in the atmosphere has resulted in the global warming.

Reason (R) : Large scale destruction of forests has contributed for the rise in atmospheric carbon.

Codes :

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(C) (A) is true, but (R) is false

(D) (A) is false, but (R) is true

27. Match the following :

List – I (Organ of human ear)	List – II (Function)
I. Auditory canal	i. Carry message to brain
II. Sensory hairs	ii. Collection of sound waves
III. Melens, incus and stapes	iii. Conversion of sound in electrical signal
IV. Auditory nerve	iv. Amplication/ Dampening of sound

Codes :

	I	II	III	IV
(A)	(i)	(ii)	(iii)	(iv)
(B)	(iv)	(iii)	(i)	(ii)
(C)	(iii)	(ii)	(iv)	(i)
(D)	(ii)	(iii)	(iv)	(i)

28. PAN formation is a process of interaction between

i. Hydrocarbon and nitrogen oxides

ii. Carbon monoxide and hydrocarbons

iii. Aerosols and nitrogen oxides

Codes :

(A) (i), (iii) are correct

(B) (i), (ii) are correct

(C) (ii), (iii) are correct

(D) Only (i) is correct

29. Which one of the following is not a type of nuclear reactor ?

(A) Light Gas Reactor (LGR)

(B) Light Water Reactor (LWR)

(C) Heavy Water Reactor (HWR)

(D) Liquid Metal Fast Breeder Reactor (LMFBR)

30. Match the trace element given in Column I with that of the its effect given in Column II :

Column – I	Column – II
I. Arsenic	1. Minamata accident
II. Mercury	2. Carcinogenic
III. Lead	3. High blood pressure
IV. Cadmium	4. Nervous disorders

Codes :

	I	II	III	IV
(A)	1	4	3	2
(B)	2	1	4	3
(C)	4	1	2	3
(D)	3	2	1	4

31. Which one of the following factors do not belong to soil survey and land use planning ?

(A) Engineering construction

(B) Crop suitability

(C) Erosion

(D) Particulate matter

32. Correctly sequence the following terms in hydrological cycle.

I. Evaporation

II. Interception

III. Percolation

IV. Infiltration

V. Precipitation

VI. Condensation

VII. Transpiration

VIII. Runoff

IX. Storage.

Codes :

(A) I $\rightarrow$ IX $\rightarrow$ VII $\rightarrow$ VIII $\rightarrow$ II $\rightarrow$ III $\rightarrow$ IV $\rightarrow$ V $\rightarrow$ VI

(B) I $\rightarrow$ VI $\rightarrow$ V $\rightarrow$ II $\rightarrow$ IV $\rightarrow$ III $\rightarrow$ VII $\rightarrow$ VIII $\rightarrow$ IX

(C) I $\rightarrow$ IV $\rightarrow$ III $\rightarrow$ II $\rightarrow$ V $\rightarrow$ VIII $\rightarrow$ VI $\rightarrow$ VII $\rightarrow$ IX

(D) IV $\rightarrow$ I $\rightarrow$ III $\rightarrow$ V $\rightarrow$ II $\rightarrow$ VI $\rightarrow$ VIII $\rightarrow$ VII $\rightarrow$ IX

33. Arrange the ecological levels of organisation, hierarchy in proper order.

1. Organism
2. Community
3. Cell
4. Ecosystem
5. Tissue
6. Population
7. Landscape
8. Biome
9. Organ

Codes :

(A) $7 \rightarrow 1 \rightarrow 4 \rightarrow 9 \rightarrow 2 \rightarrow 5 \rightarrow 3 \rightarrow 6 \rightarrow 8$

(B) $3 \rightarrow 5 \rightarrow 9 \rightarrow 1 \rightarrow 6 \rightarrow 2 \rightarrow 4 \rightarrow 7 \rightarrow 8$

(C) $4 \rightarrow 7 \rightarrow 8 \rightarrow 2 \rightarrow 3 \rightarrow 1 \rightarrow 6 \rightarrow 5 \rightarrow 9$

(D) $3 \rightarrow 5 \rightarrow 8 \rightarrow 7 \rightarrow 2 \rightarrow 1 \rightarrow 4 \rightarrow 9 \rightarrow 6$

34. **Assertion (A)** : Co-evolution is the joint evolution of two or more non-interbreeding species that have a close ecological relationship, such as plants and herbivores, large organisms and their micro-organism symbionts, or parasites and their hosts.

Reason (R) : The 'struggle for existence' and 'survival of the fittest' are not just a matter of 'dog eat dog'. In many cases, survival and successful reproduction are based on co-operation rather than competition.

Codes :

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true and (R) is not the correct explanation of (A)

(C) (A) is true and (R) is false

(D) (A) is false and (R) is true

35. **Assertion (A)** : Decomposition of hydrocarbons is favoured in neutral soil.

Reason (R) : Neutral pH favours the greatest population of micro-organisms.

Codes :

(A) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(B) Both (A) and (R) are true and (R) is the correct explanation of (A)

(C) (A) is false and (R) is true

(D) (A) is true and (R) is false

36. Which of the following statement is true about mercury ?

a. Principal ore of Hg is cinnabar.

b. The natural abundance of Hg in soil is 0.5 ppm.

c. Elemental Hg is fairly inert and non-toxic.

d. There is remarkable difference in toxicity of methyl mercury compound and other species.

Codes :

(A) only a is correct

(B) only d is correct

(C) b, c and d are correct

(D) a, b and d are correct

37. Find the correct match from the following :

List – I	List – II
I. Cryptophyte	1. Buds are naked and situated high upon the plant
II. Chamaephyte	2. Buds are completely hidden in soil and mostly found in arid zones
III. Phanerophyte	3. Buds are hidden under soil surface and are mostly found in temperate zone
IV. Hemicryptophyte	4. Complete their life cycle in a single season
	5. Buds are situated close to the ground surface and are common at high altitudes

Codes :

	I	II	III	IV
(A)	2	4	5	3
(B)	5	4	1	3
(C)	2	5	1	3
(D)	3	5	2	1

38. Identify the correct match among the following :

I. Rachel Carson	1. The sum of the adaptation of the plant to climate
II. Raunkiaer	2. Gamma diversity
III. Robert Whittaker	3. Hot spots for tropical forest plants
IV. Norman Myers	4. Silent spring
	5. Agrobiodiversity centre

Codes :

	I	II	III	IV
(A)	4	5	1	2
(B)	2	1	5	3
(C)	4	2	3	1
(D)	4	1	2	3

39.

List – I (Disease)	List – II (Vector)
I. Malaria	1. *Aedes*
II. Dengue	2. *Anopheles*
III. Dysentery	3. *Culex*
IV. Filaria	4. *Musca*

Codes :

	I	II	III	IV
(A)	3	4	2	1
(B)	2	1	4	3
(C)	2	4	1	3
(D)	1	3	4	2

40. Main toxic substance in Bhopal disaster was

(A) Methyl isocyanide

(B) Methyl isocyanate

(C) BHC

(D) Both DDT and BHC

41. The atmospheric condition represented by no change in temperature with altitude is

(A) Super adiabatic lapse rate

(B) Sub adiabatic lapse rate

(C) Environmental lapse rate

(D) Isothermal lapse rate

42. How many environmental attributes were used in a cross impact matrix developed by Johnson and Bell ?

(A) 90

(B) 100

(C) 92

(D) 80

43. In statistical hypothesis test of equality of means, such as $H_0 : \mu = 10$ if $\alpha = 5\%$

(A) 5% of the time we will make a correct inference

(B) 5% of the time we will say that there is no real difference when there is a difference (Type II error)

(C) 5% of the time we will say that there is a real difference when there is no difference (Type I error)

(D) 95% of the time the null hypothesis will be correct

44. Match the following :

List – I	List – II
I. Kyoto protocol	1. Wetland conservation
II. Rio Earth Summit	2. Ozone
III. Montreal protocol	3. Biodiversity convention
IV. Ramsar convention	4. Climate change

Codes :

	I	II	III	IV
(A)	4	3	2	1
(B)	1	4	2	3
(C)	2	1	4	3
(D)	4	1	3	2

45. Identify the correct order of component plant species in the succession on a rock.

(A) *Lacanora*, *Parmelia*, *Polytrichum*, *Festuca*, *Phytocarpus* and Mesophytic trees

(B) *Parmelia*, *Polytrichum*, *Lacanora*, *Festuca*, *Phytocarpus* and Mesophytic trees

(C) *Lacanora*, *Polytrichum*, *Festuca*, *Parmelia*, *Phytocarpus* and Mesophytic trees

(D) *Lacanora*, *Polytrichum*, *Phytocarpus*, *Parmelia*, *Festuca* and Mesophytic trees

46. **Assertion (A)** : Conservation ethics is related to scientific preservation view.

Reason (R) : It extends the rational consideration to the entire and for all times.

Codes :

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true and (R) is not the correct explanation of (A)

(C) (A) is true, but (R) is false

(D) (A) is false, but (R) is true

47. **Assertion (A)** : Thermal pollution brings the aquatic life under threat.

Reason (R) : The biological reactions and dissolved oxygen content are dependent on the temperature variations in the water bodies.

Codes :

(A) Both (A) and (R) are true and (R) is proper explanation of (A)

(B) Both (A) and (R) are true but (R) is not proper explanation of (A)

(C) (A) is true but (R) is false

(D) (A) and (R) both are false

48. Which of the following statements are true ?

i. Ozone is a major constituent of photochemical smog.

ii. Ozone is not used for drinking water treatment.

iii. Ozone is a stable gas.

iv. Ozone protects the life from harmful radiation of sun.

Codes :

(A) only (i) and (ii)

(B) (i), (ii) and (iii)

(C) (i), (iv) only

(D) (ii), (iii), (iv)

49. Which of the following statements are true ?

i. Nuclear energy is the energy in the nucleus of an atom.

ii. Nuclear energy can be used to produce electricity.

iii. Nuclear energy can be obtained either by nuclear fusion or by nuclear fission.

iv. In case of nuclear fusion or nuclear fission atoms experiment, no loss of mass.

Codes :

(A) (i) and (iii) are correct

(B) (i), (ii) and (iii) are correct

(C) (iii) and (iv) are correct

(D) (i), (ii), (iii) and (iv) are correct

50. Match the term given in Column I with its objectives given in Column II :

Column – I	**Column – II**
i. Biomass	1. Indirectly supplies all the energy required for sustaining life in earth
ii. Biogas	2. Good means of storing diffused and intermittent energy
iii. Petroplants	3. An important solution to prevent energy crises in rural areas
iv. Solar energy	4. Source of liquid hydrocarbon

Codes :

	i	**ii**	**iii**	**iv**
(A)	4	3	2	1
(B)	2	3	4	1
(C)	3	2	4	1
(D)	3	2	1	4

51. Match the following :

List – I	List – II
I. Earthquakes	1. Ice
II. Rock	2. Lava
III. Volcanos	3. CH_4
IV. Green House Gas	4. Mineral
V. Avalanche	5. Richter scale

Codes :

	I	II	III	IV	V
(A)	5	4	1	2	3
(B)	5	4	2	3	1
(C)	4	5	3	1	2
(D)	2	4	1	3	5

52. Which one of the following is the predominant volatile gas in a volcanic eruption ?

(A) CO

(B) S_2

(C) H_2

(D) N_2

53. Identify the proper order in the process of speciation.

I. Geographical isolation

II. Reproductive isolation

III. Homogenous population

IV. Species formation

V. Permits new species to live in same regions

Codes :

(A) V $\rightarrow$ IV $\rightarrow$ III $\rightarrow$ II $\rightarrow$ I

(B) IV $\rightarrow$ III $\rightarrow$ V $\rightarrow$ I $\rightarrow$ II

(C) III $\rightarrow$ II $\rightarrow$ I $\rightarrow$ IV $\rightarrow$ V

(D) II $\rightarrow$ I $\rightarrow$ IV $\rightarrow$ V $\rightarrow$ III

54. **Assertion (A)** : Meta-populations defined as sub-populations occupying discrete patches or islands of suitable habitat that are separated by unsuitable habitat but connected by dispersal corridors.

Reason (R) : Meta-population in a patchy environment with corridors between patches. If the species fails to reproduce in a patch, then the meta-population may survive by receiving immigrants from a high quality patch.

Codes :

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(C) (A) is false and (R) is true

(D) (A) is true and (R) is false

55. Activation energy of a chemical reaction is evaluated from

(A) Van't Hoff isotherm

(B) Arrhenius plot

(C) Scatchard plot

(D) Gibb's – Helmholtz equation

56. Match the contents of Column I with Column II and choose the correct answer :

Column – I	Column – II
I. A process in which electrons are transferred between two species	1. Oxidation
II. The process when the oxygen content of a covalent bonded molecule increases	2. Redox reaction
III. The primary constituent of fossil fuels	3. Methanol
IV. The major component of natural gas	4. Hydrocarbons

Codes :

	I	II	III	IV
(A)	4	3	2	1
(B)	2	1	4	3
(C)	1	2	3	4
(D)	2	3	1	4

57. The study of interactions between different communities of the area is referred as

(A) Autecology

(B) Community ecology

(C) Population ecology

(D) Biome ecology

58. **Assertion (A)** : The nitrogen cycle is the most complex of the nutrient cycles.

Reason (R) : Many steps in the cycle are mediated by specific micro-organisms.

Codes :

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(C) (A) is false and (R) is true

(D) (A) is true and (R) is false

59. The target for Solar Energy Mission under the Climate Change Action Plan of India, is

(A) To achieve 100 GW

(B) To achieve 50% of the installed capacity by solar

(C) To make all villages electrified with solar

(D) (B) and (C) are correct

60. What is true about environmental education :

i. Environmental education aims to acquire an awareness of and sensitivity to the total environment and its allied problems.

ii. It aims at acquiring skills for identifying and solving environmental problems.

iii. It does not aim at developing to evaluate environmental measures and education programmes in terms of ecological, economic and educational factors.

iv. A number of new objectives and guiding principles for developing environmental education were formulated at the UNESCO-1977 Tbilisi Conference.

Codes :

(A) (i) and (iii) are correct

(B) (i), (ii), (iii) and (iv) are correct

(C) (i), (ii) and (iv) are correct

(D) (iii) and (iv) are correct

61. In the wood management, the area of trees which have been cut down to the ground to allow shoots to grow which are then harvested is called

(A) Coppice system

(B) Bodging system

(C) Vattaknal system

(D) Taungya system

62. What are the characteristics of the major projects ?

a. Substantial capital investment

b. Wide range of impacts

c. Employ less numbers

d. Cover large area

Codes :

(A) (a) and (c) are correct

(B) (b) and (c) are correct

(C) (c) and (d) are correct

(D) (a), (b) and (d) are correct

63. Which of the following is correct for the effective stack height ?

(A) Stack height – Plume height

(B) Stack height + Plume height

(C) Stack height × Plume height

(D) Stack height ÷ Plume height

64. What is the purpose of a multiple regression ?

(A) To predict scores on an independent variable from scores on multiple independent variable

(B) To predict scores on a dependent variable from scores on a single independent variable

(C) To assess whether there is a significant difference between repeated measures

(D) To predict scores on a dependent variable from scores on multiple independent variable

65. If value of 'p' is smaller or lesser than 0.5, then binomial distribution is classified as

(A) Skewed to right

(B) Skewed to left

(C) Skewed to infinity

(D) Skewed to integers

66. "Environmental statement" is the outcome of the

(A) Environmental Audit

(B) Environmental Impact Assessment

(C) Environmental Public Consultation

(D) Environmental Monitoring

67. What are the direct benefits of the Environmental Audit to the industry ?

I. Enhance the productivity

II. Savings from the resources conservation

III. Receives tax concessions on profits

IV. Enable managements to know compliance status

Codes :

(A) I and II are correct

(B) II and III are correct

(C) I and III are correct

(D) II and IV are correct

68. Match the following :

List – I (CFC Species)	**List – II (Uses)**
I. CFC – 11	i. Extinguishing fires
II. CFC – 12	ii. As propellents in aerosols
III. CFC – 113	iii. As a solvent
IV. CFC – 114	iv. As a coolents

Codes :

	I	**II**	**III**	**IV**
(A)	(iv)	(iii)	(i)	(ii)
(B)	(iii)	(ii)	(iv)	(i)
(C)	(i)	(iii)	(ii)	(iv)
(D)	(ii)	(iv)	(iii)	(i)

69. Biomedical waste disposal is done by

i. Incineration

ii. Release in municipal waste stream

iii. Autoclaving and landfilling

Codes :

(A) (i) is correct

(B) (ii), (iii) are correct

(C) (i), (ii) are correct

(D) (i), (ii), (iii) are correct

70. According to 2011 survey of World Energy Council (WEC), the top crude oil producing country in the world was

(A) Venezuela

(B) India

(C) Iran

(D) Canada

71. Match the contents of Column I with that of Column II :

Column – I	**Column – II**
I. A device that utilises the photoelectric effect to convert incidental sunlight directly into electricity	1. Nuclear fission
II. Radiant energy from the sun	2. Energy content
III. The process that energies sun	3. Photovoltaic cell
IV. The total amount of energy stored within a given quantity of fuel	4. Solar energy

Codes :

	I	**II**	**III**	**IV**
(A)	1	2	3	4
(B)	2	3	1	4
(C)	3	2	1	4
(D)	3	4	1	2

72. Weathering process is related to

(A) Weather formation

(B) Formation of soil

(C) Formation of atmosphere

(D) Soil profile

73. The following characters are the salient features used in

1. Large size
2. Low productivity
3. Long period of sexual immaturity
4. Low mortality
5. Long life span
6. Economical use of energy

Codes :

(A) r-strategies (B) k-strategies
(C) s-strategies (D) z-strategies

74. Match the following :

List – I	List – II
I. Micro-organisms have evolved with the physical environment to provide control and to maintain conditions favourable to life on earth is called	1. Gause principle
II. No two species with the same ecological requirements can co-exist	2. Liebig Law
III. Developed logistic equation, expressing interspecific competition, such as predator-prey relationships	3. Gaia hypothesis
IV. The essential resources most closely approaching the minimum need tends to be the limiting one	4. Lotka-Volterra equation

Codes :

	I	II	III	IV
(A)	3	4	2	1
(B)	2	4	1	3
(C)	4	3	2	1
(D)	3	1	4	2

75. Assertion (A) : Organic particulate matter originate mainly from combustion of fuels, automobiles and vegetation.

Reason (R) : Chrysene, benzeno-fluoranthene and benzidine are some organic particulate matter.

Codes :

(A) (A) is correct and (R) is wrong
(B) (A) is wrong and (R) is correct
(C) Both (A) and (R) are correct
(D) (A) is correct but (R) is not the correct explanation of (A)

76. Which one of the following is not an un-saturated hydrocarbon ?

(A) Ethene
(B) Benzene
(C) Hexane
(D) Acetic acid

77. Tropical rain forests are found in

(A) Equatorial regions with rainfall less than 240 cm a year and temperature more than 17°C
(B) Equatorial regions with average temperature below 17°C and rainfall exceeding 240 cm a year
(C) Equatorial regions with rainfall exceeding 240 cm a year and the average temperature is more than 17°C
(D) Equatorial regions with rainfall below 200 cm and temperature below 15°C

78. Identify the correct statements :

I. The pyramids of numbers and biomass are always upright.

II. Pyramids of energy are always upright.

III. The pyramid of biomass is always inverted.

IV. Pyramids of numbers may be upright or inverted.

Codes :

(A) I, IV

(B) I, II, III

(C) II, III, IV

(D) II, IV

79. Arrange the process order for solid waste management.

I. Reduce generation

II. Eliminate generation

III. Recover

IV. Reuse/Recycle

V. Disposal

Codes :

(A) I $\rightarrow$ II $\rightarrow$ III $\rightarrow$ IV $\rightarrow$ V

(B) II $\rightarrow$ III $\rightarrow$ IV $\rightarrow$ I $\rightarrow$ V

(C) I $\rightarrow$ II $\rightarrow$ IV $\rightarrow$ III $\rightarrow$ V

(D) II $\rightarrow$ I $\rightarrow$ IV $\rightarrow$ III $\rightarrow$ V

80. Match the following :

Column – I	**Column – II**
I. Earth scan	1. Founded by UNEP in 1976 which commissions original articles on environmental matters
II. Environmental Protection Agency (EPA)	2. An autonomous body founded in 1948 with its headquarters at Morges, Switzerland
III. IUCN	3. An independent federal agency of the U.S. government established in 1970
IV. UNEP	4. It was set up in 1972 with headquarters at Nairobi, Kenya

Codes :

	I	**II**	**III**	**IV**
(A)	1	3	2	4
(B)	2	1	3	4
(C)	4	1	2	3
(D)	3	2	1	4

81. Match the following :

List – I (Industrial project)	List – II (Impacts)
I. Irrigation	i. Toxic waste emission
II. Thermal power plant	ii. Submergence of forests
III. Sugar and distillery	iii. Particulate and gases emission
IV. Pesticide/ Fertilizer	iv. Biological waste emission

Codes :

	I	II	III	IV
(A)	(ii)	(iii)	(iv)	(i)
(B)	(i)	(iv)	(ii)	(iii)
(C)	(iii)	(ii)	(i)	(iv)
(D)	(iv)	(ii)	(iii)	(i)

82. If z score of normal distribution is 2.5, mean of distribution is 45 and standard deviation of normal distribution is 3, then value of X for normal distribution is

(A) 97.5

(B) 47.5

(C) 37.5

(D) 67.5

83. Discrete probability distribution in which outcome is very small with a very small period of time is classified as

(A) Posterior distribution

(B) Cumulative distribution

(C) Normal distribution

(D) Poisson distribution

84. Basal convention is related to

(A) Categorization of hazardous substances

(B) Handling and storage of hazardous substances

(C) Transboundary movement of hazardous substances

(D) Disposal strategies for Hazardous substances

85. The top two major and toxic heavy metals that enter into soil from domestic batteries

I. Copper

II. Lithium

III. Selenium

IV. Cadmium

Codes :

(A) II and IV are correct

(B) I and IV are correct

(C) II and III are correct

(D) I and III are correct

86. **Assertion (A)** : There is an increase in oxygen demand in fresh water reservoirs in India.

Reason (R) : Suspended matter contributes to oxygen depletion due to low penetration of sunlight interfering in photosynthetic activity.

Codes :

(A) Both (A) and (R) are true and (R) is correct explanation of (A)

(B) Both (A) and (R) are true but (R) is not a correct explanation for (A)

(C) (A) is true but (R) is false

(D) (A) is false but (R) is true

87. Identify the correct statements :

i. The sensory cells in the cochlear canal converts the sound energy in electrical signal.

ii. The sensory cells magnify the sound received by inner ear.

iii. Inadequate oxygen supply leads in metabolic exhaustion of sensory cells.

iv. The frequent metabolic exhaustion of sensory cells results in degenerative changes.

Codes :

(A) (i) (ii) (iii)

(B) (ii) (iii) (iv)

(C) (i) (iii) (iv)

(D) (i) (ii) (iv)

88. Match the type of coal given in Column I with its calorific value given in Column II :

Column – I	**Column – II**
I. Anthracite	1. 8.3 to 25 million joules/kg.
II. Bituminous coal	2. 5.5 to 14.3 million joules/kg
III. Sub-bituminous coal	3. 18.8 to 29.3 million joules/kg
IV. Lignite	4. 30.0 million joules/kg

Codes :

	I	**II**	**III**	**IV**
(A)	3	4	2	1
(B)	4	3	2	1
(C)	2	3	4	1
(D)	4	3	1	2

89. Which of the following is the correct statement ?

i. The earth's internal temperature can provide a useful source of energy at same places.

ii. High pressure, high temperature steam fields exist below the earth's surface.

iii. Around the continental plates, this geothermal energy is expressed in form of hot springs, geysers and fumaroles.

iv. The earth's internal temperature can not provide a useful source of energy at any place.

Codes :

(A) (i) and (ii) are correct

(B) (i), (ii) and (iii) are correct

(C) (i), (iii) and (iv) are correct

(D) (iii) and (iv) are correct

90. Match the following :

List – I	**List – II**
I. Clay	1. 0.02 – 0.20 mm
II. Silt	2. 0.20 – 2.00 mm
III. Fine sand	3. Less than 0.002 mm
IV. Coarse sand	4. 0.002 – 0.02 mm

Codes :

	I	**II**	**III**	**IV**
(A)	3	1	2	4
(B)	2	4	1	3
(C)	4	3	2	1
(D)	3	4	1	2

91. The three important environmental activities

1. Action (habitat → organisms)
2. Reaction (organism → physical factors)
3. Co-action (organism → organism)

were proposed by

(A) Eugene P. Odum

(B) F. E. Clements

(C) E. C. Evans

(D) C. J. S. Krebs

92. Match the following :

List – I	**List – II**
I. Carbon source is CO_2 and energy source is light	1. Photo-heterotrophs
II. Carbon source is CO_2 and energy source is chemicals	2. Chemo-heterotrophs
III. Carbon source is organic matter and energy source is light	3. Photo-autotrophs
IV. Carbon source is organic matter and energy source is chemicals	4. Chemo-autotrophs

Codes :

	I	**II**	**III**	**IV**
(A)	3	4	2	1
(B)	4	3	2	1
(C)	3	4	1	2
(D)	2	3	4	1

93. Identification of inorganic , organometallic or organic species of an element in the environment is known as

(A) Chemical analysis

(B) Chemical separation of elements

(C) Chemical speciation

(D) Chemical composition

94. Gibb's energy is defined as

(A) The energy associated with an organism to perform various activities

(B) The energy that can be associated with a physical reaction that can be used to do work

(C) The energy that can be associated with a chemical reaction that can be used to do work

(D) The energy associated with converting water into ice

95. **Assertion (A)** : A keystone species plays a critical role in a biological community that is out of proportion to its abundance.

Reason (R) : Keystone species seem to be rare in aquatic and terrestrial habitats to check its abundance.

Codes :

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(C) (A) is false and (R) is true

(D) (A) is true and (R) is false

96 – 100 : The atmosphere is a collection of gases that gravity holds in a thin envelop around earth. The gases within the lowest layer, the troposphere, are responsible for moderating the flow of energy to earth and are involved with the biogeochemical cycling of many elements and compounds – oxygen, nitrogen, carbon, sulphur and water, to name the most crucial ones. The troposphere ranges in thickness from 10 miles (16 km) in the tropics to 5 miles (8 km) in higher latitudes, due mainly to differences in heat energy budgets. This layer contains practically all of the water vapours and clouds in the atmosphere; it is the site and source of our weather. Except for local temperature inversion, the troposphere gets colder with altitude. Air masses in this layer are well mixed vertically, so pollutants can reach the top within a few days. Substances entering the troposphere – including pollutants – may be changed chemically and washed back to Earth's surface by precipitation. Capping the troposphere is the tropopause.

Above the tropopause is the stratosphere, a layer within which temperature increases with altitude, up to about 40 miles above the surface of earth. The temperature increases primarily because the stratosphere contains ozone (O_3), a form of oxygen that absorbs high energy radiation emitted by the Sun. Beyond the stratosphere are two more layers, the mesosphere and thermosphere, where the ozone concentration declines and only small amounts of oxygen and nitrogen are found.

96. The thickness of troposphere in the tropics is

(A) 15 miles

(B) 25 miles

(C) 10 miles

(D) 5 miles

97. The thickness of troposphere in the higher latitudes is

(A) 15 miles

(B) 25 miles

(C) 10 miles

(D) 5 miles

98. The troposphere gets colder with

(A) Latitude

(B) Altitude

(C) Longitude

(D) Magnitude

99. A layer with which temperature increases up to about 40 miles above the surface of the earth is called

(A) Troposphere

(B) Stratosphere

(C) Mesosphere

(D) Thermosphere

100. The temperature increases because the stratosphere contains ozone which

(A) Absorbs high energy radiation emitted by the sun

(B) Radiates high energy radiation emitted by the sun

(C) Absorbs low energy radiations emitted by the sun

(D) Radiates low energy radiation emitted by the sun

Space for Rough Work

Space for Rough Work