PAPER-III
ENVIRONMENTAL SCIENCE

Signature and Name of Invigilator

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

OMR Sheet No. : .....
(To be filled by the Candidate)

Roll No. | | | | | | | | |
(In figures as per admission card)

Roll No._____
(In words)

D 8 9 1 3

Time : **2 ½** hours] [Maximum Marks : **150**

Number of Pages in this Booklet : **12**

Number of Questions in this Booklet : **75**

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of seventy five 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.**
   (iii) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
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 Sheet given inside the Booklet only.** If you mark at any place other than in the circle in the OMR 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, Roll Number, Phone Number or put any mark on any part of the OMR Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. You have to return the test question booklet and Original OMR Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry duplicate copy of OMR Sheet on conclusion of 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.**

परीक्षार्थियों के लिए निर्देश

1. इस पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए ।
2. इस प्रश्न-पत्र में पचहत्तर बहुविकल्पीय प्रश्न हैं ।
3. परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी । पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे, जिसकी जाँच आपको अवश्य करनी है :
   (i) प्रश्न-पुस्तिका खोलने के लिए उसके कवर पेज पर लगी कागज की सील को फाड़ लें । खुली हुई या बिना स्टीकर-सील की पुस्तिका स्वीकार न करें ।
   (ii) **कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चैक कर लें कि ये पूरे हैं । दोषपूर्ण पुस्तिका जिनमें पृष्ठ/प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात् किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले लें । इसके लिए आपको पाँच मिनट दिये जायेंगे । उसके बाद न तो आपकी प्रश्न-पुस्तिका वापस ली जायेगी और न ही आपको अतिरिक्त समय दिया जायेगा ।**
   (iii) इस जाँच के बाद OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें ।
4. प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (A), (B), (C) तथा (D) दिये गये हैं । आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है ।
   उदाहरण : (A) (B) ● (D)
   जबकि (C) सही उत्तर है ।
5. प्रश्नों के उत्तर **केवल प्रश्न पुस्तिका के अन्दर दिये गये OMR पत्रक पर ही** अंकित करने हैं । यदि आप OMR पत्रक पर दिये गये वृत्त के अलावा किसी अन्य स्थान पर उत्तर चिह्नांकित करते हैं, तो उसका मूल्यांकन नहीं होगा ।
6. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें ।
7. कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें ।
8. यदि आप OMR पत्रक पर नियत स्थान के अलावा अपना नाम, रोल नम्बर, फोन नम्बर या कोई भी ऐसा चिह्न जिससे आपकी पहचान हो सके, अंकित करते हैं अथवा अभद्र भाषा का प्रयोग करते हैं, या कोई अन्य अनुचित साधन का प्रयोग करते हैं, जैसे कि अंकित किये गये उत्तर को मिटाना या सफेद स्याही से बदलना तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
9. आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं मूल OMR पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें । हालांकि आप परीक्षा समाप्ति पर OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं ।
10. **केवल नीले/काले बाल प्वाईंट पेन का ही इस्तेमाल करें ।**
11. **किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है ।**
12. **गलत उत्तरों के लिए कोई नकारात्मक अंक नहीं हैं ।**

ENVIRONMENTAL SCIENCE
PAPER – III

Note : This paper contains **seventy five (75)** objective type questions of **two (2)** marks each. **All** questions are compulsory.

1. For an overcast day or night, the atmosphere is

(A) stable (B) neutral
(C) slightly stable (D) unstable

2. **Assertion (A) :** The energy flow in an ecosystem follows the law of thermodynamics.

Reason (R) : The energy flow in an ecosystem is unidirectional and during the transformation of energy from one trophic level to the other, 80 – 90% of energy is lost.

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.

3. Match the List – I with List – II and identify the correct answer from the given codes :

List – I (Thermodynamic Variables) (Symbols have their usual meanings.)		**List – II (Expression)**	
(a)	ΔG	i.	$\Delta E + P\Delta V$
(b)	ΔG°	ii.	$-n FE^\circ$
(c)	ΔS	iii.	$RT \ln \frac{V_1}{V_2}$
(d)	ΔH	iv.	$nR \ln \frac{V_2}{V_1}$

Codes :

	(a)	(b)	(c)	(d)
(A)	ii	iv	i	iii
(B)	iii	ii	iv	i
(C)	iii	i	iv	ii
(D)	ii	iii	iv	i

4. The environmental lapse rate during day time is governed by

(i) Wind speed
(ii) Sunlight
(iii) Topographical features
(iv) Cloud cover

The correct answer is

(A) (i) and (ii) only
(B) (ii) and (iii) only
(C) (i), (ii) and (iii) only
(D) (i) and (iv) only

5. The wavelength range of UV–C radiations is

(A) 200 – 280 nm
(B) 180 – 240 nm
(C) 320 – 400 nm
(D) 240 – 300 nm

6. In a gas chromatography experiment, the retention factor (R_f) values for pollutant 'A' and pollutant 'B' in a mixture of pollutants were 0.5 and 0.125, respectively. If the distance travelled by solvent front is 12 cms, the distance (in cms) travelled by pollutant 'A' and pollutant 'B' will be

(A) 6 and 1.5
(B) 3 and 1.5
(C) 0.5 and 0.125
(D) 1.5 and 3

7. Using the following equations, which can be determined correctly ?

$Ca(HCO_3)_2 \xrightarrow{\Delta} CaCO_3 + H_2O + CO_2$ (by heating)

or $Ca(HCO_3)_2 + Ca(OH)_2 \longrightarrow 2\ CaCO_3 + 2H_2O$ (by addition of lime)

(A) Carbon dioxide
(B) Carbonates
(C) Bicarbonates
(D) Carbonates and Bicarbonates

8. Assume that a river having dissolved oxygen 0.5 g/m^3, BOD 0.3 g/m^3 flowing at 80 m^3/sec. converge with another river having Dissolved Oxygen 0.7 g/m^3. BOD 0.6 g/m^3 flowing at a rate of 60 m^3/sec. If after the confluence the Dissolved Oxygen is 0.59 g/m^3, then the BOD is

(A) 0.83 g/m^3 (B) 0.43 g/m^3

(C) 0.73 g/m^3 (D) 0.92 g/m^3

9. Cells grown in a medium containing phosphorous –32 will show radio labelling in

(A) Starch

(B) Glycogen

(C) Proteins

(D) Nucleic acids

10. C^{14} has a half-life of 5700 years. The fraction of the C^{14} atoms that decays per year is

(A) 1.216×10^{-4} (B) 0.52×10^{-3}

(C) 0.78×10^{-4} (D) 2.81×10^{-4}

11. **Assertion (A) :** Marine biodiversity tends to be highest in mid-latitudes in all oceans and along coasts in the Western Pacific.

Reason (R) : Sea surface temperature along coasts in the Western Pacific is highest.

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.

12. "Double digging" is a method of

(A) Bio-intensive agriculture

(B) Deforestation

(C) Aforestation

(D) Water conservation

13. The rate of replacement of species along a gradient of habitats pertains to

(A) Alpha diversity

(B) Beta diversity

(C) Gamma diversity

(D) Species diversity

14. Match the List – I and List – II. Choose the correct answer from the given codes :

List – I (Vegetation development)		**List – II (Nomenclature of succession)**
(a)	On a rock	i. Psammosere
(b)	On sand	ii. Lithosere
(c)	In aquatic habitat	iii. Xerosere
(d)	In dry habitat	iv. Hydrosere

Codes :

	(a)	(b)	(c)	(d)
(A)	ii	i	iv	iii
(B)	i	ii	iii	iv
(C)	iii	iv	ii	i
(D)	iv	iii	i	ii

15. If individuals of a species remain alive only in captivity or other human controlled conditions, the species is said to be

(A) Ecologically extinct

(B) Mass extinct

(C) Wild extinct

(D) Anthropogenic extinct

16. Which of the following symbolises correct sequence in hydrosere ?

(A) Diatoms → Wolffia → Hydrilla → Cyperus → Populus

(B) Hydrilla → Wolffia → Cyperus → Populus → Diatoms

(C) Cyperus → Diatoms → Hydrilla → Wolffia → Populus

(D) Diatoms → Hydrilla → Wolffia → Cyperus → Populus

17. Which of the following is not a class of aquatic ecosystems based on salinity levels ?

(A) Stagnant water ecosystem

(B) Freshwater ecosystem

(C) Brackish ecosystem

(D) Marine ecosystem

18. The K-strategists are

(a) large organisms which have relatively longer life

(b) provide care for their offsprings

(c) organisms that stabilise their population at carrying capacity for the area

Choose the correct answer ;

(A) (a) and (b) only

(B) (a) and (c) only

(C) (b) and (c) only

(D) (a), (b) and (c)

19. Limnetic zone in freshwater ecosystem is characterised by

(A) Presence of rooted vegetation

(B) Absence of rooted vegetation

(C) Presence of large proportion of lime

(D) Absence of phytoplankton

20. Match the List – I with List – II, choose the correct answer from the given codes :

	List – I (Plants)		**List – II (Family)**
(a)	*Camellia caduca*	i.	Orchidaceae
(b)	*Picea brachytyla*	ii.	Theaceae
(c)	*Colchicum luteum*	iii.	Pinaceae
(d)	*Arachnantha clarkei*	iv.	Liliaceae

Codes :

	(a)	(b)	(c)	(d)
(A)	iv	ii	iii	i
(B)	i	ii	iii	iv
(C)	ii	i	iv	iii
(D)	ii	iii	iv	i

21. Vegetation cover shows maximum reflectance in which of the following regions of the electromagnetic radiation spectrum ?

(A) Ultraviolet

(B) Near infrared

(C) Middle infrared

(D) Visible

22. During remote sensing of the vegetation cover, the spectral reflection of vegetation over electromagnetic radiation spectrum depends upon

(A) Pigmentation in the leaf

(B) Structure of the leaf

(C) Moisture content of the leaf

(D) All the above characters

23. Given below are statements in the context of biogeochemical cycles :

(i) Ecosystems are black boxes for many of the processes that take place within them.

(ii) Ecosystem boundaries are permeable to some degree or other.

(iii) The energy and nutrients can be transferred to and from one ecosystem to another via imports and exports.

Identify the correct answer from the codes given below :

(A) (i) & (ii) only
(B) (ii) & (iii) only
(C) (i) & (iii) only
(D) (i), (ii) and (iii)

24. The volume of ejecta and the column height for a volcano are $10^{8.5}$ m^3 and 24 km, respectively. What is its volcanic explosivity index value ?

(A) 2 (B) 8
(C) 7 (D) 4

25. In the context of material balance in hydrological cycle, which of the following equations is correct for oceans ?

(A) Input + change in storage = output
(B) Precipitation + inflow = evaporation
(C) Input – change in storage = output
(D) Precipitation – inflow = evaporation

26. In disaster management which steps are followed in post-disaster recovery phase ?

(A) Relief, rehabilitation, reconstruction, learning – review
(B) Risk Assessment, mitigation, preparedness, emergency plans.
(C) Relief, mitigation, emergency plans.
(D) Learning – review, emergency plans, preparedness.

27. Permafrost represents

(A) permanently frozen subsurface soil
(B) frozen leaves of Oak trees
(C) frozen needles of pine trees
(D) temporarily frozen subsurface soil

28. **Assertion (A) :** Estuaries are productive ecosystems.

Reason (R) : Large amounts of nutrients are introduced into the basin from the rivers that run into them.

Choose the correct answer :

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

29. A confined aquifer of thickness 25 m has two wells 200 m apart along the direction of flow of water. The difference in their hydraulic heads is 1 m. If hydraulic conductivity is 50 m/day, the rate of flow of water per day per metre of distance perpendicular to the flow of water is

(A) 25 m^3/day per metre
(B) 50 m^3/day per metre
(C) 5 m^3/day per metre
(D) 1 m^3/day per metre

30. Which of the following material has the highest hydraulic conductivity ?

(A) Clay
(B) Sandstone
(C) Limestone
(D) Quartzite

31. Which of the following energy sources is not renewable on human time scale ?

(A) Solar (B) Hydrothermal
(C) Geothermal (D) Biomass

32. For a solar flat plate collector the following data is given : Useful heat gain = 28 watts/m^2 per hour, solar radiation intensity = 350 watts/m^2 per hour and the factor to convert beam radiation to that on the plane of the collector = 1.2. The collector efficiency is

(A) ~ 6.6 % (B) ~ 4.8 %
(C) ~ 12.2 % (D) ~ 15.2 %

33. For the reaction in a hydrogen-oxygen fuel cell,

$$H_2 + \frac{1}{2} O_2 = H_2O\ (l)$$

Given $\Delta G° = 240$ kJ/gm – mole of H_2 and Faraday's constant = 96,500 Coulomb/gm mole.

The developed voltage in the fuel cell will be

(A) ~ 1.13 Volts
(B) ~ 2.13 Volts
(C) ~ 1.51 Volts
(D) ~ 1.24 Volts

34. Identify the correct sequence of the fuels in order of their increasing carbon intensity :

(A) Natural gas < Oil < Bituminous coal < Nuclear
(B) Oil < Coal < Natural gas < Nuclear
(C) Nuclear < Coal < Natural gas < Oil
(D) Nuclear < Natural gas < Oil < Bituminous coal

35. In nuclear thermal reactors, which of the following is not used as moderator ?

(A) Normal water
(B) Heavy water
(C) Graphite
(D) Liquid Helium

36. The minimum temperature gradient (°C/km) required for OTEC is about

(A) 20 (B) 10
(C) 40 (D) 60

37. A solar pond has electricity generating capacity of 600 MWe. If the efficiency of solar energy to electric generation process was 2% and solar energy supply rate was 300 W/m^2, what is the area of solar pond ?

(A) 100 km^2 (B) 90 km^2
(C) 60 km^2 (D) 180 km^2

38. Which of the following causes warming of atmosphere but cooling of the earth's surface ?

(A) Ozone
(B) Black carbon aerosols
(C) All Greenhouse gases
(D) Sulphates and nitrates

39. **Assertion (A) :** For noise level surveys in urban areas, weighting A is used for measurements.

Reason (R) : Weighting A filters out unwanted signals.

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) Both (A) and (R) are false.

40. Noise levels of 80 dB refers to a sound pressure level of

(A) 0.2 Pa

(B) 0.02 Pa

(C) 20 Pa

(D) 200 Pa

41. Asphyxiation is caused by

(A) HCN, $COCl_2$

(B) NO_x

(C) $CHCl_3$

(D) AsH_3

42. Sequence of a typical sewage treatment plant operation process will be

(A) Aeration → Flocculation → Sedimentation → Recarbonation → Filtration → Disinfection

(B) Aeration → Sedimentation → Flocculation → Filtration → Recarbonation → Disinfection

(C) Flocculation → Aeration → Recarbonation → Sedimentation → Filtration → Disinfection

(D) Sedimentation → Flocculation → Aeration → Filtration → Recarbonation → Disinfection

43. Which one of the following isotopes has maximum half-life period ?

(A) Rn^{222}

(B) Pb^{210}

(C) Ti^{210}

(D) Bi^{210}

44. Match the List – I with List – II and identify the correct answer from given codes :

List – I (Aerosols)		**List – II (Constituents)**
(a)	Dust	i. Small gas borne particles resulting from combustion
(b)	Mist	ii. Black carbon
(c)	Smoke	iii. Suspended small liquid droplets
(d)	Atmospheric Brown Cloud	iv. Solid suspended particles

Codes :

	(a)	(b)	(c)	(d)
(A)	iv	iii	ii	i
(B)	iii	iv	i	ii
(C)	ii	i	iii	iv
(D)	i	ii	iii	iv

45. **Assertion (A) :** Chloroflurocarbons deplete ozone.

Reason (R) : These compounds contain chlorine, bromine and fluorine.

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.

46. Which of the following organic compounds is <u>not</u> of biogenic origin ?

(A) Isoprene

(B) α-pinene

(C) Myrcene

(D) Acrolein

47. Which of the following is used as plant indicator for detection of presence of SO_2 and HF in air ?

(A) Lichen (B) Orchid
(C) Apricot (D) Tobacco

48. Integrated Gasification Combined Cycle (IGCC) technology is best at removing

(A) NO_2 and CO
(B) CO and SO_2
(C) Particulates and sulphur
(D) NO_2 and SO_2

49. A wastewater treatment plant in a city treats 50,000 m^3 wastewater generated per day. For an average flow rate of 25 m^3 per day per sq. metre, what should be the diameter of the circular primary settling tank ?

(A) 50.4 m (B) 30.6 m
(C) 20 m (D) 25.8 m

50. An Electrostatic Precipitator (ESP) with collector plate area = 5000 m^2 treats a flue gas with drift velocity = 0.12 m/s with 98% efficiency. The volumetric flow rate (m^3/s) of the flue gas is

(A) ~ 175.2 (B) ~ 213.5
(C) ~ 153.4 (D) ~ 198.9

51. **Assertion (A) :** Urban heat islands contribute to build up of pollutants in cities.

Reason (R) : Urban heat islands produce a somewhat stable air mass in the city's atmosphere.

Codes :

(A) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(B) Both (A) and (R) are correct, but (R) is not the correct explanation of (A).
(C) (A) is true, but (R) is false.
(D) Both (A) and (R) are false.

52. Match List – I with List – II and choose the correct answer from the codes given below :

List – I (Analytical functions)		**List – II (Activity under the function)**
(a)	Defining scope of EIA	i. Critical Assessment of impacts
(b)	Identification of impacts	ii. Estimation of the probability that a particular impact will occur
(c)	Prediction of Impacts	iii. Description of the existing environment system
(d)	Impact Evaluation and Analysis	iv. Deciding important issues and concerns

Codes :

	(a)	(b)	(c)	(d)
(A)	iii	iv	i	ii
(B)	iv	iii	ii	i
(C)	ii	i	iii	iv
(D)	i	ii	iv	iii

53. A drawback of checklists is

(A) Preliminary analysis is available in scaling checklist
(B) Checklists are too general or incomplete
(C) Checklists summarises information to make it available to experts
(D) Ecosystem functions can be clearly understood from weighting methods

54. If EIU_j = environmental impact units for j^{th} alternative, EQ_{ij} = environmental – quality – scale value for i^{th} factor and j^{th} alternative, PIU_i = parameter importance units for i^{th} factor, then what is the correct formulation for the index expressed in environmental impact units (EIU_i) ?

(A) $EIU_i = \sum_{i=1}^{n} \left(\frac{E}{Q_{ij}}\right) PIU_i$

(B) $EIU_i = \sum_{i=1}^{n} \left(\frac{Q_{ij}}{E}\right) PIU_i$

(C) $EIU_i = \sum_{i=1}^{n} EQ_{ij}\, PIU_i$

(D) $EIU_i = \sum_{i=1}^{n} \frac{PIU_i}{EQ_{ij}}$

55. Match List – I with List – II and choose the correct answer from the codes given below :

	List – I (Scales used in EIA methods)		**List – II (Example)**
(a)	Nominal	i.	Temperature (degrees)
(b)	Ordinal	ii.	Species classification
(c)	Interval	iii.	Map scale
(d)	Ratio	iv.	Worst to best

Codes :

	(a)	(b)	(c)	(d)
(A)	i	ii	iii	iv
(B)	iv	iii	ii	i
(C)	iii	i	iv	ii
(D)	ii	iv	i	iii

56. Risk assessment in EIA does not involve

(A) Maximum credible analysis

(B) Hazard and operability studies

(C) Preparation of disaster management plan

(D) Assessment of economic benefit arising out of a project

57. In a gravity flow autoclave, medical waste is subjected to a temperature

(A) > 120 °C (B) < 100 °C

(C) > 300 °C (D) > 800 °C

58. Hierarchy of priorities in hazardous waste management is

(A) Eliminate generation → Reduce generation → Recycle / Reuse → Treatment → Disposal

(B) Reduce generation → Eliminate generation → Recycle/Reuse → Treatment → Disposal

(C) Eliminate generation → Reduce generation → Treatment → Recycle/Reuse → Disposal

(D) Reduce generation → Eliminate generation → Treatment → Recycle/Reuse → Disposal

59. Public Liability Insurance Act was enacted in the year

(A) 1991 (B) 1993

(C) 1995 (D) 1997

60. Match List – I with List – II and choose the correct answer from the codes given below :

	List – I (Convention)		**List – II (Year)**
(a)	Convention for the protection of the ozone layer	i.	1979
(b)	Conservation of migratory species of wild animals	ii.	1985
(c)	Kyoto protocol	iii.	1982
(d)	UN Convention on the law of the sea	iv.	1997

Codes :

	(a)	(b)	(c)	(d)
(A)	ii	i	iv	iii
(B)	ii	iv	iii	i
(C)	iii	i	ii	iv
(D)	i	ii	iii	iv

61. Match List – I with List – II and choose the correct answer from the codes given below :

	List – I (Acts)	List – II (Year when enacted)
(a)	Wildlife Protection Act	i. 1980
(b)	Forest Conservation Act	ii. 1972
(c)	Air (Prevention and Control of Pollution) Act	iii. 1974
(d)	Water (Prevention and Control of Pollution) Act	iv. 1981

Codes :

	(a)	(b)	(c)	(d)
(A)	ii	i	iv	iii
(B)	i	ii	iii	iv
(C)	iii	ii	i	iv
(D)	iv	iii	ii	i

62. **Assertion (A) :** χ^2 distribution is a non-parametric distribution.

Reason (R) : χ^2 is a sample statistic having no corresponding population parameter.

Codes :

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

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

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

(D) Both (A) and (R) are false.

63. In a simple regression analysis of y on *x*, the standard error of estimate of y on *x*, S_{yx} = 5, number of observations N is 30, and $\sum y^2$ = 2000. The unexplained variance is

(A) 1500 (B) 750

(C) 500 (D) 250

64. Two normal populations have variances $\sigma_1^2 = 10$ and $\sigma_2^2 = 20$. Two random samples of sizes 25 and 20, independently selected from these populations have variances of $S_1^2 = 8$ and $S_2^2 = 15$, respectively. What is the $F_{(24, 19)}$ statistic ?

(A) 1 (B) 2

(C) 2.81 (D) 3.6

65. **Assertion (A) :** A matrix is non-singular if and only if none of its eigen values is zero.

Reason (R) : The product of the eigen values equals the determinant of a matrix.

Codes :

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

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

(C) (A) is correct, but (R) is false.

(D) Both (A) and (R) are false.

66. In Gaussian Plume Model assume $\sigma_z = cx$ where c is a constant and ratio of σ_y to σ_z to be a constant. If H is the effective height of the stack, the maximum concentration at a distance (*x*) from the stack is proportional to

(A) H^{-1} (B) H^{-2}

(C) $\exp(-H^2)$ (D) $H^{-3/2}$

67. The Pearson Linear correlation coefficient (r) for the following paired data (*x*, y) : (2, 1.4) (4, 1.8), (8, 2.1), (8, 2.3), (9, 2.6) is

(A) 0.623 (B) – 0.572

(C) 0.957 (D) 0.823

68. In a rough terrain the wind speed at a height of 10 m is 2.5 m/s. The wind speed at an elevation of 300 m will be

(A) 4.9 m/s (B) 1.2 m/s

(C) 3.6 m/s (D) 7.9 m/s

69. In the context of $REDD^+$ initiatives the land clearing in forest areas is primarily concerned with

(A) Physical resources of the area

(B) Ecology of the area

(C) Carbon budget of the area

(D) Water resources of the area

70. What was the objective of Basel Convention (1989) under UNEP ?

I. Minimize generation of hazardous wastes in terms of quantity and hazardousness

II. Disposal of hazardous wastes as close to the source of generation as possible.

III. Reduce the movement of hazardous wastes.

Choose the correct code :

(A) I and II only.

(B) II and III only.

(C) I, II and III.

(D) I only.

71. Global Warming Potential (GWP) of a greenhouse gas (GHG) is a comparison of global warming impact between

(A) 1 kg of GHG and 1 kg of methane

(B) 1 kg of GHG and 1 kg of CO_2

(C) 1 kg of GHG and 1 kg of N_2O

(D) 1 kg of GHG and 1 kg of CFC-11

72. Which of the following mixture of gases is called biogas ?

(A) CO_2, CH_4, NH_3, H_2S, H_2O (vapour)

(B) CO, CH_4, NH_3, H_2S, H_2O (vapour)

(C) CO_2, CH_4, N_2O, NH_3, H_2O (vapour)

(D) CO_2, NO_x, H_2O, CH_4

73. Environmental ethics deal with moral relationship of human beings to

(A) the value and moral status of the environment and its non-human contents

(B) the values that are important to development and economic growth

(C) the conservation values of selected species

(D) the development of genetically modified organisms

74. The major source of BaP (Benzo-a-pyrene) in atmospheric environment is

(A) residential wood burning

(B) gasoline

(C) coal tar

(D) cooked meat

75. Match the List – I with List – II and choose the correct answer from the codes given below :

List – I (Materials)	**List – II (Applications)**
(a) Trichloro-ethylene	1. Gasoline
(b) Toluene	2. Wood treatment
(c) Zinc	3. Dry cleaning
(d) Phenol	4. Mining

Codes :

	(a)	(b)	(c)	(d)
(A)	3	1	4	2
(B)	2	3	1	4
(C)	1	4	2	3
(D)	4	2	3	1

UGC – NET EXAM DECEMBER 2013
KEYS – PAPER 3

Subject (89) ENVIRONMENTAL SCIENCE

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

Qno	Answer
51	A
52	B
53	B
54	C
55	D
56	D
57	A
58	A
59	A
60	A
61	A
62	A
63	B
64	A
65	A
66	B
67	C
68	A
69	C
70	C
71	B
72	A
73	A
74	A
75	A