Previous Year Question Paper

of

SET MH (MAHARASHTRA)

ENVIRONMENTAL SCIENCES

Question Paper – III

State Eligibility Test

2015, September

(Original Question Paper with Answer Key)

State Eligibility Test

Test Booklet No.
प्रश्नपत्रिका क्र. **M**

Paper-III
ENVIRONMENTAL SCIENCE

Signature and Name of Invigilator

1. (Signature) .....

(Name) .....

2. (Signature) .....

(Name) .....

Seat No. | | | | | | |
(In figures as in Admit Card)

Seat No. .....
(In words)

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

AUG - 31315

Time Allowed : 2½ Hours] **[Maximum Marks : 150**

Number of Pages in this Booklet : **20** Number of Questions in this Booklet : **75**

Instructions for the Candidates

1. Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
2. This paper consists of **75** objective type questions. Each question will carry *two* marks. *All* questions of Paper-III will be compulsory, covering entire syllabus (including all electives, without options).
3. At the commencement of examination, the question booklet will be given to the student. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as follows :
   (*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 or 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 missing pages/ questions or questions repeated or not in serial order or any other discrepancy should not be accepted and correct booklet should be obtained from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given. The same may please be noted.**
   (*iii*) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
4. Each question 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 : 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 at the end of this booklet.
8. If you write your Name, Seat 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, you will render yourself liable to disqualification.
9. You have to return original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry the Test Booklet and 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 marking for incorrect answers.**

विद्यार्थ्यांसाठी महत्त्वाच्या सूचना

1. परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
2. सदर प्रश्नपत्रिकेत **75** बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास **दोन** गुण आहेत. या प्रश्नपत्रिकेतील **सर्व** प्रश्न सोडविणे अनिवार्य आहे. सदरचे प्रश्न हे या विषयाच्या संपूर्ण अभ्यासक्रमावर आधारित आहेत.
3. परीक्षा सुरू झाल्यावर विद्यार्थ्याला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून पहाव्यात.
   (*i*) प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू नये.
   (*ii*) **पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून पहावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चूकीचा क्रम असलेली किंवा इतर त्रुटी असलेली सदोष प्रश्नपत्रिका सुरुवातीच्या 5 मिनिटातच पर्यवेक्षकाला परत देऊन दुसरी प्रश्नपत्रिका मागवून घ्यावी. त्यानंतर प्रश्नपत्रिका बदलून मिळणार नाही तसेच वेळही वाढवून मिळणार नाही याची कृपया विद्यार्थ्यांनी नोंद घ्यावी.**
   (*iii*) वरीलप्रमाणे सर्व पडताळून पहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
4. प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळा/निळा करावा.
   उदा. : जर (C) हे योग्य उत्तर असेल तर.

5. या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे **ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत.** इतर ठिकाणी लिहीलेली उत्तरे तपासली जाणार नाहीत.
6. आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
7. प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
8. जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरीक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूण केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गाचा अवलंब केल्यास विद्यार्थ्याला परीक्षेस अपात्र ठरविण्यात येईल.
9. परीक्षा संपल्यानंतर विद्यार्थ्याने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापी, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
10. **फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.**
11. **कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
12. **चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

AUG - 31315/III

Environmental Science

Paper III

Time Allowed : 2½ Hours] **[Maximum Marks : 150**

Note : This Paper contains **Seventy Five (75)** multiple choice questions, each question carrying **Two (2)** marks. Attempt *All* questions.

1. Ozone layer is found in the :

   (A) Ionosphere

   (B) Troposphere

   (C) Mesosphere

   (D) Stratosphere

2. The value of environmental lapse rate is :

   (A) ~10°C per km

   (B) ~6°C per km

   (C) ~1°C per km

   (D) ~4°C per km

3. The unit of pressure 'hPa' commonly used in meteorology is equal to :

   (A) 1 dyne/cm^2

   (B) 1 dyne/m^2

   (C) 100 dyne/m^2

   (D) 1000 dyne/cm^2

4. Tropopause is at its highest level at :

   (A) Poles

   (B) Equator

   (C) Subtropics

   (D) Mid-latitude

5. How many agreements are there in Agenda 21 ?

(A) 2

(B) 5

(C) 6

(D) 7

6. Darwin's finches are a good example of :

(A) Convergent evolution

(B) Industrial menalism

(C) Connecting link

(D) Adaptive radiation

7. The oldest macrofossils of plants and animals are only ..... years old and if these were the remains of the original living organisms, the planet would have been lifeless for almost ..... years.

(A) 0.6-0.7; 4.0 billion

(B) 0.5-0.6; 3.0 billion

(C) 0.4-0.5; 2.0 billion

(D) 0.3-0.4; 1.0 billion

8. Which of the following air pollutant(s) is (are) mainly responsible for poor air quality at most of the Indian sites ?

(A) Carbon soot

(B) Atmospheric dust

(C) Carbon soot + atmospheric dust

(D) CO_2

9. Which of the following is a must for rice sheath blight pathogen, *Pellicularia sasakii* ?

(A) Polyoxin D

(B) Polyoxin B

(C) Polyoxin L

(D) Polyoxin

10. Acetylene reduction technique is an important assay to measure :

(A) Rate of phosphate solubilization

(B) Rate of Nitrogen fixation

(C) Rate of Carbon fixation

(D) Rate of photosynthesis

11. The most preferred technique for the analysis of metals is :

(A) Ion chromatography

(B) Atomic absorption spectroscopy

(C) Mass spectrometry

(D) Titrimetry

12. A radioactive sample shows an activity of 40,000 cpm. What will be its activity after four half lives ?

(A) 10,000

(B) 4,000

(C) 2,500

(D) 2,000

13. As compared to the aridified regions of the globe, rain water in India has an excess of :

(A) Chloride

(B) Calcium

(C) Sodium

(D) Methyl sulphonic acid

14. Which of the following is *correct* order with respect to solubility product ?

(A) AgI < AgBr < AgCl

(B) AgI > AgBr > AgCl

(C) AgI < AgCl < AgBr

(D) AgI > AgCl > AgBr

15. Which of the following consists of only one element ?

(A) Sand

(B) Marble

(C) Glass

(D) Diamond

16. Carrying capacity is :

(A) prevention of population explosion

(B) the maximum number of organisms that a habitat can sustain

(C) the limiting factors existing in an ecosystem

(D) the upper limit of J curve

17. Which one of the following is an abiotic component of the ecosystem ?

(A) Bacteria

(B) Plants

(C) Fungi

(D) Humus

18. The total biomass of any organism is determined by the nutrients present in the minimum concentration in relation to the requirements of that organism, known as :

(A) Liebig's law of the minimum

(B) Shelford's law of tolerance

(C) Liebig's law of tolerance

(D) Shelford's law of minimum

19. The source of energy for the green plants in any ecosystem is :

(A) Glucose

(B) Sunlight

(C) ATP

(D) Protein

20. The largest number of species on earth belongs to :

(A) Fungi

(B) Angiosperms

(C) Insects

(D) Crustaceans

21. The commonly used medium for submerged bacterial fermentation at commercial scale is :

(A) Molasses

(B) Liver extract

(C) Germinated seed

(D) Peptone

22. An ecosystem is a complex of interacting systems of :

(A) Individuals

(B) Populations

(C) Communities and their soils

(D) Biotic and abiotic components

23. GIS and remote sensing are very useful to analyse :

(A) Quality of life

(B) Spatio-temporal data

(C) Behavioral pattern of flora and fauna

(D) Sound-economic data

24. The earth's atmosphere is divided into layers based on the vertical profile of :

(A) Air pressure

(B) Air temperature

(C) Air density

(D) Wind speed and direction

25. ..... Planet in the solar system is also known as a Blue Planet.

(A) Venus

(B) Jupiter

(C) Earth

(D) Mars

26. Which one of the following is an example for assessing Land quality ?

(A) Fauna

(B) Sulfur

(C) Slope

(D) Community

27. Vegetation cover has maximum reflectance level in which one of the following electromagnetic radiation spectrum ?

(A) Middle infrared

(B) Visible

(C) Near infrared

(D) Ultraviolet

28. What are the major weather related hazards during winter ?

(A) Floods

(B) Fog and coldwave

(C) Tropical cyclones

(D) Dust storms

29. Salinity of sea water depends upon evaporation and precipitation difference. Thus it is highest near :

(A) Poles

(B) Equator

(C) Subtropics

(D) Mid-latitudes

30. GIS is an efficient tool for :

(A) analysing spatial and aspatial data

(B) analysing attribute data only

(C) manipulating behaviour of flora and fauna

(D) assessing ecological pyramids

31. CO_2 emissions from the burning of fossil fuel affect largely :

(A) Sulphur cycle

(B) Nitrogen cycle

(C) Carbon cycle

(D) Water cycle

32. The rich source of energy that never causes atmospheric pollution is :

(A) Nuclear energy

(B) Solar energy

(C) Fossil fuel

(D) Biomass energy

33. A photovoltaic cell is *not* limited in efficiency by :

(A) top surface emissivity

(B) quantum efficiency

(C) excess photon energy

(D) top surface reflection

34. Gasohol used to run the vehicles is a mixture of :

(A) Petrol and Diesel

(B) Petrol and Methane

(C) Petrol and Alcohol

(D) Petrol and Kerosene

35. Greenhouse gases usually comprise :

(A) CO_2 only

(B) CH_4 only

(C) CH_4, CO_2 mainly and NOx slightly

(D) CH_4 and CO_2 only

36. The optimum range of wind speed for generating energy with windmills is :

(A) 5 to 30 km/hr

(B) 5 to 20 km/sec

(C) 0 to 10 km/sec

(D) 0 to 20 km/hr

37. Radiation from sun is due to :

(A) Nuclear fission reactions

(B) Nuclear fusion reactions

(C) Physical melting

(D) Atomic collision

38. In a typical sewage treatment plant the following is the flow diagram of the plant :

(A) Collection → Pre-treatment → Secondary Treatment → Disinfection

(B) Collection → Pre-treatment → Primary Treatment → Disinfection

(C) Collection → Pre-treatment → Primary Treatment → Secondary Treatment → Disinfection

(D) Collection → Primary Treatment → Disinfection

39. The noise level measurements are often expressed in unit of dB(A). What does 'A' refer to ?

(A) frequency weighting

(B) amplitude weighting

(C) phase weighting

(D) category of noise zone

40. Indicator used in hardness measurement of water is :

(A) Methyl orange

(B) Eriochrome black

(C) Phenolphthalein

(D) Potassium chromate

41. The mechanism of biomagnification accumulation of intracellular uptake and storage by microorganisms is mainly due to :

(A) Active cation transport system

(B) Passive cation transport system

(C) Active anion transport system

(D) Passive anion transport system

42. Air pollutants are toxic to plants in the following ascending order of severeness :

(A) SO_2, NO_2, HF, CO

(B) NO_2, HF, CO, SO_2

(C) CO, NO_2, SO_2, HF

(D) SO_2, NO_2, CO, HF

43. One of the precursors of tropospheric ozone is :

(A) SO_2

(B) NO_2

(C) N_2O

(D) H_2S

44. Fraction of atmospheric sulphur contributed by the anthropogenic sources is :

(A) ~10%

(B) ~25%

(C) ~75%

(D) ~99%

45. After N_2 and O_2, the third most abundant gas found in the air is :

(A) CO_2

(B) Ar

(C) He

(D) CH_4

46. UASB is an advance level of wastewater treatment. UASB stands for :

(A) Urban Area Sewage Board

(B) Upflow Anaerobic Sludge Blanket

(C) Upflow Aerobic Sludge Blanket

(D) Urban Area Sludge Board

47. Lichens indicate pollution by :

(A) Ozone

(B) SO_2

(C) NO_2

(D) CO

48. "The pollutants emitted to the atmosphere are uniformly mixed in a volume of air." Which of the following models is based on this assumption ?

(A) Fugitive dust Model

(B) Vossler Model

(C) Box Model

(D) Screen Model

49. The expanded Environmental Impact Assessment for policies programs and plan is :

(A) Rapid Environmental Impact Assessment

(B) Short-run Environmental Impact Assessment

(C) Special Environmental Impact Assessment

(D) Strategic Environmental Impact Assessment

50. Which of the following forms of land degradation is dominently prevalent in India ?

(A) Desertification

(B) Soil erosion

(C) Landslides

(D) Soil submergence

51. Environmental Impact Assessment for various developmental project is carried out by a team of experts. Each expert member associated for EIA requires accrediation from :

(A) NEERI

(B) NABET/QCI

(C) CPCB

(D) SPCB

52. The secondary and tertiary impacts of developmental action can be addressed by :

(A) Simple matrix

(B) Stepped or cross impact matrix

(C) Checklists

(D) Overlay maps

53. Problem of soil salinity along coastal belts is often mitigated by treating the land with :

(A) Urea

(B) Organic compost

(C) Superphosphate

(D) Calcium sulphate

54. Interpretation of the anticipated impacts of any developmental project does *not* consider :

(A) Individual species

(B) Characteristics of habitat

(C) Characteristics of ecosystem

(D) Monetary cost of project

55. Natural decomposition of solid waste is a :

(A) Biodegradable process

(B) Pyrolysis

(C) Carbonization

(D) Corrosion

56. Which of the following is *not* a characteristic of hazardous waste ?

(A) Toxicity

(B) Corrosivity

(C) Ignitability

(D) Porosity

57. The emissions of air pollutants from automobiles were initially regulated under :

(A) The Air (Protection and Control of Pollution) Act, 1981

(B) The Environment (Protection) Act, 1986

(C) The Water (Protection and Control of Pollution) Act, 1974

(D) Forest (Conservation) Act, 1980

58. Which of the following is first Act passed by Indian Government in confirmation to the United Nation's Conference ?

(A) The Water (Prevention and Control of Pollution) Act, 1974

(B) The Environment (Protection) Act, 1986

(C) The Air (Prevention and Control of Pollution) Act, 1981

(D) The Indian Forest Act, 1927

59. All the members of a State Pollution Control Board except the member-secretary can hold the office for a term of :

(A) Six years

(B) Three years

(C) Four years

(D) Five years

60. In which year the Forest (Conservation) Act was passed ?

(A) 1974

(B) 1981

(C) 1980

(D) 1986

61. In order to cover the areas not covered by other laws regarding environmental pollution in the wake of Bhopal Tragedy, the notable legislation passed in India is :

(A) The Wildlife (Protection) Act, 1972

(B) The Environmental (Protection) Act, 1986

(C) The Water (Prevention and Control of Pollution) Act, 1974

(D) The Air (Prevention and Control of Pollution) Act, 1981

62. A population grows exponentially with the growth rate of 2% per year. After how many years it will double ?

(A) ~25 years

(B) ~70 years

(C) ~35 years

(D) ~30 years

63. A Log-Normal distribution has a mean of 5 and standard deviation of 2. Its ~67% of the area under the curve is between the values of the variable lying between :

(A) 3 and 7

(B) 2.5 and 10

(C) 1.25 and 20

(D) 1 and 9

64. The normal distribution is also expressed in terms of normalized parameter $z = \frac{x - \mu}{\sqrt{2}\sigma}$; where symbols have their usual meaning. The standard deviation of such a distribution, $\sigma(z)$ is :

(A) $\sqrt{2}$

(B) 0.5

(C) 1.0

(D) 0

65. The eigenvalues of the matrix

$$\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$$

are :

(A) 1 and 0

(B) 2 and 0

(C) 1 and 2

(D) 1 and 3

66. In simple regression equation :

$$Y = \alpha + \beta x + \in;$$

the expectation value of the random error term $<\in>$ is :

(A) 0

(B) σ; σ is standard deviation

(C) σ^2

(D) $\sqrt{2}\,\sigma$

67. In a multiple regression analysis, the explained variance per degree of freedom is found to be 100 and the unexplained variance per degree of freedom is 20. The value of F-statistic will be :

(A) 5

(B) 0.2

(C) 80

(D) 120

68. The most abundant hydrocarbon in natural gas is :

(A) Methane

(B) Ethane

(C) Propane

(D) Butane

69. 'Ozone hole' over Antarctica is seen during :

(A) September—November

(B) July—August

(C) May—June

(D) December—January

70. Carbon intensity of a country is a measure of :

(A) Carbon dioxide emissions per unit GDP

(B) Carbon dioxide emissions per unit electrical energy produced

(C) Carbon dioxide emissions per unit area per year

(D) Carbon dioxide emissions produced per person

71. Global warming potential (relative to CO_2) of N_2O over a time horizon of 20 years is :

(A) 100

(B) 280

(C) 170

(D) 25

72. Grazing cattle suffer mottling of teeth due to emission of ..... from a factory in the neighbourhood.

(A) Chlorides

(B) Fluorides

(C) Ammonia

(D) Benzene

73. One of the following waste is *not* classified as hazardous waste :

(A) Electronic waste

(B) Chemical waste

(C) Biomedical waste

(D) Kitchen waste

74. Ozone concentration is measured in Dobson unit. One Dobson unit represents a layer of ozone around the earth which at standard atmospheric pressure ?

(A) 1 mm thick

(B) .1 mm thick

(C) .3 mm thick

(D) 0.01 mm thick

75. Soil salinity is caused mainly due to excess concentration of ..... in black cotton soil.

(A) Sodium

(B) Calcium

(C) Magnesium

(D) Potassium

ROUGH WORK

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