Test Booklet Code & Serial No.
प्रश्नपत्रिका कोड व क्रमांक

D

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)

JAN - 31318

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.

   (A) (B) ● (D)

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.

   (A) (B) ● (D)

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.**

Environmental Science

Paper III

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

Note : This paper contains **Seventy Five (75)** multiple choice questions. Each question carries **Two (2)** marks. Attempt *All* questions.

1. The lake forest Archaic tradition relied on.....resources : the Maritime Archaic hunted..... creatures.

   (A) Pelagic : midden

   (B) Lacustrine : pelagic

   (C) Midden : littoral

   (D) Littoral : Lacustrine

2. The directed breeding of plants and animals is called :

   (A) Foraging

   (B) Natural selection

   (C) Artificial selection

   (D) Herding

3. How long ago did human groups begin actively controlling their food sources by artificially producing conditions under which these sources would grow ?

   (A) Within the past 8,000 years

   (B) Within the past 12,000 years

   (C) Within the past 15,000 years

   (D) Within the past 20,000 years

4. Evidence of wild grain harvesting and consumption in Israel dates to as early as :

   (A) 20,000 BP

   (B) 12,000 BP

   (C) 10,000 BP

   (D) 8,000 BP

5. The difference between simple foragers and complex foragers :

(A) Complex foragers focus on a few highly productive resources

(B) Complex foragers rely on many different food sources

(C) Complex foragers are highly mobile

(D) Complex foragers employ irrigation technology

6. The development of the first satellite was a leap forward to satellite technology in India :

(A) Aryabhatta

(B) Bhaskara

(C) IRS-IA

(D) CARTOSAT-2

7. In a 50 ppm Zn standard, an analyst determined 54 ppm Zn. The calculated error is :

(A) 0·8%

(B) 0·4%

(C) 1·6%

(D) 8·0%

8. Which anaerobic digestion process convert soluble low molecular components of fatty acids, amino acids and monosaccharides to low molecular volatile acids, alcohol, ammonia, H_2 and CO_2 ?

(A) Methanogenesis process

(B) Acidogenesis process

(C) Hydrogenesis process

(D) Hydrolysis process

9. Which methanogen does not utilize hydrogen to reduce the organic compound or CO_2 to methane during anaerobic digestion process ?

(A) Methylotrophic methanogens

(B) Methanotrophic methanogens

(C) Acetotrophic methanogens

(D) Hydrogenotrophic methanogens

10. Why microbial conversion of lignocellulosic straw feedstock to bioethanol is difficult ?

(A) Presence of more insoluble amorphous cellulose

(B) Absence of insoluble branched lignin fraction

(C) Presence of more insoluble branched hemicellulose

(D) Presence of microcrystalline cellulose and lignin

11. Cumulative conversion of arginine to putrescine by streptococcus spp. and *E. coli* signifies the following microbial interaction :

(A) Commensalism

(B) Synergism

(C) Amensalism

(D) Competition

12. What provision a typical bioreactor possess to overcome the vortex formation during fermentation ?

(A) Baffles on the side walls

(B) Stuffing boxes

(C) Sparger

(D) Oxygen probe

13. What is *correct* in case C : N ratio during composting is narrow then optimal level of 30 – 35 ?

(A) Nitrogen in compost lost as ammonia

(B) Protract the compost

(C) Enhance decomplexation of ions

(D) Agglomerate the compost material

14. Which process incorporate essential nutrients (viz. N, P) and electron acceptor to contaminated area in order to promote the activity of native microbes for degradation of pollutants ?

(A) Biosparging

(B) Bioaugmentation

(C) Biostimulation

(D) Bioventing

15. Which indicator bacteria indicates recent fecal contamination of water and detected in glucose azide broth ?

(A) *Escherichia coli*

(B) *Streptococcus faecalis*

(C) *Clostridium perfringens*

(D) *Listeria monocytogens*

16. How bioavailability of recalcitrant hydrocarbons is increased through microbial interaction with smaller solubilized/pseudosolubilized hydrocarbon droplets ?

(A) Secretion of biosurfactants

(B) Chemotaxis

(C) Efflux pumps

(D) Altered cell surface property

17. Which biological wastewater treatment system consists of large diameter corrugated plastic media centered on a horizontal shaft and submerged 40% in wastewater ?

(A) Trickling filter system

(B) Activated sequencing batch reactor

(C) Rotating biological contractors

(D) In-vessel submerged system

18. Which lithotrophic bacteria grow aerobically with CO as a sole source of carbon and energy ?

(A) *Alkaligenes eutrophas*

(B) *Pseudomonas carboxydovorans*

(C) *Thiobacillus thiooxidans*

(D) *Nitrobacter winogradskyii*

19. Which bacteria form symbiosis with some non-leguminous flowering plants (viz. Alnus, Casurina) for nitrogen fixation in soils ?

(A) *Bradyrhizobium* spp.

(B) *Frankia* spp.

(C) *Azotobacter vinelandii*

(D) *Klebsiella* spp.

20. Which aerobic photosynthetic prokaryote has heterocysts to fix nitrogen in acquatic system ?

(A) Cynobacteria

(B) Green sulphur bacteria

(C) Frankia

(D) Algae

21. Which bacteria produces a variety of Nod factors and nodulate a large variety of legumes as well as non-legume *Parasponia andersonii* ?

(A) *Sinorhizobium meliloti*

(B) *Bradyrhizobium japonicum*

(C) *Rhizobium NGR234*

(D) *Rhizobium leguminosarum*

22. Which mycorrhizae penetrate the cell wall of plant root and form arbuscules for carbon/nutrient exchange ?

(A) Ericoid mycorrhizae

(B) Arbutoid mycorrhizae

(C) Orchid mycorrhizae

(D) VAM

23. With the spread of warmer climate due to global warming there will be :

(A) Increased mortality due to heat waves

(B) Increased mortality due to cold waves

(C) Decrease in number of deaths from floods and draughts

(D) Decrease in risk of flooding in coastal areas

24. Which foods are included in the trial of plants that provided the subsidence base for indigenous New World Civilizations ?

(A) Rice, beans and squash

(B) Barley, lentils and wheat

(C) Maize, beans and squash

(D) Yarns barley and millet

25. What is the resultant noise if 8 sound levels of 50 dB(A) each mixed together ?

(A) 56 dB(A)

(B) 53 dB(A)

(C) 59 dB(A)

(D) 60 dB(A)

26. The project characteristics and the baseline information is brought together by.....of impacts.

(A) Prediction

(B) Evaluation

(C) Assessment

(D) Identification

27. Which of the following models is frequently used to analyze the air quality impacts of single, elevated point source ?

(A) Box Model

(B) Mass Balance Model

(C) Gaussian Model

(D) Pasquill Model

28. How many envioronmental attributes were used to display the relationships in a cross-impact matrix developed by Johnson and Bell ?

(A) 90

(B) 100

(C) 92

(D) 80

29. Which of the following matrix is useful as a gross screening tool for impact identification ?

(A) Gross-impact Matrix

(B) Interaction Matrix

(C) Magnitude Matrix

(D) Leopold Matrix

30. Which of the following methods involves an explict and predefined relationship such as mathematical model for social impact prediction ?

(A) Qualitative Description

(B) Quantitative Description

(C) Application Specific Predictive Technique

(D) Relative comparisons of the effects of alternatives

31. Since 1950-51 under land utilisation in India, area under one of the following land-use category is decreased :

(A) Area under forest

(B) Fallow land

(C) Area under non-agricultural uses

(D) Net sown area

32. No. of significant figures in 0·1040 is :

(A) Three

(B) Four

(C) Five

(D) Six

33. When water is pumped from wells in some coastal areas, a problem arises known as :

(A) Saltwater incursion

(B) Sand deposition

(C) Permeability decrease

(D) Artesian recharge

34. Asphyxiants are chemicals that exclude :

(A) Oxygen

(B) Nitrogen

(C) Carbon dioxide

(D) Methane

35. Ozone in air is :

(A) Primary air pollutant

(B) Secondary air pollutant

(C) Tertiary air pollutant

(D) Fundamental air pollutant

36. Under the Biological Diversity Act, 2002 one of the mandate is to have People's Biodiversity Registered and is to be documented by :

(A) Local communities/people

(B) Scientist

(C) Dept. of Environment

(D) Forest Dept.

37. In wastewater treatment..... is the odor formation and causes impact on treatment process.

(A) Sulfate

(B) Chlorine

(C) Akalinity

(D) Nitrate

38. The process used in domestic water softening, where sodium ion form a cationic exchange resin replace the calcium & magnesium ion reducing the hardness of water is done by :

(A) ion-exchange

(B) sand filtration

(C) sedimentation

(D) chlorination

39. COD test in a measure of the oxygen equivalent of organic matter in wastewater that can be oxidized by :

(A) Dichromate in an acid solution

(B) 3 days incubation

(C) 5 days incubation

(D) Incubation with microbes seed

40. In a pre-treatment for sewage treatment plants following are removed :

(A) Large suspended material

(B) Grit & large suspended material

(C) Settlable material

(D) Oily and fatty substances

41. In economics resonance use is a linear, then in ecology it will be :

(A) Circular

(B) Carrying capacity

(C) Capital

(D) Expansion

42. .....is used to study genetic diversity amongst the species.

(A) PCR

(B) RNA

(C) *m*RNA

(D) *t*RNA

43. The list of species may become threatened if trade is not strictly regulated. For such species requires export permit are included in the category under CITES :

(A) Appendix II

(B) Appendix I

(C) Appendix III

(D) Appendix B

44. Life zone system used for classifying vegetation formation, based on a gradient of mean annual bio-temperature with latitude and altitutde, percentage precipitation and evapotranspiration was proposed by :

(A) Holdridge

(B) Wittakar

(C) Clements

(D) Odum

45. Community, which becomes stable and in equilibrium with the climate is known as :

(A) Climax community

(B) Serol community

(C) Mixed community

(D) Pioneer community

46. Illegal trade of endangered species of plant and animal is most prevalent in :

(A) Developed countries

(B) Tropical countries

(C) Temperate countries

(D) Industrialized countries

47. A study to reconstruct past ecosystem and in particular to see how ecosystems and communities function before human become a major influence :

(A) Evolutionary ecology

(B) Historical ecology

(C) Palaeoecology

(D) Habitat ecology

48. Precipitation value of biodiversity is :

(A) Consumption use value

(B) Production use value

(C) Ecosystem service value

(D) Essential value

49. Phyto-sociological studies the size of area selected is based on :

(A) Random size

(B) Species-area curve

(C) Population of species

(D) Quadrate

50. Some plants may inhibit the growth of other species by the chemical nature of the litter or by special secretion is known as :

(A) Allopatric

(B) Allelopathy

(C) Apomict

(D) Admixture

51. Methane campaign of India was lead by :

(A) Dr. M.S. Swaminathan

(B) Dr. A.P. Mitra

(C) Dr. B.P. Pal

(D) Dr. S.K. Sinha

52. Depletion of ozone of stratospheric zone cause :

(A) CO_2 increase

(B) Skin cancer

(C) Cholera

(D) Dengue

53. Indian standard method of measurement of Nitrogen dioxide (in microgram/Cu meter) $\mu g/m^3$, in ambient air is :

(A) Improved West & Gaeke

(B) Ultraviolet fluorescence

(C) Modified Jacob & Hochheiser

(D) Spectrophotometry

54. Discharge limit of BOD (in mg/lit) in the surface water stream is :

(A) 500

(B) 100

(C) 50

(D) 30

55. Laboratory, Testing of Biological Oxygen Demand (BOD) is done by using :

(A) Atomic Absorption Spectro-photometer

(B) Incubator

(C) Gas chromatograph

(D) Mass spectrometer

56. Motor vehicle emission consists of :

(A) BOD

(B) Carbon monoxide

(C) Fluoride-HF

(D) Calcium

57. Wet scrubber is used to treat pollution of :

(A) Water

(B) Air

(C) Soil

(D) Noise

58. The stationary phase in reverse phase chromatography is :

(A) Polar

(B) Non-polar

(C) Both of these

(D) None of these

59. Law stating that the gas dissolved in a liquid is proportional to its partial pressure is called as :

(A) Rutherford's law

(B) Lambert's law

(C) Henry's law

(D) Beer's law

60. The *correct* order of solubility in water is :

(A) $CaF_2 > Ca(OH)_2 > LiF > NaCl$

(B) $NaCl > Ca(OH)_2 > LiF > CaF_2$

(C) $CaF_2 > LiF > Ca(OH)_2 > NaCl$

(D) $NaCl > LiF > Ca(OH)_2 > CaF_2$

61. Bleaching powder used in water purification has the chemical formula as :

(A) NH_4OH

(B) $CaCl_2$

(C) $CaOCl_2$

(D) NH_4Cl

62. Completely ionize acids in water are :

(A) HCl and HNO_3

(B) HCl and H_2CO_3

(C) HNO_3 and CH_3COOH

(D) H_2CO_3 and CH_3COOH

63. Which one of the following has the highest melting point ?

(A) *o*-bromophenol

(B) *p*-chlorophenol

(C) *m*-bromophenol

(D) *m*-chlorophenol

64. Element present in dolomite but absent in limestone :

(A) C

(B) Ca

(C) Mg

(D) O

65. Hardest form of carbon is :

(A) Charcol

(B) Diamond

(C) Coke

(D) Graphite

66. Which one of the following combinations of metals has completely filled '*d*' orbital ?

(A) Ti, Fe, Ni

(B) Sc, V, Fe

(C) Zn, Ca, Hg

(D) Zn, Co, Cu

67. Chlorosis of plants occurs due the deficiency of :

(A) Ca

(B) Cl

(C) N

(D) S

68. Paris Climate Treaty has been signed by :

(A) 191 countries

(B) 101 countries

(C) 151 countries

(D) 77 countries

69. When energy is converted from one form to another, the useful output is never as much as the input. The ratio of the useful output to the required input is called the :

(A) Efficiency

(B) Consistency

(C) Constancy

(D) Defficiency

70. Entropy is given by :

(A) dp/T

(B) dH/T

(C) dH/p

(D) dp/dH

71. Give in the *correct* order of increasing diameter the following precipitate drops (Drizzle, shower & rain) :

(A) Drizzle, rain shower

(B) Rain drizzle shower

(C) Shower rain drizzle

(D) Rain drizzle shower

72. The emission from use of fossil fuel can be reduced by various options, which of the following is not an mitigation option ?

(A) Use of wind energy

(B) Increased capacity of traditional power plants

(C) Afforestation

(D) Use of PV cells for domestic power

73. Energy produced from use of fossil fuel globally is quite large which needs to be reduced to cut down emission of CO_2. The energy produced from these sources is nearly.....of the total energy generated :

(A) 80%

(B) 60%

(C) 90%

(D) 50%

74. The most prominent feature of the food resource base of post Pleistocene Europe :

(A) A dependence on mega fauna

(B) Diversity

(C) Dependence on fur-bearing animals

(D) New agriculture methods

75. When effect did 'Cold snap' have on human populations ?

(A) It tested the ability of human beings to adapt

(B) It had no effect at all

(C) It forced all humans to wear clothing

(D) It created an environment that required all populations to move to the equator

ROUGH WORK