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)

Test Booklet No.

J–8909

PAPER–II

Time : 1¼ hours] # ENVIRONMENTAL SCIENCE **[Maximum Marks : 100**

Number of Pages in this Booklet : **8** Number of Questions in this Booklet : **50**

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of fifty 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 Test Booklet Number should be entered in the OMR Sheet and 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 oval 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 Answer Sheet given **inside the Paper I booklet only**. If you mark at any place other than in the ovals 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 test booklet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. You have to return the test question booklet and OMR Answer Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall.
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.**

परीक्षार्थियों के लिए निर्देश

1. पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए।
2. इस प्रश्न-पत्र में पचास 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 अर्थात 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 प्रश्न-पुस्तिका की क्रम संख्या OMR पत्रक पर अंकित करें और 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 दीर्घवृत्त 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 पत्र I के अन्दर दिये गये** उत्तर-पत्रक पर ही अंकित करने हैं। यदि आप उत्तर पत्रक पर दिये गये दीर्घवृत्त के अलावा किसी अन्य स्थान पर उत्तर चिन्हांकित करते है, 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 उत्तर-पुस्तिका पर अपना नाम या ऐसा कोई भी निशान जिससे आपकी पहचान हो सके, किसी भी भाग पर दर्शाते या अंकित करते हैं तो परीक्षा के लिये अयोग्य घोषित कर दिये जायेंगे।
9. आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं OMR उत्तर-पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें।
10. **केवल नीले/काले बाल प्वाईंट पैन का ही इस्तेमाल करें।**
11. **किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है।**
12. **गलत उत्तर के लिए अंक नहीं काटे जायेंगे।**

ENVIRONMENTAL SCIENCE

PAPER – II

Note : This paper contains **fifty** (50) multiple-choice questions, each question carrying **two** (2) marks. Attempt **all** of them.

1. Which of the following bacterium is used in the recovery of otherwise unprofitable grades of Uranium and Copper ores ?

(A) *Escherichia coli* (B) *Azotobacter*

(C) *Clostridium* (D) *Thiobacillus ferroxidans*

2. A measure of the amount of oxygen consumed in the biological process that break down organic matter is known as :

(A) Bioconcentration (B) Biochemical oxygen demand

(C) Bioaccumulation (D) Biomagnification

3. Which of the following was formed first ?

(A) RNA (B) DNA

(C) DNA and RNA both (D) Eucryotic cell

4. Which of the following can be used for biological destruction of undesired fungal mass?

(A) Bacteriophages (B) Mycophages

(C) TMV (D) HIV

5. Which of the following have alga as symbiont ?

(A) Pinus (B) Walnut

(C) Coralloid roots of cycas (D) Mango tree

6. Organisms which require ingestion of one or several organic compounds are called :

(A) Autotrophs (B) Facultative Autotrophs

(C) Chemotrophs (D) Heterotrophs

7. Which of the following cell is present in bone cortex ?

(A) Osteoblast (B) Osteocalcin

(C) Stem cells (D) Astrocytes

8. The equation of state of a gas, incorporating the Van der Waals'' correction is given as :

(A) $PV = RT$ (B) $\left(P + \frac{a}{v^2}\right)(V - b) = RT$

(C) $PV^{\gamma} = \text{constant}$ (D) $PV = \text{constant}$

Where P = pressure, V = volume, R = gas constant, T = absolute temperature, a and b are constants.

$\gamma = c_p / c_v$, where c_p and c_v are the specific heat at constant pressure and volume respectively.

9. **Assertion (A) :** Cedar wood oil is used as immersion oil for 100-X lens of microscope.
Reason (R) : The refractive index of cedar wood oil is same as that of the glass slide.

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

10. How do insect pheromones work as biopesticides :
(A) Work as mating disruption agents in insects
(B) Kills bacteria
(C) Kills fungi
(D) Kills protists

11. For a normal distribution, the skewness is :
(A) 1 (B) ∞ (C) 0 (D) $\frac{1}{2}$

12. The derivatives of 'f' at x = 0, where $f(x) = x^2|x|$ is :
(A) Zero (B) 1 (C) 2 (D) 3

13. A cyclist starting from stand still acclerates at 0.4 m sec^{-1} for 10 seconds. (a) what velocity does it reach and (b) the distance it covers :
(A) (a) 4 m sec^{-1} (b) 10 m (B) (a) 4 m sec^{-1} (b) 20 m
(C) (a) 2 m sec^{-1} (b) 10 m (D) (a) 2 m sec^{-1} (b) 20 m

14. The law of conservation of energy is described by :
(A) Zeroth law of thermodynamics (B) First law of thermodynamics
(C) Second law of thermodynamics (D) Third law of thermodynamics

15. A microwave source has a wavelength of 4 cm. Given then their speed is 3×10^8 m sec^{-1}, the frequency is :
(A) 7.0 GHZ (B) 7.5 GHZ (C) 12.0 GHZ (D) 14.0 GHZ

16. As per temperature of an n-type semiconductor increases, the number of hole :
(A) Does not change but the number of electrons increases
(B) Decreases but the number of electrons increases
(C) Increases but the number of electrons does not change
(D) Increases but the number of electrons decreases

17. The region of the electromagnetic spectrum, which are used for remote sensing in microwave region include :
(A) < 0.1 cm (B) 0.1 – 2.0 cm (C) 2.0 – 10.0 cm (D) 0.1 – 30.0 cm

18. Photovoltaics (solar cells) work on the principle of :

(A) Raman effect (B) Zeeman effect

(C) Photoelectric effect (D) Faraday effect

19. Doppler effect is not commonly observed using light, because :

(A) Velocity of sound is much smaller than that of light

(B) Light is an electromagnetic wave

(C) Object has to be moving at a speed that is a significant fraction of the speed of light.

(D) Sound is audible

20. The value of the integral $\int_{\sqrt{2}}^{\infty} \frac{dx}{x\sqrt{x^2-1}}$ is :

(A) Zero (B) $\pi/2$ (C) $\pi/4$ (D) $\pi/8$

21. One of the important mechanism of aerosol formation is :

(A) Nucleation from vapour molecules

(B) Breakdown of nimbus clouds

(C) Precipitation in local ponds

(D) Cracking of ionosphere

22. Isomorphism in a solid :

(A) Refers to different shapes but same chemistry

(B) Refers to same chemistry but different shapes

(C) Refers to different structure but same chemistry

(D) Refers to different chemistry but same structure

23. Electromagnetic pollution is caused by :

(A) Vehicular traffic (B) Mobile phones

(C) Aircraft noise (D) Lightening and thunder storms

24. Effect of doubling in concentration of green house gases such as CO_2, will lead to an increase in the temperature (taking initially at 300° K) by an amount :

(A) 1.0° K (B) 1.26° K (C) 2.26° K (D) 3.16° K

25. The relationship between pressure (ρ), velocity (υ) and height (h), is given by Bernoulli's equation :

(A) $\rho + \frac{1}{2}\rho v^2 + \rho gh = \text{constant}$ (B) $\rho + \frac{1}{2}\rho v^2 + \rho gh = \text{constant}$

(C) $\rho + \frac{1}{2}\rho v^2 + \frac{1}{2}\rho gh = \text{constant}$ (D) $\rho + \frac{1}{2}\rho v^2 + \frac{1}{2}\rho gh = \text{constant}$

where ρ = density

g = Accleration due to gravity

26. After 560 days, 1 gm of a radioactive element is reduced to $\frac{1}{16}$ gm. The half life of the radioactive element is :

(A) 140 days (B) 280 days (C) 70 days (D) 210 days

27. In pure water, the generation of each one of the ions H^+ and OH^- at standard temperature and pressure :

(A) $10^{-14}\ m/l$ (B) $0.5 \times 10^{-14}/l$ (C) $10^{-7}\ m/l$ (D) $2 \times 10^{-7} m/l$

28. pH of sea water is about :

(A) 7.0 (B) 6.0 (C) 8.0 (D) 9.2

29. In colloidal chemical substance, the light undergoes :

(A) Diffraction (B) Polarization
(C) Scattering (D) Total internal reflection

30. In an one-component system H_2O critical point refers to :

(A) Co-existence of solid and gas phases
(B) Co-existence of all phases
(C) Pressure of liquid and gas phase
(D) Absence of liquid and gas phases

31. Out of the following minerals which is a non-silicate :

(A) Muscovite (B) Quartz (C) Hornblende (D) Siderite

32. Density of seawater (g/cm^3) at 20° C and salinity 35%, at atmospheric pressure is :

(A) 1.024785 (B) 1.256135 (C) 1.362398 (D) 1.481359

33. December 26, 2004 Tsunami in the Indian Ocean was caused by movements between

(A) Australian and Antarctic plates
(B) Indian and Australian plates
(C) Burmese arc and Indonesian archipelago
(D) Pacific plate and Asian plate

34. Material left behind when part of a rock is removed by chemical weathering process is called :

(A) Left over deposit (B) Lag deposit
(C) Residual deposit (D) Chemical precipitate

35. Water table that is a reference line, represents a hypothetical line below the surface where :

(A) Water is always present above the reference line
(B) Water is never present above the reference line
(C) Water is always present below the reference line
(D) Above the reference line is a zone of reduction

36. Geological process whereby one constituent in a mineral is progressively substituted by another is called :

(A) Alteration (B) Precipitation

(C) Absorption (D) Replacement

37. A landscape which shows a pattern of denudation in limestone and dolomitic rock is know as :

(A) Plateau (B) Mesa topography

(C) Scarp face topography (D) Karst topography

38. Weathering of a granite rock produces a sedimentary rock known as :

(A) Graywacke (B) Arkose (C) Limestone (D) Shale

39. An environment agency measures the average velocity of flow in a river to be 1.1 m sec^{-1}, where it is 0.5 m deep and 5.0 m wide. The flow rate is :

(A) 2.75 m^3 sec^{-1} (B) 3.75 m^3 sec^{-1}

(C) 4.75 m^3 sec^{-1} (D) 5.75 m^3 sec^{-1}

40. In a nuclear reactor fission of U^{238} is brought about by :

(A) α rays (B) β rays

(C) γ rays (D) Thermal neutrons

41. The radioactivity attributable to radon in the air is measured in :

(A) Microgram per litre (B) Picocuries per litre

(C) Parts per million (D) Percentage

42. pH of human blood is :

(A) 4 (B) 7 (C) 8 (D) 10

43. Hardness of water is due to :

(A) Na and K (B) Ca, Mg and CO_3

(C) Na, K, Ca, Mg (D) Ca, Mg, CO_3, SO_4

44. Fastest seismic wave is :

(A) Y wave (B) X wave (C) M wave (D) P wave

45. Biomass fuels can provide a sustainable substitute for fossil fuels, with :

(A) Decrease in carbon dioxide production

(B) Increase in carbon dioxide production

(C) Slight variation in carbon dioxide production

(D) No net carbon dioxide production

46. Which of the following is not a clay mineral ?

(A) Kaolinite (B) Montimorillonite

(C) Illite (D) Pyroxene

47. When a bottle of fully packed water in plastic bottle is fully frozen, then while opening :

(A) The empty space develops inside the bottle due to less total volume

(B) Due to increased pressure inside the bottle, the bottle cracks

(C) Due to increased volume inside the plastic bottle, the bottle cracks

(D) Due to both increased pressure and density inside the bottle, the bottle shrinks in size

48. Global Warming Potential of the gases increases in order of :

(A) $CH_4 > CO_2 > NO_X$ (B) $NO_X > CH_4 > CO_2$

(C) $CO_2 > CH_4 > NO_X$ (D) $CO_2 > NO_X > CH_4$

49. One of the following is the correct order of increasing energy content :

(A) Gasoline > Wood > Cowdung (B) Cowdung > Gasoline > Wood

(C) Gasoline > Cowdung > Wood (D) Coal > Cowdung > Wood

50. A man weighing 70 kg on the surface of the earth, will weigh on the surface of moon :

(A) Same as that on the surface of earth

(B) $\frac{1}{6}$ as that on the surface of earth

(C) $\frac{1}{8}$ as that on the surface of earth

(D) $\frac{1}{10}$ as that on the surface of earth

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Space For Rough Work