Test Booklet Code & Serial No.

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प्रश्नपत्रिका कोड व क्रमांक Paper-III ENVIRONMENTAL SCIENCE

	ELA A LICOLAMEN	TAL SCIENCE
Sig	nature and Name of Invigilator	Seat No.
1. (8	Signature)	(In figures as in Admit Card)
(1	Name)	Seat No.
2. (8	Signature)	(In words)
(1	Name)	OMR Sheet No.
	PR - 31317	(To be filled by the Candidate)
	ne Allowed : 2½ Hours]	[Maximum Marks : 150
	mber of Pages in this Booklet : 20	Number of Questions in this Booklet: 75
1. 2. 3.	Instructions for the Candidates Write your Seat No. and OMR Sheet No. in the space provided on the top of this page. 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). 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. 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.	विद्यार्थ्यांसाठी महत्त्वाच्या सूचना 1. परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोप-यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा. यद प्रश्नपत्रिकेत 75 बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास दोन गुण आहेत. या प्रश्नपत्रिकेतील सर्व प्रश्न सोडिवणे 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 प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून पहावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चुकीचा कम 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 विद्यार्थांनी 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.	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.	(A) (B) (D)
6.	Read instructions given inside carefully.	5. या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत. इतर ठिकाणी लिहीलेली उत्तरे तपासली जाणार नाहीत.
7. 8.	Rough Work is to be done at the end of this booklet. If you write your Name, Seat Number, Phone Number or put	है। अति दिलेल्या सूचना काळजीपूर्वक वाचाव्यतिः
υ.	any mark on any part of the OMR Sheet, except for the space	7. प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
	allotted for the relevant entries, which may disclose your	8. जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरीक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खुण
	identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.	नाव, आसन क्रमाक, फान नंबर किवा आळख पटल अशा काणताहा खूण केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किवा इतर गैरमार्गाचा
9.	You have to return original OMR Sheet to the invigilator at the	अवलंब केल्योस विद्यार्थ्याला परीक्षेस अपात्र ठरविण्यात येईल.
	end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed	9. परीक्षा संपल्यानंतर विद्यार्थ्याने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे
	to carry the Test Booklet and duplicate copy of OMR Sheet on	परत करणे आवश्यक आहे. तथापें, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
10	conclusion of examination.	10. फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.
10. 11.	Use only Blue/Black Ball point pen. Use of any calculator or log table, etc., is prohibited.	11. कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.
12.	There is no negative marking for incorrect answers.	12. चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही,

11.

12.

Environmental Science Paper III

Time	Allowed:	$2\frac{1}{2}$ Hours]		[Maximum	Marks :	: 150
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Note: This paper contains **Seventy Five (75)** multiple choice questions, each question carrying **Two (2)** marks. Attempt *All* questions.

- - (A) 6.5 and 4.0 respectively
 - (B) 4 and 6.5 respectively
 - (C) 6.5 and 6.0 respectively
 - (D) 6.0 and 6.0 respectively
- 2. Nearly percentage of the incident solar energy at the top of the atmosphere is in the infrared region of the electromagnetic spectrum.
 - (A) 60
 - (B) 35
 - (C) 46
 - (D) 25

- 3. Which of the following measures does *not* contribute to "Mitigation" with reference to climate change?
 - (A) Use of solar energy
 - (B) Use of wind energy
 - (C) Deforestation
 - (D) Use of fuel efficient vehicles
- 4. One of the major causes for eustatic sea level changes, those that are synchronous throughout the world, is a change in the mass of the:
 - (A) Polar ice caps
 - (B) Alpine ice caps
 - (C) Himalayan ice caps
 - (D) Kilimanjaro ice caps

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5.	Carbonate reefs, fringing reefs,	7.	Chilika lakes recognised as one of
	barrier reefs and atoll are the		the hot spots of biodiversity is the
	characteristics of		largest brackish water that
	characteristics of		sprawls along the East Coast of
	(A) Emergent Coast		India in Mahanadi Delta.
	(B) Biogenic Coast		(A) Tidal Lagoon
	(C) Depositional Coast		(B) Tidal Swamp
	(D) Glacial Coast		(C) Blue Lagoon
			(D) Atoll Lagoon
6.	Fjords are the long, narrow bays	8.	When pyroclastic debris comes in
	with steep valley sides that		contact with water, snow or ice on
	characterize the coast of Norway		the slopes of volcano, a high density
	are examples of		slurry can be generated that moves
			downslope are called:

(A) Glacial Coast

(B) Emergent Coast

(C) Biogenic Coast

(D) Depositional Coast

(A) Lahars

(B) Tephra falls

(C) Structural collapse

(D) Debris avalanches

- - (A) Screening and settling
 - (B) Removal of organics and inorganics
 - (C) Waste stabilizing lagoon
 - (D) Variety of chemical methods
- 10. Flood magnitude can be measured as the elevation to which a river rise during a flood, but more commonly it is reported as the of the stream during the event.
 - (A) Less discharge
 - (B) Maximum discharge
 - (C) Rating curve
 - (D) Maximum recharge

- 11. The ratio of the resisting forces to the during forces is a quantitative indication of slope stability known as
 - (A) Frictional force
 - (B) Safety factor
 - (C) Coefficient of friction
 - (D) Residual strength
- 12. Which is the major source of carbon monoxide to the Urban air environment?
 - (A) Industrial processes
 - (B) Solid waste
 - (C) Stationary fuel combustion
 - (D) Transportation
- 13. The spectral signature of water ranges between
 - (A) $0.3\ to\ 0.7\ \mu m$
 - (B) 0.9 to 1.3 μm
 - (C) 0.5 to 1.5 µm
 - (D) 0.9 to 1.2 μm

- 14. What is *incorrect* condition for efficient anaerobic digestion process?
 - (A) Maintain pH between 6.8-7.2
 - (B) SRT/HRT >> 1-10
 - (C) Volatile fatty acids (100-500 ppm)
 - (D) Presence of more butyric acid (> 500 ppm)
- 15. Which high rate anaerobic digester retains very high concentration of active biomass and operate at high loading rate of 5-20 kg COD/m³-day?
 - (A) Upflow anaerobic sludge blanket reactor (UASB)
 - (B) Anaerobic baffled reactor
 - (C) Floating dome bioreactor
 - (D) Plug flow bioreactor

- 16. Which high rate process adopts high upflow velocity of influent wastewater to expand the biocarrier by 15-30%?
 - (A) Static Granular Bed Reactor (SGBR)
 - (B) Anaerobic Filter Reactor (AFR)
 - (C) Expanded Bed Bioreactor (EBR)
 - (D) Fluidized Bed Bioreactor (FBR)
- 17. Which plant has endosymbiotic *Anabaena* and used as biofertilizer for paddy fields?
 - (A) Orchid
 - (B) Monotropoid
 - (C) Arbutus
 - (D) Azolla
- 18. A group of metabolically related bacterial population in a microbial ecosystem are commonly known as
 - (A) Ecotone
 - (B) Population
 - (C) Communities
 - (D) Guilds

- 19. What simple and effective strategy is recommended in case the compositing material "ball up" and restrict the air flow due to excess initial moisture (> 65%)?
 - (A) Incorporate bulking agent
 - (B) Amendment with anhydrous sodium sulphite
 - (C) Extend thermophilic phase during composting
 - (D) Continue the composting for prolong period
- 20. Why is moisture level of 50-60% desirable for more microbial activity at the initial stages of composting?
 - (A) To increase compact structure of compost
 - (B) To lower down diffusion of air
 - (C) To allow biofilm formation on compost material
 - (D) To increase micropore formation for holding water

- 21. What chemical property of a pesticide confers resistance to microbial degradation?
 - (A) More solubility of pesticide in water
 - (B) Inert resonance structure of pesticide
 - (C) Less complex structure of pesticide
 - (D) Pesticide with more acetyl group.
- 22. Which microbial process metabolize the pesticide to CO₂ and water as end product?
 - (A) Biomineralization
 - (B) Co-dissimilation
 - (C) Bioreduction
 - (D) Conjugate with sugars

- 23. What is *true* about characteristic of filter packing media used in trickling filter system for treatment of wastewater?
 - (A) Less surface area per unit
 - (B) Low durability and biodegradable
 - (C) High porosity to minimize clogging
 - (D) Inert and toxic to microbes
- 24. Which process has capacity to remove nitrogen in effluent with lowC: N ratio and operate alternate aerobic and anaerobic conditions?
 - (A) Bardenpho process
 - (B) Air stripping of ammonia
 - (C) Anammox process
 - (D) Ludzack-Ettinger process

- 25. Which of the following bacterial activities contributes to the formation of natural sulphur deposits from hydrogen sulphide gas?
 - (A) Baggiota spp.
 - (B) Methanosarcina spp.
 - (C) Thiobacillus thioxidans
 - (D) Desulfovibrio spp.
- 26. What is the basis used for identification of positive interactions within the microbial population?
 - (A) Prolong stationary phase of microbes
 - (B) Extended lag period of microbial growth
 - (C) Short log period of microbial growth
 - (D) Rapid decline in microbial population

- 27. Which bacterium contributes to the conversion of nitrates to elemental nitrogen in biogeochemical cycle?
 - (A) Nitrosomonas europaea
 - (B) Nitrobacter winogradskyi
 - (C) Rhizobium leguminosarum
 - (D) Micrococcus denitrificans
- 28. In what way is nitrogenase activity protected from oxygen in nodules of Rhizobium-legume symbiosis?
 - (A) Rhizobium secret slime
 - (B) Leghaemoglobin
 - (C) Rhizobium secret oxygen insensitive nitrogenase
 - (D) Nodules provide anaerobic environment

- 29. The harvester ant *Pogonomyrmex*occidentalis enriches its nest with
 the following microbe that possess
 high endophytic infection:
 - (A) Orchid mycorrhizae
 - (B) VAM spores
 - (C) Monotropoid mycorrhizae
 - (D) Arbutus mycorrhizae
- 30. Maize appears in the American southwest around, in the east around
 - (A) 6000 BP; 5800 BP
 - (B) 4000 BP; 3200 BP
 - (C) 3500 BP; 1800 BP
 - (D) 2000 BP; 1600 BP

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31.	The term is related to the	34.	Identify a group of hazards caused
	distribution of equal amount		by endogenous forces of the earth:
	sunshine.		by endogenous forces of the earth.
	(A) Isonephs		(A) Earthquake – landslide –
	(B) Isophene		drought
	(C) Isophaline		(B) Earthquake – volcano – flood
	(D) Isohel		
32.	The maximum concentration of		(C) Volcano – landslide – tsunami
52.	ozone in the atmosphere is observed		(D) Earthquake – tsunami – forest
	between		fire
	(A) 10 to 20 km.	35.	the type of boundary where
	(B) 20 to 30 km.		
	(C) 30 to 50 km.		Nepal earthquake happened in
	(D) 50 to 60 km.		year 2015.
33.	affects the angle at which		(A) Destructive boundary
	the sun's rays reach the earth.		(B) Conservative boundary
	(A) Weather		
	(B) Wind		(C) Continent-continent collision
	(C) Latitude		boundary
	(D) Sea level		(D) Island-arc boundary

(D) Sea level

- 36. The data products of the India region are generally produced in projection for LISS I, II and III and PAN images.
 - (A) Polyconic
 - (B) Cylindrical
 - (C) Mercator
 - (D) Azimuthal
- 37. Which of the following errors can be reduced by taking repeated measurement?
 - (A) Random error
 - (B) Systematic error
 - (C) Both of the above
 - (D) None of the above
- 38. Which of the following impact identification is problematic in the EIA process?
 - (A) Direct
 - (B) Positive
 - (C) Negative
 - (D) Cumulative

- 39. What will be the resultant noise at the workshop operating four equipments each emitting equal sound of 55 dB (A)?
 - (A) 60 dB (A)
 - (B) 61 dB (A)
 - (C) 110 dB (A)
 - (D) 58 dB (A)
- 40. Which of the following is *correct* for the cross impact matrix ?
 - (A) Display of environmental factor against other environmental factor
 - (B) Display of environmental factors against project action
 - (C) Display of environmental factors against constructional activities of initiating action
 - (D) Display of environmental factors against operational activities of initiating action

41.	Who developed the network method	44.	Deeper lakes are characterized by
	for impact identification in EIA?		the presence of a warmer upper
	(A) Soloman et al, 1977		layer that is mixed by the wind and
	(B) Odum et al, 1975		
	(C) Sorensen, 1971		colder, deep layer is not mixed, the
	(D) Stover, 1972		two layers are separated by a
42.	Which of the following indicates the		distinctive temperature transition
	necessity of EIS preparation under		zone called the
	Section 102 of NEPA 1969 ?		(A) Thermofrost
	(A) Part A		
	(B) Part B		(B) Thermostat
	(C) Part C		(C) Thermocline
	(D) Part D		(D) Thermoline
43.	Narrow sandy islands that form	15	is a biofertilizer.
	offshore from a coastline are called	10.	is a biolefulizer.
			(A) Nostoc
	(A) Oceanic Islands		(B) Pediamstrum
	(B) Island Arcs		
	(C) Barrier Islands		(C) Scenedesmus
	(D) Seamounts		(D) Nitzschia

- 46. A classified sewage can be treated using aerobic oxidation pond method.

 Which two types of organisms are complementary to each other:

 (A) Bacteria
 - (B) Algae
 - (C) Algae and Bacteria
 - (D) Aquatic plants
- 47.is used to know the settleable solids from the waste water.
 - (A) Imhoff cone
 - (B) Imhoff chamber
 - (C) Measuring cylinder
 - (D) Beaker

- 48. Analysis of polluted water for D.O. and free ${\rm CO_2}$ will show the following pattern :
 - (A) Absense of CO_2 and higher D.O
 - (B) Higher CO_2 and higher D.O
 - (C) Higher CO_2 and low $\mathrm{D.O}$
 - (D) No change in D.O and CO2
- 49. Restriction Fragment Length

 Polymorphism method is used to

 study:
 - (A) Genetic variation
 - (B) Biochemical variation
 - (C) Morphological variations
 - (D) Physiological variation

50.	Stenophagic and euryphagic terms	53.	The pioneer of Xerosere are:
	are used w.r.t.:		
	(A) Food		(A) Mosses
	(B) Water		(B) Ephimeral herbs
	(C) Salinity		(C) Lichens
	(D) Temperature		(D) Shrubs
51.	Removal of rags, floatables grit, sticks etc. in the wastewater	54.	Biologically the richest region of the
	treatment is called:		world is:
	(A) Primary clarifier		(A) Indo-Malay region
	(B) Preliminary clarifier		(B) Russia
	(C) Solid clarifier		(C) West Africa
	(D) Secondary clarifier		
52.	Diversity of habitat over the total		(D) South America
	landscape or geographical area is	55.	Natural ecosystem depends upon :
	called:		(A) Animal
	(A) Alfa diversity		
	(B) Beta diversity		(B) Plant
	(C) Gamma diversity		(C) Man
	(D) Zeta diversity		(D) Self-operating system

56.	An animal that feeds on plants and
	also on animals is called:

- (A) Carnivores
- (B) Herbivores
- (C) Omnivores
- (D) Tertiary carnivores
- 57. The Eco-mark of Indian consumer product:
 - (A) Peacock
 - (B) Lotus
 - (C) Swan
 - (D) Earthen pot
- 58. Which of the following states have highest wasteland?
 - (A) U.P. and Bihar
 - (B) A.P. and TN
 - (C) Rajasthan and Madhya Pradesh
 - (D) Assam and Tripura

- 59. International agency that adopted rehabilitation of the displaced ones due to construction of dams etc. is :
 - (A) World Bank
 - (B) WHO
 - (C) WWF
 - (D) UNEP
- 60. Ambient air quality standard for sulphur dioxide in notified ecologically sensitive area, in micrograms per cu. meter (μg/m³), annual average is prescribed at :
 - (A) 100
 - (B) 80
 - (C) 50
 - (D) 20

61.	Regulation and management of	63.	Method of treatment and disposal of
	apparent to actablish/amounts in June		domestic solid waste is:
	consent to establish/operate is done		(A) Compost plant
	by:		(B) Catalytic converter
	(A) MOEF & CC		(C) Multiple effect evaporator
	(B) CPCB		(D) Catalytic converter
	(B) CI CB	64.	Best suitable technique for the
	(C) SPCB		separation and quantify the
	(D) State Environment Deptt.		impurities in drugs is
			(A) NMR
62.	Provision under Article 48A of the		(B) HPLC
	Constitution of India deals with:		(C) IR
	(A) Trade in wildlife		(D) MS
		65.	Least soluble compound in $\mathrm{NH_4OH}$
	(B) Pollution control		is
	(C) Agriculture soil conservation		(A) AgBr
			(B) AgCl
	(D) Protection and improvement of		(C) AgI
	environment		(D) AgF

66.	Which one of the following has the	69.	No. of electrons present in H^+
	strongest ionic bond ?		is
	(A) H-F		(A) One
	(B) H-Cl		(B) Two
	(C) H-N		(C) Three
	(D) H-O		(D) Zero
67.	Oxidation state of Mn in KMnO ₄	70.	Most electropositive element is
	is		(A) K
	(A) +2		(B) Na
	(B) +5		(C) Cs
	(C) +7		(D) Ca
	(D) +8	71.	Half life of a substance is 4 hrs.
68.	No. of valence electrons in carbon		2 g of this substance will be left with
	is		the following amount after 12 hrs:
	(A) One		(A) 1 g
	(B) Two		(B) 0.5 g
	(C) Three		(C) 0.25 g
	(D) Four		(D) 0.125 g

72.	Paris climate deal which was adopted	74.	The composition (Mean molecular)
	on December 12, 2015 will be		of the atmosphere remains almost
	effective from		unchanged upto a height of
	(A) N104 2016		km.
	(A) November 04, 2016		(A) 15
	(B) December 04, 2016		(B) 50
	(C) November 14, 2016		(C) 80
	(D) December 14, 2016		(D) 40
73.	First law of thermodynamics states	75.	The inversion layer near the ground
	that the:		is common during in North
	(A) Francy is always consonyed		India.
	(A) Energy is always conserved		(A) Early morning in winter
	(B) Energy is doubled		(B) Morning hours in summer
	(C) Energy is decreased		(C) Afternoon in summer
	(D) Energy is trippled		(D) Afternoon in winter

ROUGH WORK

ROUGH WORK