

UGC NET Environmental Science

Saturday 6 June 2020 12:08

- Fundamentals of EnvSc (1 day)**
 - Meteorological Parameters
 - Humidity, mixing ratio, saturation mixing ratio, radiation and wind velocity (see if it's there in Masters and Ela 2014, otherwise leave it)
 - Biogeographic provinces of the world
 - Agroclimatic zones of India
 - NCERT
 - Remote sensing
 - Madhuraj 2020
- Environmental Chemistry**
 - Molarity, molality and normality
 - Masters and Ela (2014: 47-86)
 - pH, oxidation, reduction (pE - Manahan 2017: 63-79; pH etc. Masters and Ela, Spooner 2012)
 - Atmospheric chemistry (Q8, 10)
 - Manahan (2017: 211-40) Just read the last bits.. Pp275-83.
 - Toxicity
 - Spooner 2012: 249-262
 - Optional: Manahan 2017: 659-689
 - Various measurement techniques (Q1, 6, 15)
 - Manahan 2017: 689-709
 - Madhuraj 2020: 82-7
 - Make table for various measurement techniques
 - Make table for various toxins
- Environmental Biology**
 - Energy dynamics etc.
 - Stiling 2012: 518-35
 - Species interactions (e.g. Parasitism etc.)
 - Lotka Volterra (Stiling 2012: 234-5), in predation: Stiling 2012: 271-3
 - Tilman's R (Stiling 2012: 236-7)
 - Mathematical modelling of mutualism (Stiling 2012: 258)
 - Various ecosystems, biomes and successions
 - Enger and Smith (2015: 109-142)
 - An overview: Spooner (2012: 89-107)
 - Population Biology
 - Spooner (2012: 107-129)
 - Masters and Ela (2014: 87-126)
 - Make a table of:
 - Biomes etc.
 - Different bacteria in the list, w special focus on bioremediating species, don't forget Nitrosomonas and Nitrobacter
 - Different antibiotics in the list
 - Different Earthworms in list (some species some species also mentioned in Madhuraj Soil Pollution)
 - Plant Hormones in list
 - National Parks, Sanctuaries, Protected Areas and Sacred Groves in India (check out their definitions as well)
 - Extinct, Rare, Endangered, Threatened Flora and Fauna of India (check out their

definitions as well)

Geosciences

- Differences between crust, mantle, core
 - Spooner 2020:
- Biogeochemical cycles
 - Stiling 2012: 562-578
- Air and ocean circulation in the atmosphere
 - Spooner 2012: 89-107
 - Stiling: 450-5
- Landforms
 - Spooner (2020: 115-163; 163-233)
 - Britannica
- Minerals
 - List questions on minerals in R Singh
 - Spooner (2020: 49-79)
 - Britannica
 - Essentials, chemical polymorphism etc (1-19)
 - Different minerals: silicates etc. (35-77) add any minerals missing in the list
 - Clay minerals (196) - don't forget to add it to the table
 - Add Madhuraj (2020: 12) to the table
- Rocks
 - List questions on rocks in R Singh
 - Spooner (2020: 79-115)
 - Britannica

Energy and Environment

- For an overview, read: Smith (2005: 42-76); Spooner (2012: 47-57, 191-220);
- Fossil Fuels
 - Manahan 2017: 503, 513-8
- Solar
 - Questions from R Singh
 - Smith (2005: 59-62)
- Hydroelectric
 - Questions from R Singh
 - Smith (2005: 53-4)
- Tidal
 - Smith 2005 (56-8)
- Wave
 - Smith 2005 (58-9)
- Magnetohydrodynamic
 - Questions, numerical
- Wind
 - Smith (2005: 54-56)
- Geothermal
 - Smith (2005: 94-5)
 - Optional: Manahan (2017: 525)
- Nuclear
 - Smith (2005: 205-239)
 - Boeker and van Grondelle (2011: 221-4, 238)
 - Optional: Masters and Ela (2014: 76-81) and Manahan (2017: 521-5)
- Biofuels (Smith 2005: or Manahan 2017: 532-42)
- [India's Renewable Energy aims by 2022](#)

Environmental Pollution and Control

- Noise

- Questions in R Singh
- Optional: Smith (2005: 199-204)
- Soil
 - Questions from R Singh
 - Manahan (2017: 409-449)
- Water
 - Questions from R Singh (2019: 678-712)
 - Masters and Ela (2014: 173-280, 281-367)
 - Revise water remediation measures etc.**
 - Optional: Manahan (2017: 135-175)
 - Make table for:
 - Different pollutants
- Air
 - Masters and Ela (2014: 367-499)
 - Read indoor air pollution
 - Make table for:
 - Criteria Pollutants (source, NAAQS limit, effects on humans, effects on plants, Main environmental effects)
 - Main cleaning methods
- Solid Waste Management**
 - Questions in R Singh, make notes etc.
 - Madhuraj (2020: 53-61)
 - Masters and Ela (2014: 601-685)
- Environmental Legislation**
 - Notes from R Singh
 - Notes from Madhuraj
 - International legislations etc. (Spooner 2012: 311-9)
 - Make table for:
 - Major environmental days (e.g. Earth Day, Wetland Day etc.)
 - Major international environmental legislation (Year, Agenda, Place, Country)
 - Different major programmes in India (see Syllabus, Contemporary Environmental Issues, highlighted)
 - Major dams
 - Ramsar sites in India https://en.wikipedia.org/wiki/List_of_Ramsar_sites_in_India, <https://www.ramsar.org/sites/default/files/documents/library/sitelist.pdf> page 24
- Statistics**
 - Probability
 - Questions in R Singh
 - BMA Handbook of Mathematics (BMA 2004: 334-341)
 - Madhuraj (2020: 164-5)
 - Measures of centre
 - Mean
 - 'Usual' mean
 - Harmonic
 - Geometric
 - Medians and Quartiles
 - Mode
 - Moments
 - Schaum (1999: 114-7)
 - Skewness, kurtosis
 - Schaum (1999: 114-7)
 - Madhuraj (2020: 163-4)

- Measures of variability
 - Standard deviation
 - Variance
- Distribution
 - Binomial (Rumsey 2019)
 - Normal (Rumsey 2019)
 - Poisson
 - Schaum series (1999: 155-8)
 - Madhuraj (2020)
 - Chi-sq (Schaum 1999 261-281)
 - t-distribution
 - Rumsey (2019: 107-111)
 - Schaum series (1999: 242-261)
- T-statistic (Rumsey 2019: 107-111, Rumsey 2011: ch 10)
- Margin of error calculation
- P-value
- Chi-sq test
- ANOVA and F-test
 - Questions from R Singh
 - URLs from websites
- Correlation and Regression
 - Rumsey (2019: 113-126)

Water Pollution

Tuesday 25 August 2020 12:57

- 1. Introduction
- 2. Water Resources (P175-181)
 - a. Unusual Properties of Water (P175-6)
 - b. The Hydrologic Cycle (P176-8)
 - c. Water Usage (P178-181)
- 3. Water Pollutants (P181-196)
 - a. Pathogens (P181-5)
 - b. Oxygen-Demanding Wastes (P185-6)
 - c. Nutrients (P186-8)
 - d. Salts (P188-190)
 - e. Thermal Pollution (P190)
 - f. Heavy Metals (P190-1)
 - g. Pesticides (P191-3)
 - h. Volatile Organic Chemicals (P193-4)
 - i. Emerging Contaminants (P194-6)
- 4. Status of Surface Water Quality (P196-9)
- 5. Biochemical Oxygen Demand (P199-209)
 - a. Five-Day BOD Test (P199-202)
 - b. Modelling BOD as a First-Order Reaction (P202-5)
 - c. The BOD Reaction Rate Constant k (P205-6)
 - d. Nitrification (P206-9)
 - e. Other Measures of Oxygen Demand (P209)
- 6. The Effect of Oxygen-Demanding Wastes on Rivers (P210-9)
 - a. Deoxygenation (P210-2)
 - b. Reaeration (P212-4)
 - c. The Oxygen Sag Curve (P214-9)
- 7. Water Quality in Lakes and Reservoirs (P219-229)
 - a. Controlling Factors in Eutrophication (P220-1)
 - b. A Simple Phosphorus Model (P221-3)
 - c. Thermal Stratification (P223-5)
 - d. Stratification and Dissolved Oxygen (P225-6)
 - e. Acidification of Lakes (P226)
 - f. Bicarbonate Buffering (P227-8)
 - g. Importance of the Local Watershed (P228-9)
- 8. Groundwater (P229-231)
- 9. Aquifers (P231-3)
- 10. Hydraulic Gradient (P234-7)
- 11. Darcy's Law (P237-240)
- 12. Contaminant Transport (P240-5)
 - a. Dispersion and Diffusion (P240-1)
 - b. Retardation (P242-5)
- 13. Cone of Depression (P245-8)
- 14. Capture-Zone Curves (P248-254)
- 15. Control of Groundwater Plumes (P254-5)
- 16. Contaminants in Groundwater (P255-9)
- 17. Groundwater Remediation Technologies (P259-266)
 - a. Conventional Pump-and-Treat Systems (P259-260)
 - b. Soil Vapour Extraction (P260-2)
 - c. In Situ Bioremediation (P262-4)
 - d. Permeable Reactive Barriers (P264-5)
 - e. Other Remediation Technologies (P265-6)

Water Quality Control (P281-358)

- 1. Introduction (P281-2)
- 2. Municipal Water and Wastewater Systems (P282-3)
- 3. The Safe Drinking Water Act (SDWA) (P284-9)
 - a. Chemical Standards (P286-7)
 - b. Radionuclides (P287)
 - c. Microbiological Standards (P287-8)
 - d. Secondary Standards (P288-9)
- 4. Water Treatment Systems (P289-316)
 - a. Initial stuff (P289-90)
 - b. Sedimentation (P291-4)
 - c. Coagulation and Flocculation (P295-8)
 - d. Filtration (P298-9)
 - e. Disinfection (P299-303)
 - f. Hardness and Alkalinity (P303-9)
 - g. Softening (309-313)
 - h. Membrane Process (P313-6)
- 5. Wastewater treatment (P316-33)
 - a. Primary Treatment (P318-9)
 - b. Secondary Biological Treatment (P319-20)
 - c. Microbial Kinetics (P320-4)
 - d. Activated Sludge (P324-8)
 - e. Attached Growth Treatment (P328-9)
 - f. Hybrid Suspended/Attached Growth Systems (P329-30)
 - g. Sludge Treatment (P330-2)
 - h. Nutrient Removal (P332-3)
- 6. Hazardous Wastes (P333-5)
- 7. Hazardous Materials Legislation (P340-3)
- 8. Hazardous Waste Treatment Technologies (P343-55)
- 9. Land Disposal (P355-8)

Air Pollution

Monday 17 August 2020 11:55

- 1. Introduction (P367-8)
- 2. Overview of Emissions (P368-370)
- 3. The Clean Air Act (P370-9)
 - a. Air Quality (NAAQS) and Emission (NSPS) standards (P371-3)
 - i. Numerical on converting ppm to mass per unit volume (P372-3)
 - b. The Clean Air Act Amendments of 1977 (P373-4)
 - c. The Clean Air Act Amendments of 1990 (P374-6)
- 4. Progress in Controlling Emissions and Improving Air Quality (P376-9)
- 5. Criteria Pollutants (P380-399)
 - a. Carbon Monoxide (P380-2)
 - b. Oxides of Nitrogen (P382-3)
 - c. Volatile Organic Compounds (VOCs) (P383)
 - d. Photochemical Smog and Ozone (P384-9)
 - e. Particulate Matter (P389--393)
 - f. Oxides of Sulphur (P394-7)
 - g. Lead (P397-9)
- 6. Toxic Air Pollutants (P399)
- 7. Air Pollution in the World's Megacities (P399-400)
- 8. Motor Vehicle Emissions (P401-26)
 - a. CAFE Fuel Economy Standards (P404-5)
 - b. The Conventional Otto Cycle Engine (P405--9)
 - c. Two-Stroke Engines (P409)
 - d. Diesel Engines (P409-410)
 - e. Automobile Emission Controls (P410-2)
 - f. Cleaner Gasoline (P412-4)
 - g. Alternative Fuels (P414-9)
 - h. Electric-Drive Vehicles (P419-426)
- 9. Stationary Sources (P426-438)
 - a. Coal-Fired Power Plants (P427)
 - b. Precombustion Controls (P428-9)
 - c. Fluidized-Bed Combustion (FBC) (P429)
 - d. Integrated Gasification Combined Cycle (P429-30)
 - e. IGCC with Carbon Sequestration (P430-1)
 - f. Controlling NO_x Emissions (P431)
 - g. Flue Gas Desulfurization (Scrubbers) (P431-2)
 - h. Particulate Control (P432-7)
 - i. Cyclone Collectors
 - ii. Electrostatic Precipitators
 - iii. Baghouses
 - i. Combined Heat and Power Systems (P437-8)
- 10. Air Pollution and Meteorology (P438-51)
 - a. Adiabatic Lapse Rate (P438-441)
 - b. Atmospheric Stability (P441-3)
 - c. Temperature Inversions (P443-8)
 - d. Atmospheric Stability and Mixing Depth (448-9)
 - e. Smokestack Plumes and Adiabatic Lapse Rates (P450-1)
- 11. The Point Source Gaussian Plume Model (P451-69)

- 12. Indoor Air Quality (P470-86)
 - a. Environmental Tobacco smoke (P471-2)
 - b. Asbestos (P472-3)
 - c. Radon (P473-6)
 - d. Exposure assessment (P476-9)
 - e. Infiltration, ventilation and air quality (P480-3)
 - f. An indoor air quality model (P483-6)

Soil Pollution

Sunday 6 September 2020 16:03

<input type="checkbox"/>	Chapter 15 Soil: Earth's Lifeline	409
<input checked="" type="checkbox"/>	15.1 Have You Thanked a Clod Today?	409
<input checked="" type="checkbox"/>	15.1.1 What Is Soil?	409
<input checked="" type="checkbox"/>	15.1.2 Agriculture and Soil	409
<input checked="" type="checkbox"/>	15.2 Structure of Soil	411
<input checked="" type="checkbox"/>	15.3 Composition of Soil	412
<input checked="" type="checkbox"/>	15.3.1 Water in Soil	412
<input checked="" type="checkbox"/>	15.3.2 The Soil Solution	414
<input checked="" type="checkbox"/>	15.3.3 Air in Soil	414
<input checked="" type="checkbox"/>	15.3.4 Inorganic Solids in Soil	414
<input checked="" type="checkbox"/>	15.3.5 Soil Organic Matter	415
<input checked="" type="checkbox"/>	15.4 Acid–Base and Ion-Exchange Reactions in Soil	416
<input checked="" type="checkbox"/>	15.4.1 Acid–Base Reactions of Soil	417
<input checked="" type="checkbox"/>	15.4.2 Adjustment of Soil Acidity	418
<input checked="" type="checkbox"/>	15.4.3 Ion-Exchange Equilibria in Soil	418
<input checked="" type="checkbox"/>	15.5 Macronutrients in Soil	420
<input checked="" type="checkbox"/>	15.5.1 Sulfur in Soil and as a Macronutrient	420
<input checked="" type="checkbox"/>	15.6 Nitrogen, Phosphorus, and Potassium in Soil	420
<input checked="" type="checkbox"/>	15.6.1 Nitrogen	421
<input checked="" type="checkbox"/>	15.6.2 Phosphorus	423
<input checked="" type="checkbox"/>	15.6.3 Potassium.....	423
<input checked="" type="checkbox"/>	15.7 Micronutrients in Soil	424
<input checked="" type="checkbox"/>	15.8 Fertilizers	425
<input checked="" type="checkbox"/>	15.8.1 Fertilizer Pollution	427
<input checked="" type="checkbox"/>	15.9 Pesticides and Their Residues in Soil	427
<input checked="" type="checkbox"/>	15.9.1 Soil Fumigants	428
<input checked="" type="checkbox"/>	15.10 Wastes and Pollutants and Their Degradation on Soil	429
<input checked="" type="checkbox"/>	15.10.1 Soil Pollutants from Livestock Production.....	431
<input checked="" type="checkbox"/>	15.10.2 Biodegradation and the Rhizosphere	431
<input checked="" type="checkbox"/>	15.11 Soil Loss and Degradation	432
<input checked="" type="checkbox"/>	15.11.1 Soil Sustainability and Water Resources	433
<input type="checkbox"/>	15.12 Saving the Land	433
<input type="checkbox"/>	15.12.1 Agroforestry	434
<input type="checkbox"/>	15.12.2 Soil Restoration	435
<input type="checkbox"/>	15.12.3 Poduculture in Soil Restoration	435
<input type="checkbox"/>	15.13 Green Chemistry and Sustainable Agriculture	437
<input type="checkbox"/>	15.14 Genetics and Agriculture	439
<input type="checkbox"/>	15.14.1 Recombinant DNA and Genetic Engineering in Agriculture	440
<input type="checkbox"/>	15.14.2 The Major Transgenic Crops and Their Characteristics	441
<input type="checkbox"/>	15.14.3 Crops versus Pests	442
<input type="checkbox"/>	15.14.4 Future Crops	443
<input type="checkbox"/>	15.15 Agriculture and Health	445
<input type="checkbox"/>	15.15.1 Food Contamination	445
<input type="checkbox"/>	15.16 Protecting the Food Supply from Attack	445
<input type="checkbox"/>	References	446
<input type="checkbox"/>	Further Reading	447
<input type="checkbox"/>	Questions and Problems	448