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**ESE-2017 : Prelims Exam**

UPSC Engineering Services Examination

**GENERAL STUDIES  
& ENGG . APTITUDE**

**Answer Key & Solutions**

Test 2: Part Syllabus Non-Technical  
**Basics of Energy and Environment**

- |         |         |         |         |
|---------|---------|---------|---------|
| 1. (c)  | 14. (c) | 27. (a) | 40. (c) |
| 2. (b)  | 15. (d) | 28. (a) | 41. (b) |
| 3. (d)  | 16. (a) | 29. (c) | 42. (b) |
| 4. (b)  | 17. (d) | 30. (b) | 43. (a) |
| 5. (b)  | 18. (b) | 31. (d) | 44. (a) |
| 6. (c)  | 19. (d) | 32. (a) | 45. (d) |
| 7. (c)  | 20. (c) | 33. (d) | 46. (b) |
| 8. (c)  | 21. (d) | 34. (a) | 47. (a) |
| 9. (c)  | 22. (c) | 35. (b) | 48. (b) |
| 10. (c) | 23. (d) | 36. (d) | 49. (b) |
| 11. (a) | 24. (c) | 37. (b) | 50. (a) |
| 12. (b) | 25. (c) | 38. (b) |         |
| 13. (d) | 26. (a) | 39. (b) |         |

## DETAILED EXPLANATIONS

1. (c)  
Montreal Protocol on substances that deplete the ozone layer is an international protocol designed to protect the ozone layer by phasing out the production of substances that are responsible for ozone depletion.
2. (b)  
Earth Hour is an initiative by World Wide Fund for Nature (WWF) to raise awareness about the need to save the planet.
4. (b)  
In photosynthesis, the carbon dioxide is absorbed by the plants and the oxygen is released.
6. (c)  
The main ozone-depletion substances (ODS) are
  - (i) Chlorofluorocarbons (CFCs)
  - (ii) Halon's (Brominated fluorocarbons)
  - (iii) Carbon Tetrachloride
  - (iv) Hydrochlorofluorocarbons (HCFCs)
  - (v) Methyl chloroform
10. (c)  
Environment Protection Act, 1986 was enacted by the Government of India under Article 253 of the Constitution. The purpose of the Act is to implement the decisions of United Nations Conference on Human Environment which advocated that environment and natural resources must be safeguarded.
14. (c)  
The main steps in the environmental impact assessment (EIA) process are
  1. Screening
  2. Scoping
  3. Prediction and Mitigation
  4. Management and Monitoring
  5. Audit
16. (a)  
Eutrophication is the enrichment of an ecosystem with chemical nutrients, typically compounds containing nitrogen, phosphorous, or both.  
When lakes are used for aquaculture, excess fish food pollutes the water as complete use of the food cannot be achieved.
18. (b)  
Photochemical smog occurs in warm, dry and sunny climate. It has high concentration of oxidizing agents and therefore also known as oxidizing smog.
20. (c)  
The term "dirty dozen" refers to 12 persistent organic pollutants which were listed under the Stockholm Convention.
22. (c)  
The main sources of sulphur dioxide in the air is industrial activity that processes materials containing

sulphur. Besides, automobile exhaust is an important source of sulphur dioxide pollution. The high concentration of sulphur dioxide leads to stiffness of flower buds which eventually fall off from the plants.

23. (d)

Primary pollutants are harmful chemicals that are released directly from a source into the atmosphere. e.g. Particulate matter, oxides of carbon and nitrogen, sulphur dioxide. Hydrocarbons like methane and benzene, etc.

Secondary air pollutants are produced from chemical reactions involving the primary pollutants. e.g. - Ozone, sulphur, trioxide, photochemical smog, etc.

26. (a)

An ecological niche is the role and position a species has in its environment; how it meets its need for food shelter, how it survives, and how it reproduces. The niche include all of its interactions with the biotic and abiotic factors of its environment.

No two species have identical niche.

28. (a)

1. Species having overlapping areas of geographic distribution are known as Sympatric species.
2. Species that are important in determining the ability of a large number of other species to persist in community are known as Keystone species.

29. (c)

The MIDORI Prize for Biodiversity is an International biennial Prize co-organised by the AEON Environmental Foundation and the secretariat of Convention on Biological Diversity (CBD). It aims to raise public awareness about the importance of biodiversity and to contribute to the objectives of the United Nations Decade on Biodiversity 2011-2020.

34. (a)

**First generation biofuels:** They are produced directly from food crops. These biofuels are ultimately derived from the starch, sugar, animal fats, and vegetable oil.

**Second generation biofuels:** They are also known as advanced biofuels. What separates them from the first generation biofuels is the fact that feedstock used in producing second generation biofuels are generally not food crops. Jatropha-based biofuels are example of second generation biofuels.

**Third generation biofuels:** The term third generation biofuels refers to biofuel derived from algae. It is predicted that algae have the potential to produce more energy than conventional crops.

**Fourth generation biofuels:** They include photobiological solar fuels and electrofuels. They do not require the destruction of biomass.

36. (d)

Plants are able to manufacture biomass through the process of photosynthesis where chlorophyll absorbs energy from the sun and use it to convert carbon dioxide to carbohydrates. When these carbohydrates are burned, they are converted back to water, carbon dioxide and energy.

45. (d)

Minamata disease is a neurological syndrome caused by mercury. It was detected from consumption of fish captured from mercury contaminated Minamata Bay (Japan) in 1952.

