

**Indraprastha Institute of Information Technology Delhi**

**ESC 205 A Environment Science**

**End Semester Examination**

**Time : 2 hrs.**

**MM 30**

**Answer all questions**

**1a. Describe how can the solar cells be recycled.**

**1b. What are 5 disadvantages of solar energy?**

**1c. Describe the 3 processes by which the power generated by photovoltaic cells be stored?**

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**2. What are the following :**

**2 (a). What is the cradle to grave story?**

**2(b) What is CAPA? What are the 7 steps of CAPA process?**

**2(c). What are the typical PLF numbers for RE projects -for solar, 30- for wind and for solar-wind hybrid projects?**

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**3. Fill in the blanks :**

**a. Windrose/ wind rose diagrams show a ..... which act on offshore structures over time of wind.**

**b. Environment load refers to the various types of forces such as ..... that act on offshore structures over time.**

**c. Backwater is water that is .....**

**d. PAN in air pollution stands for .....**

**e. India has .....% of the total global water ..... % of world population**

**f. TSDF stands for..... in hazardous waste management.**

g. Liners in landfills are used to ..... leachates.

h. RCA stands for .....

i. PDCA stands for.....

j. HIRA in hazardous waste management modeling stands for .....

k. ALOHA in the hazard modeling stands for ..... l. In India almost  
..... % people live in cities

m. PFAS are ..... substances.

n. Greenwashing is a advertising or marketing spin that ..... uses green PR and green marketing to persuade the public that an organization's products, goals, or policies are environmentally friendly.

o. Hayli Gubbi volcano erupts in <sup>Ethiopia</sup> ~~India~~ after <sup>12000</sup> ~~12000~~ years in ~~Ethiopia~~ and its  
12000 — reach India & China

p. CDW stands for .....

q. Cement kilns can be used to incinerate the ..... wastes

r. Compressed biogas consists of mainly .....

s. Brown coal is also called ..... in some countries

t. The full form of KRA is ..... 10

#### 4. Answer true or false

- i. Indoor pollution can be controlled through use of belfams.
- ii. Solar concentrators are used in the filtration of sun light.
- iii. Carbon black is a super pollutant .
- iv. Solar wind is prevalent in coastal areas.
- v. LNG stands for liquefied nitrogen gas .
- vi. Line source of air pollution is a pollution generated from roadways
- vii. CO is a secondary pollutant.
- viii. Life cycle assessment is a widely used tool to quantify the potential output of products.
- ix. Acid rain has no effect on crops

x. Thermocol is a domestic hazardous waste

xi. Cradle to grave concept involves final disposal of the waste

xii. PEC shows the Predicted effluent concentration at which there would be great effects on organisms in the compartment

xiii. ISO 14010 is mandatory.

xiv. Environment audit is conducted periodically.

xv. ISO 14031 gives the guidelines for Environmental Performance Index.

xvi. National Environment Policy was the first initiative in 2010

xvii. BEE is a Board of Energy Efficiency

xviii. UNFCCC stands for United Nations Framework for Climate Conference

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**Numericals. Each numerical carries 1 mark**

5. In a wastewater settling tank the length of the tank is 4 meters, width is 3 meters and the depth is 5 meters, and the flow rate is  $1.2 \text{ m}^3/\text{min}$ . Calculate the terminal velocity  $v(t)$  of the critical particle.

6. Calculate the sludge volume index (SVI) when the sludge volume after settling for 30 min., (ml/litre) is 25 and MLSS (Mixed Liquor Suspended Solids) concentration is 125 mg/litre.

Calculate the Maximum Return Sludge Concentration also.

7. Calculate the calorific value of the Municipal waste having the following analysis :

Hazardous waste = 14 %

Medical Waste = 19 %

Plastics = 39%

Inert material ( Uncombustible material) – 28 %

The calorific values of hazardous waste is 21 MJ/kg, medical waste is 42 MJ/kg and Plastics is 35 MJ/kg.

8. Estimate the tons of carbon in the atmosphere corresponding to a concentration of 380 ppm of CO<sub>2</sub>. Assume the total mass of air equals

$5.1 \times 10^{18}$  kg. The density of air at the standard temperature and pressure ( STP, 0 ° C and 1 atm. ) is 1.29 kg/m<sup>3</sup>.

9. If the utilities generate electricity using 33 % efficient coal fired power plant. As a carbon reducing measure if electric water heater that convert heat into electricity at 100 % efficiency are replaced with a gas water heaters with a 75 % conversion efficiency. By what fraction the ( and percentage) carbon emission would be reduced.

Emission factor for coal is  $25.2 \times 10^6$  ton. C/ quad

Emission factor for gas is  $14.5 \times 10^6$  tons/quad.

You may Assume 1 quad of electricity is being delivered to electric heaters.