20-05-2026 FE SEM-II (NEP-2020) ECNES QP CODE: 20013842

Time: 1.5 Hours **Marks: 45**

N.B.

1. **Question number 1 is compulsory.**
2. **Attempt any two questions from Q.2 to Q.5.**
3. **Draw neat diagrams and write chemical equations wherever necessary.**
4. **Figures to the right indicate full marks.**
   (Atomic Weights: H = 1, C = 12, O = 16, Na = 23, Ca = 40, Mg = 24, Cl = 35.5, S=32)

Q.1. Solve any Five of the following **(15M)**

a Define photochemical smog and its effect on the environment.

b Distinguish between Temporary and Permanent hardness.

c What are the point sources of water pollution? Explain with two examples.

d Differentiate between conventional and non-conventional energy sources.

e What is Biomass Energy? Give its Advantages.

f Explain why energy audit is important.

g A 6 ml sample of waste water after refluxing, the excess unreacted dichromate required 20 ml of 0.1M FAS solution. A blank of distilled water required 35 ml of 0.1M FAS solution. Calculate COD value of the waste water.

Q.2.

a What is Natural Resource management? Which are the Principles of Natural Resource Management? Write the Importance of Natural Resource Management **6M**

b Illustrate Anaerobic decomposition process. **5M**

c Calculate all types of hardness of water containing $Ca(HCO_3)_2$ =81 ppm, $MgSO_4$=60ppm, $MgCO_3$ =42ppm, $Ca(NO_3)_2$ =82ppm. **4M**

Q.3.

a Explain Activated Sludge Process of Waste water. **6M**

b Demonstrate the construction and working of solar energy cell. **5M**

c Define hazardous waste. Write any four characteristics and sources of hazardous waste. **4M**

Q.4.

a Explain working and chemical reactions of catalytic converter. **6M**

b Write Principle, working and application of hydrogen fuel cell. **5M**

c Describe the working of a wind power plant with its advantages. **4M**

Q.5.

a Write Principle, working, diagram, advantages and limitations of electrodialysis process. **6M**

b Define ozone hole and its (any four) effect on human health. **5M**

c 0.5 g of CaCO3 was dissolved in dilute HCl and diluted to 1000 ml.50 ml of this solution required 30 ml of EDTA solution for titration. 50 ml of hard water sample required 25 ml of EDTA solution for titration. 50 ml water sample after boiling, filtering requires 10 ml of EDTA solution for titration. Calculate the temporary, permanent and total hardness of water. **4M**

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