**2024**

( FYUGP )

( 1st Semester )

# ENVIRONMENTAL SCIENCE

( Major )

Paper Code : EVS/C–2T

**( Physics and Chemistry of Environment )**

*Full Marks* : 75
*Pass Marks* : 40%

*Time* : 3 hours

*The figures in the margin indicate full marks for the questions*

Answer *any* **five** questions

**1.** *(a)* Define light. Differentiate between monochromatic and polychromatic light, and mention two properties of light. 1+2+2=5

*(b)* Define a blackbody. State Kirchhoff's law in relation to blackbody radiation. 1+4=5

*(c)* What is Rayleigh and Mie scattering? Explain Beer-Lambert law. 1+1+3=5

**2.** *(a)* Write notes on heat and work. 2½+2½=5

*(b)* Define absolute temperature. Explain the relationship between temperature and kinetic energy. Write a note on thermal equilibrium. 1+2+2=5

*(c)* Elucidate on the working principle and efficiency of hydropower plant. 5

**3.** *(a)* Explain the Gaussian plume model. 5

*(b)* What are the sources of pollutants? Discuss pollutant dispersal. 2+3=5

*(c)* Write notes on mixing heights and turbulence. 2½+2½=5

**4.** *(a)* Mention in detail the types of smog. 5

*(b)* Explain the chemistry of acid rain. 5

*(c)* Define aerosol with examples. Elaborate on the role of CFCs in ozone depletion. 2+3=5

**5.** *(a)* What is atomic structure? Specify Dalton's atomic theory. 1+4=5

*(b)* What are redox reactions? Explain its types. 1+4=5

*(c)* Draw a comparison between aliphatic and aromatic compounds. 2½+2½=5

**6.** *(a)* Expound in detail the types of chemical bonds. 5

*(b)* Explain the working principle of a galvanic cell. 5

*(c)* Give a brief explanation on substitution and elimination reactions. 2½+2½=5

**7.** *(a)* What is cohesion and adhesion? Explain the amphoteric nature of water. 2+3=5

*(b)* What is alkalinity of water? State the factors that affect water alkalinity. 1+4=5

*(c)* How is permanent hardness of water removed? Explain. 5

**8.** *(a)* What are complexes? Mention the significance of formation of complexes. 2+3=5

*(b)* Define colloids. What are the different types of colloids? 1+4=5

*(c)* Explain in brief the industrial and domestic sources of heavy metal contamination in water. 2½+2½=5

**9.** *(a)* Explain soil composition. 5

*(b)* What is soil carbon? Mention the sources of soil carbon. 1+4=5

(c) Mention the organic and inorganic components of soil. 2½+2½=5

**10.** (a) Explain ion exchange in soil. Write its importance. 3+2=5

(b) What are the factors affecting phosphorus availability in soil? Explain. 5

(c) Describe phenolics. What are the effects of phenolics on soil? 2+3=5

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