CH-419   **Consumer Chemistry**   **Endsem (90 marks)**   **11/05/2023**   **14.00-17.00**

1. What is meant by sustainable development? Mention three targets against goal 7? (6)

2. What are the different configurations of an Organic Field Effect Transistor? Draw their structures and list 04 advantages and disadvantages. (8)

3. What is *Gravure* printing? Depict the OLED device architecture with all layers, the HOMO-LUMO energy diagram of active layers, and 04 prominent properties. (8)

4. List 04 advantages of Organic/Polymer based materials for electronics applications. (4)

5. Draw figures of 04 solution processing techniques by which organic materials are fabricated into devices. (8)

6. Discuss with appropriate reactants the synthesis of polyacetylene and mention the structures and conditions to obtain all-cis and all-trans polyacetylene. (4)

7. Describe the chemical synthesis of polyaniline. Explain the different salts of polyaniline, their structures and band gaps of any two of these salts. (6)

8. What is meant by photoconductivity? Give example of one photoconducting polymer and list four different possible applications with it. (4)

9. Schematically explain the preparation of PEDOT:PSS and its four applications. (6)

10. Represent the various tactic forms of polypropylene and their properties. (6)

11. How is BUNA-S prepared and explain its vulcanization process. (6)

12. An n-type OFET having 100 nm PVA as an organic polymer dielectric (K=10), has threshold voltage of 1 V, gate to source voltage of 3 V and W/L ratio 20. (6)
Calculate and provide answers corrected to 02 decimal places.
(i) the C_i (Oxide capacitance per unit area) in F/cm^2
(ii) μ of the OFET when V_{DS} applied is 1V, and I_{DS} is 10 nA
(iii) μ of the OFET when V_{DS} applied is 5V, and I_{DS} is 20 nA

13. A solar cell shows a power conversion efficiency of 17.5%, fill factor of 76.2% and short circuit current density of 22.25 mA/cm^2 when illuminated with a 100 mW/cm^2 light (P_{in}). (6)
(a) If the short circuit current is 3.56 mA, what is the area of device in mm^2 ?
(b) Calculate open circuit voltage of the device in mV (Correct to one decimal place).

14. Explain with diagram the working principle of DSSC. (6)

15. Match the most appropriate application with the materials. (6)

1	Calcium	A	Phosphorescent material
2	Indium Tin Oxide	B	Solid State Lighting
3	Dimethyl-9-decalol	C	Emeraldine Salt
4	Tris[2-phenylpyridinato-C2 N]iridium(III)	D	Cathode material
5	Polyaniline	E	Anode material
6	Electroluminescence	F	Geosmin