STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI- 86
(For candidates admitted during the academic year 2016 – 17 & thereafter)

SUBJECT CODE : 16VS/VA/MF45

B. Voc. DEGREE EXAMINATION, APRIL 2022
SUSTAINABLE ENERGY MANAGEMENT
FOURTH SEMESTER

COURSE : ALLIED CORE
PAPER : MICROBIAL FUEL CELLS
TIME : 3 HOURS **MAX. MARKS : 100**

SECTION – A

ANSWER ALL QUESTIONS (30x1 = 30)

I. CHOOSE THE CORRECT ANSWER

1. EIS stands for _____ Spectroscopy
   a. Electron Impedance c. Electrical Impedance
   b. Electrochemical Impedance d. Electrostatic Impedance
2. Which one of the following is not a part of In-situ electrochemical characterization technique?
   a. Current–Voltage Measurement c. Cyclic Voltammetry
   b. Current Interrupt Measurement d. Porosity Determination
3. In an electrochemical experiment, the fundamental variables are _____.
   a. Voltage (V) c. Current (I)
   b. Time (t) d. All the above
4. For optimization of designs, CFD is _____.
   a. Slow and expensive c. Cost-effective but slow
   b. Fast but expensive d. Cost-effective and fast
5. A fuel cell uses_____ to produce electricity
   a. He b. H_2 c. N_2 d. CO_2
6. _____CANNOT be used as a fuel for fuel cells.
   a. CO/H_2 b.CH_3OH c.CH_4 d. H_2S

II. FILL IN THE BLANK

7. Oxidation is _____of electrons.
8. The lightest element of the periodic table is _____
9. Catalyst for a traditional fuel cell is _____.
10. _____ helps to monitor the flow rate of a fuel cell.
11. If the resistance of a fuel cell is _____, the fuel cell performance will increase.
12. Efficiency of an alkali fuel cell is _____ percent.
13. MFC in biosensors is used to evaluate the _____ level of wastewater effluents.
14. Oxidation is _____of electrons.

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III. ANSWER IN A SENTENCE OR TWO

15. What is fuel crossover?
16. Give any two applications of frequency response.
17. Why are fuel cell stacks used?
18. What is the operating range of PAFC?
19. Give any two advantages of fuel cell.
20. What is the major disadvantage of Pt as an electrode?
21. Write an example of substrate that can be used in a microbial fuel cell.
22. Microbial fuel cells are considered as a source of sustainable energy. Give reason.

IV. EXPAND THE FOLLOWING

23. Pt-
24. BOD-
25. CHP-
26. CV-
27. IV

V. STATE TRUE OR FALSE

28. Microbial fuel cells can be used for the treatment of waste water.
29. Fuel cells will be connected in series to increase the voltage.
30. Acetate can be used as a substrate in microbial fuel cell.

SECTION – B

Answer any SIX questions: **(6x5=30)**

31. Discuss the commercial waste water treatment using MFC.
32. Explain In-situ electrochemical characterization techniques in brief.
33. Write a short note on CFD modeling.
34. Explain the life cycle of fuel cell with the help of the diagram.
35. Describe the role of MFC as biosensor.
36. What are the needs to characterize a fuel cell?
37. Write short notes on the fuel choices available for a fuel cell.
38. What are the advantages of fuel cells?

SECTION – C

Answer any TWO questions: **(2x20=40**

39. Tabulate the characteristics of different types of fuel cell in detail.
40. Explain the working of PEMFC with required diagram.
41. Differentiate between Microbial Fuel Cells and Traditional Fuel Cells.
42. Write the classification of fuel cells based on its electrolyte, temperature, fuel and application.

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