

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 2019
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. Fuel cell can be connected in parallel to
a) increase voltage b) decrease voltage c) increase current d) decrease current
2. Microbial fuel cells are considered as a source of sustainable energy. Because
a) They use microbes as catalyst
b) They can use a variety of inorganic material as substrate
c) They can be installed for waste water treatment
d) All the above
3. Role of a electrolyte is
a) to transport ion b) to oxidize ion c) to reduce ion d) to supply ions
4. Select the incorrect statement from the following option.
a) Fuel cells have high efficiency
b) The emission levels of fuel cells are far below the permissible limits
c) Fuel cells are modular
d) The noise levels of fuel cells are high
5. Primitive microbial fuel cell is constructed by
a) Microb b) Potter c) M.F.Cell d) Harry
6. I-V curve means
a) Impedance vs Voltage b) Current vs Voltage
c) Current vs Capacitance d) Impedance vs Capacitance
7. EIS stands for
a) Electron Impedance spectroscopy b) Electrical Impedance spectroscopy
c) Electrochemical Impedance spectroscopy d) Electrostatic Impedance spectroscopy
8. The residual product discharged by the DMFC is
a) Hydrogen peroxide, Carbon dioxide b) Alcohol, Water
c) Water, Carbon dioxide d) Potassium permanganate, Water
9. The electrolytic solution used in hydrogen-oxygen fuel cell is
a) 75% KOH solution b) 25% KOH solution
c) 75% NaOH solution d) 25% NaOH solution

II. Fill in the Blanks:

10. A fuel cell is used to convert ----- in to electrical energy.
11. Electrolyte used in SOFC is -----.
12. Fuel cell can be connected in ----- to increase voltage.

13. Reduction is ----- of electrons.
14. Cathode substrate used in MFC is -----.
15. Microbial fuel cell operate well at pH of -----.
16. BOD stands for -----.
17. Anaerobic means -----.

III. Answer in a sentence or two:

18. What is a fuel cell?
19. Draw the diagram of fuel cell.
20. What are the main disadvantages of Pt electrode?
21. Write down the requirement to promote high rate of electrode processes.
22. Write down the overall fuel cell reactions.
23. List out the name of common fuels.
24. What are the types of Microbial fuel cells?
25. What is the role of an electrolyte in a fuel cell?
26. Write two applications of microbial fuel cells.
27. Give your idea to increase the efficiency of material.

IV. State true or false.

28. Fuel cells are free from vibrations, heat transfer and thermal pollution.
29. The product is pure enough that it can even be used for drinking purpose.
30. Graphite is a anode material for MFC

SECTION – B

Answer any SIX questions:

(6x5=30)

31. Distinguish the fuel cells based on operating temperature.
32. What are the advantages of fuel cells?
33. Write a short note on the following. a) Catalyst b) activation kinetics.
34. Discuss about the different source of hydrogen.
35. Describe the needs for characterization of fuel cell?
36. Explain the principle and different components of MFC.
37. Account on applications of microbial fuel cells in wastewater treatment.
38. How MFC can be used as biosensor? Explain in detail.

SECTION – C

Answer any TWO questions:

(2x20=40)

39. Explain different types of fuel cell based on fuel used.
40. Write an essay about charge and mass transport mechanism in Fuel cell.
41. Explain in detail about the In-Situ and Ex-Situ techniques available for the characterization of a fuel cell.
42. Explain in detail about the application of microbial fuel cells as a tool for the production of bio hydrogen and bioelectricity.
