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M.Sc. DEGREE EXAMINATION, MARCH/APRIL 2019.
FOURTH SEMESTER

Material Science and Nano technology

Paper IV — ENERGY CONVERSION TECHNOLOGIES

Time : Three hours

Maximum : 75 marks

(No additional sheet will be supplied)

PART A — (5 × 3 = 15 marks)

Answer any FIVE questions.

Each question carries 3 marks.

Each answer should not exceed 1 page.

1. Discuss the challenges of biorefinery.
2. Discuss chemical processes in alcohol production.
3. Write the components of battery and their function.
4. Write the draw backs of Lead acid battery.
5. Write the principle of a fuel cell.
6. Write the functioning of direct methanol fuel cell.
7. Write the functioning of dye sensitized Solar cell.
8. Write the advantages of silicon Solar cell.

PART B — (4 × 15 = 60 marks)

Answer ALL questions.

Each question carries 15 marks.

Each answer should not exceed 6 pages.

9. (a) Discuss different mechanisms involved in production of energy from biomass.
(b) Discuss the production of ethanol from microbial process is economically viable or not.

Or

10. (a) Describe the elements present in Gasification instrument and their functioning.
(b) Discuss the steps involved in gasification.

11. (a) Write the functioning of battery.
(b) Discuss the working of Nickel-Cadmium battery.

Or

12. (a) Explain the working of Lithium ion battery
(b) Write the advantages of Lithium ion battery.
13. (a) Write the construction and working of molten carbonate fuel cell.
(b) Discuss the working of solid oxide fuel cell.

Or

14. (a) Describe the construction and working of PEM fuel cell
(b) Write the characteristics of PEM fuel cell and comment on efficiency.
15. (a) Write the construction and operation of Silicon Solar cell.
(b) Discuss the current-voltage characteristics of silicon Solar cell.

Or

16. (a) Write the preparation of molecular hetero junctions and its working.
(b) Write the advantages of organic Solar cells.

