Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 81827

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Seventh/Nineth Semester

Civil Engineering

OCH 353 — ENERGY TECHNOLOGY

(Common to : Aeronautical Engineering/Aerospace Engineering/Automobile Engineering/Biomedical Engineering/Computer Science and Design/Computer Science and Engineering/Computer Science and Engineering (Artificial Intelligence and Machine Learning)/Computer Science and Engineering (Cyber Security)/Computer and Communication Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Electronics and Telecommunication Engineering/Environmental Engineering/Geoinformatics Engineering/Industrial Engineering/Industrial Engineering and Management/Instrumentation and Control Engineering/ Manufacturing Engineering/Marine Engineering/Materials Science and Engineering/Mechanical Engineering/Mechanical Engineering (Sandwich)/Mechanical and Automation Engineering/Mechatronics Engineering/Medical Electronics/ Petrochemical Engineering/Production Engineering/Robotics and Automation/Safety and Fire Engineering/Agricultural Engineering/Artificial Intelligence and Data Science/Biotechnology/Biotechnology and Biochemical Engineering/Computer Science and Business systems/Fashion Technology/Food Technology/Handloom and Textile Technology/Information Technology/ Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology/Plastic Technology/Textile Chemistry/Textile Technology)

(Regulations 2021)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between primary and secondary energy sources with suitable examples.

2. Which three countries are the largest consumers of energy globally?

3. Name any two types of materials used as control rods in a nuclear reactor.

4. What are the factors that determines the quality of coal?

5. List two applications of solar thermal systems in industrial processes.

6. What is the principle of an OTEC power plant?

7. Is oxygen required for the pyrolysis process? Justify your answer.

8. Distinguish between alkaline fuel cell and phosphoric acid fuel cell.

9. Name two key metrics analyzed during an energy audit of a chemical process plant.

10. How can economizers improve the energy efficiency of boilers?

PART B — ($5 \times 13 = 65$ marks)

11. (a) Discuss the world current position of energy resources with suitable statistical data and explain how India is meeting its current energy demand.

Or

(b) (i) Define 'energy crisis' and discuss the main causes of crisis. (7)

(ii) Discuss on the various alternative energy sources that can replace fossil fuels. (6)

12. (a) With a neat sketch explain the working of pressurized water reactor and mention it's advantages and disadvantages over other reactors.

Or

(b) With a neat drawing, explain in detail the principle and working of fluidized bed combustion process.

13. (a) (i) With a neat sketch explain the working of solar pond. (7)

(ii) Using suitable diagram, write a brief note on solar distillation. (6)

Or

(b) Explain the working of a vapour dominated or dry steam field used in a geothermal power plant with a neat layout and T-S diagram.

14. (a) With a neat sketch, explain the construction and working of KVIC type digester for biomass processing.

Or

(b) Draw the schematic of a closed type MHD power generation and explain its working.

15. (a) What is called energy audit? How it is helpful in energy savings? Explain in detail about preliminary audit and detailed energy audit with a neat flow chart.

Or

(b) Explain in detail about any three energy-saving techniques in heat exchangers and discuss their impact on overall efficiency.

PART C — ($1 \times 15 = 15$ marks)

16. (a) Sketch the layout of hydroelectric power plant and explain the functions of each component in it. Mention the advantages and limitations of this plant.

Or

(b) (i) Elucidate the construction and working of wave energy conversion by floats with a neat illustration. (8)

(ii) Write a brief note on the working of molten carbonate fuel cell (MCFC) using a neat sketch. (7)