

Program: B. Sc. in ME
Semester: 1st

2

Date: 9 January, 2026
Time: 02:30 pm – 04:30 pm

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

Mid Semester Examination
Course Number: ME 4101
Course Title: Introduction to Mechanical Engineering

Winter Semester: 2024 - 2025
Full Marks: 120
Time : 2 Hours

There are 04 (four) questions. Answer all questions. The symbols have their usual meanings. Marks of each question and corresponding CO and PO are written in the brackets.

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1. (a) Discuss the role of mechanical engineers in the design, manufacture and management of wind energy systems for electricity generation. (15+15)
(CO1)
(PO1)
WK1-WP1
- (b) Discuss classification of wind turbines with advantages, disadvantages, applications and schematic diagrams. WK1-WP1
2. (a) Discuss the differences between run-of-river, impoundment, and pumped storage hydropower plants in a table. (10+10+8)
(CO1)
(PO1)
WK1-WP1
- (b) Discuss the advantages and potential of nuclear fusion compared to nuclear fission. WK1-WP1
- (c) Explain why biofuel is considered a renewable energy source, while fossil fuels are classified as non-renewable?
3. (a) Discuss the accessories that maximize the reuse of flue gas heat to enhance a boiler's efficiency. Include T-S and schematic diagrams to illustrate their functions. (12+10+10)
(CO2)
(PO1)
WK1-WP1
- (b) Explain why heat engines cannot achieve 100% efficiency and why a steam power plant's efficiency is limited to about 60%. WK1-WP1
- (c) Differentiate between point functions and path functions and classify non-flow processes with property diagrams.
4. (a) Discuss the mounting devices that regulate steam space and pressure in boilers. (12+10+8)
- (b) Explain why external work input is necessary for a refrigeration system, with diagrams and reasoning. (CO2)
(PO1)
WK1-WP1
- (c) Discuss the forms of energy in transit and indicate their directions.