



VIT

Vellore Institute of Technology

SLOT: E2+T

REG.NO.:

SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST (CAT) -II
Fall SEMESTER 2025-2026

Programme Name & Branch : B.Tech Mechanical Engineering
 Course Code : BMEE326L
 Course Name : Power Plant Engineering
 Faculty Name(s) : Dr.M.A.Asokan
 Class Number(s) : VL2025260102356
 Date of Examination : 09/10/2025
 Exam Duration : 90 minutes

Maximum Marks: 50

General Instruction(s):

- Answer all Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes Statements:

CO3: Analyze the gas turbine, nuclear and diesel power plants.

Q. No	Question	M	CO	BL
1.	India has predominantly selected Pressurized Heavy Water Reactors (PHWRs) for its nuclear power program. Critically discuss the reasons why PHWRs are more suitable for India compared to other reactor types.	10	3	
2	With significant investment in Fast Breeder Reactors (FBRs), analyse the potential benefits and drawbacks of this technology, highlighting issues of fuel sustainability and nuclear proliferation	10	3	
3.	A gas turbine units has a pressure ratio 5/1 and a maximum cycle temperature 900 K. the compression takes place in two stages of equal pressure ratio with inter cooling back to initial temperature of 15°C. the isentropic efficiencies of turbine and compressor are 0.86 and 0.89 respectively. Determine the efficiency of the unit when it is fitted with a heat exchanger of 70% effectiveness.	10	3	
4.	A simple open cycle gas turbine takes in air at 100kPa and 15°C and compresses it to 5 times the initial pressure, the isentropic efficiency of compressor being 85%. The air passes to the combustion chamber, and after combustion, the gases enters the turbine at a temperature of 557°C and expand to 100kPa, with an isentropic efficiency of 82%. Estimate the mass flow of air and gases in kg/min for a net power output of 1500 kW, making the following assumptions. Fall of pressure through the combustion system =0.09 bar, $C_p = 1.005 \text{ kJ/kg K}$ and $\gamma = 1.4$, for both air and combustion gases. Assume mass flow through the turbine and compressor are equal.	10	3	
5	If a diesel power plant operates continuously for 16 hours/day, critically assess the consequences of improper lubrication on efficiency, wear, and maintenance costs. Propose preventive strategies.	10	3	
