


**SCHOOL OF MECHANICAL ENGINEERING**  
**CONTINUOUS ASSESSMENT TEST - I - WINTER SEMESTER 2019-2020**
**Programme Name & Branch:** B. Tech & SMEC

**Course Name Code:** MEE2052

**Course Name:** Sustainable Energy

**Faculty Name(s):** Dr. A K Behura

**Class Number(s):** VL2019205002047


SCAN ME

**Exam Duration:** 90 min

**Maximum Marks:** 50

Answer all the questions		
Sl.No	Questions	Course outcome (CO)
1.	Define sustainable energy. What are the implications available for sustainable energy in India and also write the practical applications of it.	1
2.	What are the institutions in India that influence the energy policy and how they implement the policies for the society?	2
3.	What are the advantages of reducing energy waste and also write the importance of improving the energy efficiency?	3
4.	A reversible heat engine operates between two reservoirs at temperatures of $600^{\circ}\text{C}$ and $40^{\circ}\text{C}$ . The engine drives a reversible refrigerator which operates between reservoirs at temperatures of $40^{\circ}\text{C}$ and $-20^{\circ}\text{C}$ . The heat transfer to the heat engine is $2000\text{ kJ}$ and the net work output of the combined engine refrigerator plant is $360\text{ kJ}$ . Determine (i) the heat transfer to the refrigerant and the net heat transfer to the reservoir at $40^{\circ}\text{C}$ . (ii) Reconsider (i) given that the efficiency of the heat engine and the COP of the refrigerator are each $40^{\circ}\text{C}$ of their maximum possible values.	4
5.	A cyclic heat engine operates between a source temperature of $800^{\circ}\text{C}$ and a sink temperature of $30^{\circ}\text{C}$ . What is the least rate of heat rejection per kW net output of the engine? If the same heat engine converted into heat pump, calculate the COP.	4