

**VIT**Vellore Institute of Technology
(Approved by the University Grants Commission Act 1956)

REG.NO.: 22BME00183

RDN 120-30
SLOT: B1-TB1**SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST -I
FALL SEMESTER 2024-2025**

Programme Name & Branch : B-Tech (BMM, BMA AND BME)
 Course Code : BMEE303L
 Course Name : Thermal Engineering Systems
 Faculty Name(s) : Dr. NISHANT TIWARI, Dr. LALIT KUMAR B, Dr. SENTHIL KUMAR M, Dr. N. GOVINDHA RASU, Dr. PRAKASH R
 Class Number(s) : VL2024250103781, 3782, 3783, 3784, 3785
 Date of Examination : 26-08-2024
 Exam Duration : 90 minutes Maximum Marks: 50

General instruction(s): Assume suitable data if any missing.**Answer all the questions**

Q. No	Question	Marks
1.	Draw the valve timing and port timing diagram of a 4-Stroke and 2-Stroke C.I. engine and discuss the effect on engine performance of increasing the duration of each stroke.	10
2.	Compare the stages of combustion in S.I. and C.I. engines with neat sketch.	10
3.	A diesel engine working on 4-stroke develops a brake power of 20.9 kW. A morse test was conducted on this engine and the brake power (kW) obtained when each cylinder was made inoperative by cutting off fuel supply are 14.9, 14.3, 14.8 and 14.5 respectively. The test was conducted at constant speed. Find the indicated power, Mechanical efficiency, and brake mean effective pressure when all cylinders are firing. The bore of the engine is 75 mm and stroke is 90 mm. Assume N = 3000 rpm.	10
4.	The following observations were recorded in a test of one hour duration on a single-cylinder oil engine working on four-stroke cycle. Bore = 300 mm, stroke = 450 mm, fuel used = 8.8 kg, calorific value of fuel = 41800 kJ/kg, average speed 200 rpm, indicated mean effective pressure = 5.8 bar, brake friction load = 1860 N, Quantity of cooling water = 650 kg, temperature rise in cooling water = 22°C, diameter of brake wheel = 1.22 m. Calculate the (i) mechanical efficiency (ii) brake thermal efficiency and (iii) Draw the heat balance sheet.	10
5.	A single-acting single-cylinder reciprocating air compressor is compressing 20 kg/min. of air from 110 kPa, 30°C to 600 kPa and delivers to a receiver tank. The law of compression is $p v^{1.25} = \text{constant}$. Mechanical efficiency is 80%. Find the power input to compressor and motor (brake) power, neglecting losses due to clearance, leakage and cooling.	10
