S.B. Roll No..

THERMODYNAMICS-I
4ᵗʰ Exam/Mech./5253/Jan'2022
(FOR 2018 BATCH ONWARDS)

Duration: 1.15Hrs.   **M.Marks:25**
Use of steam table & scientific calculator is allowed.

SECTION-A

Q1. Attempt any three questions.   **3x5=15**
  i.   Define the following: a) Zeroth Law of Thermodynamic   b) Extensive property c) Gas Constant.
  ii. Explain the Free Expansion and Throttling process.
  iii. State the two statements of second law of thermodynamics.
  iv. Derive the expression for steady flow energy equation.
  v.   A heat engine works on carnot cycle between 1200°C and 150°C. When the engine receives heat, the highest temperature at the rate of 1500KJ per second, find the power of this engine.
  vi. Find the power required to drive an air compressor which has to compress 30 m³ of air/minute from 1.013 bars and deliver it at the higher pressure. Assume that the index n for the compression curve is 1.25 and that 20 percent of the work supplied to the compressor is wasted.
  vii. Explain the working of Fusible Plug.

SECTION-B

Q2. Attempt any one question.   **1x10=10**
  a. Explain any five mountings of Boiler with diagram.
  b. Steam having enthalpy of 3200 KJ/kg enters a nozzle at a velocity of 50 m/sec. Find the velocity of steam at the exit of nozzle if its enthalpy is reduced to 2500 KJ/ Kg. Assuming the nozzle to be horizontal neglecting heat losses
  c. Derive the expression for $PV^x = C$ and work done for adiabatic process.
  d. 250 KJ of steam per kg are added to 0.8 dry steams at 7 bar pressure, determine the condition of steam after heat addition.