UNI. ROLL No. ....

B.Tech. I-Year, I Term (Odd Sem.) Examination, 2016-17
Subject: - Basic Mechanical Engineering (MEE-1002)

Time: 90 Minutes **Max.Marks:20**

Notes:

1. All questions of the particular section should be answered collectively at one place. All parts of a question (a, b, etc.) should be answered at one place.
2. Answer should be brief and to-the-point and be supplemented with neat sketches.
3. Any missing or wrong data may be assumed suitably giving proper justification.

SECTION-A

Attempt all of the following: - **(1x5=05)**

Q1. Explain irreversible process.

Q2. What do you mean by thermodynamic equilibrium?

Q3. In a thermodynamic cyclic, heat transfers are +14.7kJ, -25.2 kJ, -13.56 kJ and +31.5 kJ. Calculate the net work output for this cyclic.

Q4. In a nozzle, gas enters at an enthalpy of 800 kJ/kg and leaves the nozzle at an enthalpy of 450 kJ/kg. The loss of heat from the gases to the surrounding is negligible. Calculate the exit velocity.

Q5. What do you understand by intensive and extensive property?

SECTION-B

Attempt any three of the following: - **(2 x3=06)**

Q1. For an open system drive the steady flow energy equation with proper assumption and block diagram.

Q2. A non flow reversible process can be written down by an equation ($P = V^2 + \frac{8}{V}$) bar. Determine the work done if volume changes from 2 m^3 to 4 m^3. Where V is in m^3.

Q3. In a gas turbine unit, the gases flow through the turbine is 15 kg/s and the power developed by the turbine is 12000 kW. The enthalpies of gases at the inlet and outlet are 1260 kJ/kg and 400 kJ/kg respectively, and the velocity of gases at the inlet and outlet are 50 m/s and 110 m/s respectively. Calculate the rate at which heat is rejected to the turbine.

Q4. For a closed system derive an expression for work transfer in a polytropic process.

SECTION-C

Attempt any three of the following: - **(3 x3=09)**

Q1. What do understand by zeroth law of thermodynamics? In a new temperature scale, the resistance of a wire is found 50 ohm at ice point and 150 ohm at steam point. If temperature of ice point and steam point are 100 and 300. If relation between temperature (t) and resistance (R) is given by $t = a.R + b$, where *'a'* and *'b'* are constant. What will be the temperature of wire when resistance is 100 ohm?

Q2. What do you understand by first law of thermodynamics for a process and for a cycle? What are the limitations of first law of thermodynamics?

Q3. A piston and cylinder machine contains a fluid system which passes through a complete cycle of four processes. During a cycle, the sum of all heat transfers is -340 kJ. The system completes 200 cycles per min. Complete the following table showing the method for each item, and computes the net rate of work output in kW.

Process	Q (kJ/min)	W(kJ/min)	ΔE(kJ/min)
a - b	0	4340	--------------
b – c	42000	0	--------------
c – d	-4200	--------------	-73200
d – a	---------	-----------	----------

Q4. At the inlet to a certain nozzle, the enthalpy of the fluid passing is 3000 kJ/kg and the velocity is 60 m/s. At the discharge end, the enthalpy is 2762 kJ/kg. The nozzle is horizontal and there is negligible heat loss from it.

(a) Find the velocity at exists from the nozzle.

(b) If the inlet area is 0.1 m^2 and the specific volume at inlet is $0.187 m^3/kg$, find the mass flow rate.

(c) If the specific volume at the nozzle exit is $0.498\ m^3/kg$, find the exit area of the nozzle.

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Second MID Term Examination, 2016-17

B. Tech I Year I Semester

MEE-1002: Basic Mechanical Engineering

Time: 1 ½ Hrs. **Max. Marks: 20**

SECTION-A

Note: Attempt All Question. **(1x5=5)**

1. A heat engine is operating on Carnot cycle. The heat rejected by the engine to the sink is $3/_4$ of the work output. Calculate thermal efficiency of the engine.
2. Define direct extrusion.
3. Explain any two function of riser in gating system?
4. What is difference between refrigerator and heat pump?
5. Define shake allowance?

SECTION-B

Note: Attempt Any Three Question. **(2x3=6)**

1. Explain any four properties of moulding sand.
2. Prove that entropy change for an ideal gas undergoing in a thermodynamic process (for unit mass) is

$$\Delta s = C_v \ln\left(\frac{P_2}{P_1}\right) + C_p \ln\left(\frac{V_2}{V_1}\right)$$

3. Differentiate SI engine and CI engine.
4. Explain the common allowances provided on patterns with neat sketch.

SECTION-C

Note: Attempt Any Three Question. (3x3=9)

1. What do you mean by metal forming process and explain forging processes with neat sketches?
2. Explain Kelvin – Plank and Clausius statement of the second law of thermodynamics with diagram. An inventor claims to have invented a heat engine operating between temperature of 1212 °C and 350 K. It receives 70 kJ/min of energy and delivers 1.2 kW work. Are you satisfied with his claim? Give proper justification.
3. What is green sand casting and explain gating system with neat sketch?
4. A heat pump working on the Carnot cycle takes in heat from a reservoir at 6°C and delivers heat to a reservoir at 65°C. The heat pump is driven by a reversible heat engine which takes in heat from a reservoir at 840°C and rejects heat to a reservoir at 65°C. The reversible heat engine also drives a machine that absorbs 30 kW. If the heat pump extracts 18 kJ/s from the 6°C reservoir, determine

   (a) The rate of heat supply from the 840°C source

   (b) The rate of heat rejection to the 65°C sink.

Printed Pages: 02 **University Roll No............**

I-Term Examination, Even Semester, 2016-17

B. Tech. I-Year, II-Semester

MEE 1002 : Basic Mechanical Engineering

Time: 90 Min. **Max. Marks: 20**

Instructions: Assume any data if it is missing

Section – A

Note: Attempt All Questions. **(1x5=5)**

I. Define thermal equilibrium.

II. Differentiate between point function and path function.

III. Find the rise in temperature of water when it falls down from a height of 100 m. It may be presumed that all the heat generated stays in water. Take specific heat of water =4200J/kg K.

IV. Why first law of thermodynamics is also known as law of conservation of energy?

V. Write steady flow energy equation for an open system.

Section – B

Note: Attempt Any Three Questions. **(2x3=6)**

I. Define and explain the Zeroth law of thermodynamics. Why it is so called?

II. Prove that for an adiabatic process pv^{γ}=constant.

III. Using S.F.E.E derive exit velocity of gas through nozzle.

IV. A blower handles 1kg/s of air at 20°C and consumes power of 15kW. The inlet and outlet velocities of air are 100m/s and 150m/s respectively. Find the exit air temperature, assuming adiabatic conditions. Take c_p of air as 1.005 kJ/kg.K.

Section-C

Note: Attempt Any Three Questions. (3x3=9)

I. What you understand by terms, "work", "Energy" and "Force"? Inter-relate these terms.

II. 2 kg of an ideal gas occupies a volume of 0.3 m^3 at 10 bar pressure and 500k temperature. When this gas expands polytropically $pv^{1.2}$ =C, the internal energy decreases by 300kJ. Presuming adiabatic exponent $\gamma = 1.4$, determine (a) specific gas constant (b) final temperature, pressure and volume of gas (c) heat and work interaction across the system boundary.

III. Show that the work done per kilogram of a perfect gas during an adiabatic expansion for which pv^{γ}=constant is given by:

$W_{1-2} = \frac{R(T_1 - T_2)}{\gamma - 1}$, where T_1 and T_2 are initial and final temperature and R is the characteristics gas constant.

IV. Distinguish between:

(a) Heat And work

(b) Mechanical and chemical equilibrium.

(c) Isobaric and isochoric process.

First-Term Examination **Uni. Roll No.**

Odd-Semester, 2017-18

Program: B. Tech First Year

Basic Mechanical Engineering, MEE-1102

Time: 1 Hour **Maximum Marks: 15**

Note: - Attempt all Questions

Section-A **[3x2]**

Q: 1. What is difference between Heat and Work ? What is/are limitations of First Law of thermodynamics?

Q: 2. If a gas of volume 6000 cm^3 and at a pressure of 0.1 MPa is compressed quasi-statically according to pV^2=constant until volume remains $1/3^{rd}$ of the initial volume. Determine the work transfer involved.

Q: 3. The temperature T on a thermometric scale is defined in term of a property E by the relation $T + 273 = a10^{bE}$ where a and b are constants. The values of E are found to be 0.2 & 1.0 at ice point and steam point respectively. What will be value of temperature in Celsius scale corresponding to a reading E equals to 0.7?

Section-B **[3x3]**

Q: 1.Derive Steady Flow energy equation for open system. Clearly mention the assumptions.

Q: 2.A fluid is confined in a cylinder by a frictionless piston so that pressure in the fluid is a linear function of volume i.e. P= a+ bV, where a, b are constant.

Internal energy of the system is given by U= 34+ 3.15 PV, where U is in kJ, P is in kPa and V is in m^3.If fluid changes from initial state of pressure 170kPa & volume 0.03 m^3 to a final state of pressure 400 kPa and 0.06 m^3. Find magnitude and direction of work and heat interactions.

Q: 3. Derive an expression for work done during a polytropic - process in a closed system.

First-Term Examination

***Odd*-Semester, 2018-19**

Program: B.Tech **Branch:** ME, EE, CE & EC
Year: 1st **Time:** 1Hour **Maximum Marks:** 15
Subject: Basic Mechanical Engineering (BME G-0001)

Section-A

Attempt All Questions **3 x 2 = 6Marks**

1. What do you understand by Quasi-static process and Reversible process?
2. Given that the ice point is 0^0C and 32^0C and that the steam point is 100^0C and 212^0F, set up a correlation between the Celsius and Fahrenheit scales. Determine the temperature at the Celsius and Fahrenheit scales have same numerical value.
3. Derive the expression for work transfer by an ideal gas undergoing a reversible isothermal process and calculate the work done by gas enclosed in a piston cylinder arrangement which is heated isothermally from an initial condition 150kPa and volume 0.03 m^3 to final volume of 0.1 m^3.

Section-B

Attempt All Questions **3 x 3 = 9Marks**

1. Derive steady flow energy equation for open system. Clearly mention the assumptions.
2. A mass of 8 kg gas expands within a flexible container so that the p-v relationship $pv^{1.2}$=const. The initial pressure is 1000kPa and initial volume is 1 m^3. The final pressure is 5kPa. If specific internal energy of gas decreases by 40 kJ/kg. Find the heat transfer in magnitude and direction.
3. A steam turbine operates under steady flow conditions receiving steam at the following state:
   Pressure 1.2 MPa; temperature 188^0C, Enthalpy 2785 kJ/kg, velocity 33.3 m/s and elevation 3m.The exhaust of steam from the turbine is at pressure 20 kPa, enthalpy 2512 kJ/kg, velocity 100 m/s and elevation 0m. Heat is lost to the surroundings at the rate of 0.29kJ/s. If the rate flow through the turbine is 0.42kg/s, what is the power output of the turbine in kW?

Uni. Roll No.................

First Term Examinations
Even Sem 2018-19 B.Tech First Year
Basic Mechanical Engineering (BMEG0001)

Time: 1 hr **Max. Marks 15**

Attempt All Question

Section A **(2x3)**

Q.1 A non flow reversible process occurs for which pressure and volume are related by expression pV = 150 where pressure is in bar and volume is in m^3. Make calculation for work done or by the system if pressure increases from 10 to 100 bar. Indicate about process whether expansion or compression.

Q.2 Consider a scale where temperature varies as $T = a - b\ln(X)$, where a & b are constants T is temperature and X is some property. The scale reads -6.212 when X=10 and -3.436 when X is halved. Calculate T when X is 20.

Q.3 What is a quasi-static process? How it is different from reversible process?

Section B **(3x3)**

Q1. a) Derive an expression for work transfer for a reversible polytropic process in a close system.

b) In the converging nozzle gas enters with negligible velocity and enthalpy of 800 kJ/kg and leaves with enthalpy of 350 kJ/kg. What is the velocity of gas at the outlet of the nozzle?

Q2. A gas undergoes a thermodynamic cycle consisting of three processes beginning at an initial state where p_1=1 bar, V_1= 1.5 m^3 and U_1 = 512 kJ

The processes are as follow

(i) Process 1-2: compression with pV= constant to p_2 = 2 bar, U_2= 690 kJ

(ii) Process 2-3: W23 = 0, Q23 = -150 kJ

(iii) Process 3-1: W31= +50 kJ, Neglecting KE and PE changes, Determine the heat interactions during process 1-2 & 3-1.

Q3. Derive Steady Flow Energy Equation for open system by clearly mentioning the assumptions.

Printed Pages:02 **University Roll No............**

Mid-Term Examination, Odd Semester 2019-20

Program: B.Tech (CE, EC, EE, EN&ME), Year: 1^{st} , Semester: 1^{st}

Subject Code: BMEG-0001,

Subject Name: Basic Mechanical Engineering

Time: 2 Hours **Maximum Marks: 30**

Section- A

Note: Attempt All Three Questions.. 3 x 2 =06 Marks

1. Define PMM-I and PMM-II.
2. What are the two statements of second law of thermodynamics?
3. During one cycle the working fluid in an engine engages in two work interactions: 15 kJ to the fluid and 44 kJ from the fluid, and three heat interactions, two of which are known: 75 kJ to the fluid and 40 kJ from the fluid. Evaluate the magnitude and direction of the third heat transfer.

Section- B

Note: Attempt All Three Questions. 3 x 3 =09 Marks

1. A certain gas of mass 4 kg is contained within a piston cylinder assembly. The gas undergoes a process for which $pV^{1.5}$= *constant*. The initial state is given by 3 bar, 0.1 m^3. The change in internal energy of the gas in the process is $u_2-u_1= -4.6\ KJ/Kg$. Find the net heat transfer for the process when the final volume is 0.2 m^3. Neglect the changes in K.E and P.E.
2. The temperature t on a thermometric scale is defined in terms of a property P by the relation

$$t = a \ln P + b$$

Where a and b are constants. The values of P are found to be 1.5 and 7.5 at the ice point and the steam point, the temperatures of which are assigned the numbers 0 and 100 respectively. Determine the temperature corresponding to a reading of P equal to 3.5 on the thermometer.

3. Derive the expression for work transfer by a closed system undergoing a reversible adiabatic expansion process.

Section – C

Note: Attempt Any Three Questions. 3 x 5 = 15 Marks

1. A reversible heat engine operates between two reservoir at temperatures 600^0C and 40^0C. The engine drives a reversible refrigerator which operates between reservoir at temperatures of 40^0C and -20^0C. The heat transfer to the heat engine is 2000 kJ and the net work output of the combined engine refrigerator plant is 360 KJ.
    a) Evaluate the heat transfer to the refrigerant and the net heat transfer to the reservoir at 40^0C.
    b) Reconsider (a) given that the efficiency of the heat engine and the COP of the refrigerator are each 40% of their maximum possible values.
2. A nozzle is a device for increasing the velocity of a steadily flowing stream. At the inlet to a certain nozzle, the enthalpy of the fluid passing is 3000 kJ/kg and the velocity is 60 m/s. At the discharge end, the enthalpy is 2762 kJ/kg. The nozzle is horizontal and there is negligible heat loss from it.
    a) Find the velocity at exit from the nozzle.
    b) If the inlet area is 0.1 m^2 and the specific volume at inlet is $0.187 m^3/kg$. Find the mass flow rate.
    c) If the specific volume at the nozzle exit is $0.498 m^3/kg$, find the exit area of the nozzle.
3. 0.1 m^3 of an ideal gas at 300K and 1 bar is compressed adiabatically to 8 bar. It is then cooled at constant volume and further expanded isothermally so as to reach the condition from where it started. Calculate:
    a) Pressure at the end of constant volume cooling.
    b) Change in internal energy during constant volume process.
    c) Net work done and heat transferred during the cycle.

    Assume C_p = 14.3 kJ/kg K and C_v = 10.2 kJ/kg K.
4. Derive an expression for efficiency of Carnot heat engine.

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Mid-Term Examination, Odd Semester 2021-22

B.Tech. (CE, EC, EE, EN&ME), Year:1st, Semester: 1st

Subject Code: BMEG 0101

Subject Name: Basic Mechanical Engineering

Time: 2 Hours **Maximum Marks: 30**

Section- A

Note: Attempt All Three Questions. $3 \times 2 = 6$ Marks

1. Define PMM-I
2. What is Zeroth law of thermodynamics?
3. Define Intensive and Extensive properties with examples.

Section- B

Note: Attempt All Three Questions. $3 \times 3 = 9$ Marks

1. For a closed system derive an expression for work transfer in an adiabatic process.
2. Define thermodynamic equilibrium.
3. List and describe the types of Thermodynamic System.

Section – C

Note: Attempt Any Three Questions. $3 \times 5 = 15$ Marks

1. With assumptions and block diagram derive the steady flow energy equation.
2. A gas undergoes a reversible non flow process according to the relation $p = (3V + 15)$ where V is the volume in m^3 and p is the

pressure in bar. Determine the work done when the volume changes from 3 to 6 m^3.

3. The temperature T on a thermometric scale is defined as

$$\mathbf{T = a \ln P + b}$$

where a and b are constants. The values of P are found to be 1.83 and 6.78 at 0°C and 100°C respectively. Calculate the temperature for a value of K=2.5.

4. Derive an expression for heat transfer in a polytropic process.

Course Name: B.Tech

Course Outcome

CO1: Understand the basic laws of thermodynamics and their applications in real world.

CO2: Calculate heat and energy transfer occurs in atmosphere and in components under thermal engineering applications.

CO3: Interpre the behavior of steam and its applications in thermal engineering.

CO4: Acknowledge the application of thermal engineering associated with human body.

CO5: Understand the basic industrial processes of metal joining, fabrication & casting with applications in real world.

CO6: Develop basic know how and awareness of various manufacturing processes.

Printed Pages: 2 **University Roll No.** ....

Mid Term Examination, Odd Semester 2022-23

Program (B.Tech.), Year: Ist Year (All), Semester: I

Subject Code: BMEG 0001 & Subject Name: Basic Mechanical Engineering

Time: 2 Hours **Maximum Marks: 30**

Instruction for students: *Attempt all the questions from each section, and also assume any missing data with proper justifications.*

Section – A

Attempt All Questions 3 X 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
1.	Discuss the Zeroth Law of the thermodynamics and its importance.	3	CO2 CO4	R U	F C
2.	State the difference between intensive and extensive properties of a thermodynamics system with suitable examples.	3	CO1	R U	F C
3.	What are the different types of thermodynamic systems? Discuss each of them.	3	CO1 CO3	R U	C P
4.	The temperature **T** on a thermometric scale is defined as **T = [m× (lnΩ) +n]**; where **m**, **n** are constants and **Ω** is the thermometric property. The values of **Ω** are found to be 3.66 and 13.56 at 0°C (ice point) and 100°C (steam point) respectively. Calculate the temperature for a value of Ω=4.84. **Or** Describe the following thermodynamics terms using an appropriate illustration (i) System (ii) Boundary (iii) Surroundings	3	CO4	E U	C P
5.	What is the essence of first law of thermodynamics? Write down expressions for the first law applied to (i) a process (ii) a cycle.	3	CO1 CO4	R U	F C

Section – B

Attempt All Questions 5 X 3 = 15 Marks

<table>
<tr><th>No.</th><th>Detail of Question</th><th>Marks</th><th>CO</th><th>BL</th><th>KL</th></tr>
<tr><td>6.</td><td>A fluid at a pressure of 6 bar, and with a volume of 0.36 m^3, contained in a cylinder behind a piston expands reversibly to a pressure of 0.12 bar according to a law, [$p = C/V^2$], where p represents the pressure, C the constant, and V the volume. Calculate the work done by the fluid on the piston.
Or
Derive an expression for work transfer in polytropic process.</td><td>5</td><td>CO1
CO2</td><td>E
U</td><td>C
P</td></tr>
<tr><td>7.</td><td>A fluid system, contained in a piston and cylinder machine, passes through a complete cycle of four processes. The sum of all heat transferred during a cycle is – 680 kJ. The system completes 400 cycles per minute. Complete the following table showing the method for each item, and compute the net rate of work output in kW.
<table>
<tr><th>Process</th><th>Q (kJ/min)</th><th>W (kJ/min)</th><th>□E (kJ/min)</th></tr>
<tr><td>P-M</td><td>0</td><td>8680</td><td>--------</td></tr>
<tr><td>M-N</td><td>84000</td><td>0</td><td>--------</td></tr>
<tr><td>N-O</td><td>-8400</td><td>--------</td><td>-146400</td></tr>
<tr><td>O-P</td><td>--------</td><td>--------</td><td>--------</td></tr>
</table>
Or
Explain each of the following thermodynamics terms (i) point function (ii) path function (iii) cyclic process (iv) reversible process (v) irreversible process</td><td>5</td><td>CO2
CO4</td><td>An
E</td><td>P</td></tr>
<tr><td>8.</td><td>Derive steady flow energy equation (SFEE) for open system. Also write the assumptions.
Or
A well insulated steam turbine operating under steady state flow conditions receives 3600Kg of steam per hour. The steam enters the turbine at a velocity of 80m/sec an elevation of 10m and specific enthalpy of 3276KJ/kg. It leaves the turbine at a velocity of 150m/sec. An elevation of 3m and a specific enthalpy of 2465 KJ/kg. Estimate the power output of the turbine.</td><td>5</td><td>CO1
CO3</td><td>U
A
E</td><td>D
DI</td></tr>
</table>

Course Name: B.Tech.

Course Outcome

CO1: Understand the basic laws of thermodynamics and their applications in real world.

CO2: Calculate heat and energy transfer occurs in atmosphere and in components under thermal engineering applications.

CO3: Interpre the behavior of steam and its applications in thermal engineering.

CO4: Acknowledge the application of thermal engineering associated with human body.

CO5: Understand the basic industrial processes of metal joining, fabrication & casting with applications in real world.

CO6: Develop basic know how and awareness of various manufacturing processes.

Printed Pages: 2 **University Roll No. ....**

Mid Term Examination, Even Semester 2022-23

Program (B.Tech.), Year: Ist Year (All), Semester: II

Subject Code: BMEG 0001 & Subject Name: Basic Mechanical Engineering

Time: 2 Hours **Maximum Marks: 30**

Instruction for students: *Attempt all the questions from each section, and also assume any missing data with proper justifications.*

Section – A

Attempt All Questions 3 X 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
1.	Define thermodynamics. What are the different applications of thermodynamics in an automobile industry or energy sector?	3	CO2 CO4	R U	F C
2.	Describe the following thermodynamics terms using an appropriate diagram (i) System (ii) Boundary (iii) Surrounding.	3	CO1	R U	F C
3.	Explain the concept of "Perpetual Motion Machine of the first kind (PMM-1)". Why it is impossible?	3	CO1 CO3	R U	C P
4.	State the first law of the thermodynamics for a (i) Process (ii) Cycle.	3	CO4	E U	C P
5.	Explain the following statements of second law of thermodynamics with neat sketch (i) Kelvin-Plank statement (ii) Clausius statement	3	CO1 CO4	R U	F C

Section – B

Attempt All Questions 5 X 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
6.	A gas undergoes a reversible non-flow process according to the relation p=(2V+5) where V is the volume in m^3 and p is the pressure in bar. Determine the work done when the volume changes from 2 to 4 m^3. **Or** Define the following thermodynamic terms: (i) Open system (ii) Closed system (iii) Isolated system (iv) Extensive property (v) Intensive property.	5	CO1 CO2	E U	C P

<table>
<tr>
<td>7.</td>
<td>A fluid system, contained in a piston and cylinder machine, passes through a complete cycle of three processes. The sum of all heat transferred during a cycle is "15 kJ". The system completes "10 cycle/min". (i) Complete the following table showing the method for each process (ii) Calculate the net rate of work output in kJ/min.
<table>
<tr><th>Process</th><th>Q (kJ/sec)</th><th>W (kJ/sec)</th><th>ΔU (kJ/sec)</th></tr>
<tr><td>1-2</td><td>0</td><td>35</td><td>--------</td></tr>
<tr><td>2-3</td><td>-150</td><td>0</td><td>--------</td></tr>
<tr><td>3-1</td><td>--------</td><td>--------</td><td>--------</td></tr>
</table>
Or
Determine the steady flow energy equation (SFEE) for an open system along with a simple and straightforward diagram that describes all of its assumptions.</td>
<td>5</td>
<td>CO2
CO4</td>
<td>An
E</td>
<td>P</td>
</tr>
<tr>
<td>8.</td>
<td>Derive an expression for the work done in a polytropic process undergoing a reversible expansion process according to a law: pV^n =constant.
Or
The readings $\mathbf{T_M}$ and $\mathbf{T_N}$ of two thermometers of M and N agree at ice point and steam point and are related by the equation:
$[\mathbf{T_M = (a \times T_N^2) + (b \times T_N) + c}]$
Between these temperatures limits a, b, and c are constants. When the thermometers are immersed within the oil bath, the thermometer M reads 202 °C and N reads 200 °C. Determine the reading on thermometer M, when thermometer N reads 50 °C.</td>
<td>5</td>
<td>CO1
CO3</td>
<td>U
A
E</td>
<td>D
DI</td>
</tr>
</table>