Subject Code: KME301

PAPER ID-311995

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM III) THEORY EXAMINATION 2024-25
THERMODYNAMICS

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Q no.	Question	CO	Level
a.	What is System?	1	K1
b.	Define Microscopic Approach and Macroscopic Approach.	1	K1
c.	Define Coefficient of Performance?	2	K1
d.	State Carnot theorem?	2	K1
e.	What is the difference between first and second law of thermodynamics?	3	K1
f.	What is the importance of Maxwell equations?	3	K1
g.	What advantages are obtained if superheated steam is used in steam prime mover?	4	K1
h.	Define dryness fraction of steam?	4	K1
i.	What do you mean by refrigeration?	5	K1
j.	Define Refrigeration Effect?	5	K1

SECTION B

2. Attempt any *three* of the following: **3 x 10 = 30**

a.	What is steady flow energy equation (SFEE)? What the assumption made for it?	1	K3
b.	Prove: Entropy of Isolated system always increases.	2	K3
c.	What is meant by irreversibility and effectiveness of the system?	3	K2
d.	With the help of neat sketch Explain the psychometric chart.	4	K2
e.	Describe a Bell-Coleman cycle with the help of neat and labelled sketch.	5	K2

SECTION C

3. Attempt any *one* part of the following: **1 x 10 = 10**

a.	Explain briefly free expansion phenomenon.	1	K3
b.	What do you understand by cyclic and quasi-static process? Differentiate between point function and path function.	1	K3

4. Attempt any *one* part of the following: **1 x 10 = 10**

a.	Discuss the signification of Clausius inequality and third law of thermodynamics.	2	K3
b.	Write Kelvin Planck and Clausius statement, Establish the equivalence of the above statements.	2	K3

5. Attempt any *one* part of the following: **1 x 10 = 10**

a.	Drive the Clausius-Clapeyron equation.	3	K3
b.	With the help of Tds equation prove that C_p equal to C_v at absolute zero temperature.	3	K3

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6. Attempt any *one* part of the following: 1 x 10 = 10

a.	Draw the p-T diagram of pure substance and explain various regions of the diagram in details.	4	K2
b.	Describe the simple Rankine cycle with p-V diagram and explain any one method of dryness fraction measurement.	4	K2

7. Attempt any *one* part of the following: 1 x 10 = 10

a.	Describe the Mechanism of Simple vapour compression refrigeration system.	5	K2
b.	i) Give the difference between open and closed air refrigeration cycle. ii) A scientist claims to have developed a refrigerator which maintain a freezer temperature -15°C in a room whose temperature was 35 °C and have a COP of 6.5. Justify whether his claim is true and false.	5	K3