Total No. of Questions – [6]

Total No. of Printed Pages: 2

G.R. No.	

MARCH 2020 INSEM (T1)

S. Y. B.TECH.(Mechanical Engineering) (SEMESTER – IV)

COURSE NAME: Applied Thermodynamics

COURSE CODE: MEUA22182

(PATTERN 2018)

Time: [1 Hour]

[Max. Marks: 20]

(*) Instructions to candidates:

1. Attempt Q.1 **OR** Q.2, Q.3 **OR** Q.4, Q.5 **OR** Q.6
2. Figures to the right indicate full marks.
3. Use of scientific calculator is allowed.
4. Assume suitable data wherever required and use of Psychrometric chart is allowed.

Q. 1)
- Explain the various operations of a Rankine cycle. Also represent on T-S and h-S diagram. [4]
- An engine of 250 mm bore & 375 mm stroke works on Otto cycle. The clearance volume is 0.00263 m^3. Find the air standard efficiency of the cycle. [4]

OR

Q. 2)
- Determine the air standard efficiency of the Diesel engine having cylinder with bore of 250 mm & stroke 375 mm & clearance volume of 1500 CC, with fuel cut off occurring at 5% of stroke. Assume $\gamma = 1.4$. [4]
- Explain with P-V and T-S diagram Brayton Cycle. [4]

Q. 3)
- With basic combustion reactions, explain the minimum air required for the complete combustion of fuel. [4]
- Determine the theoretical minimum amount of air required by mass for complete combustion of fuel containing 85% carbon, 8% hydrogen, 3% oxygen, 1 % Sulphur and remaining ash. What is the air fuel ratio if 40 % excess air is supplied? [4]

OR

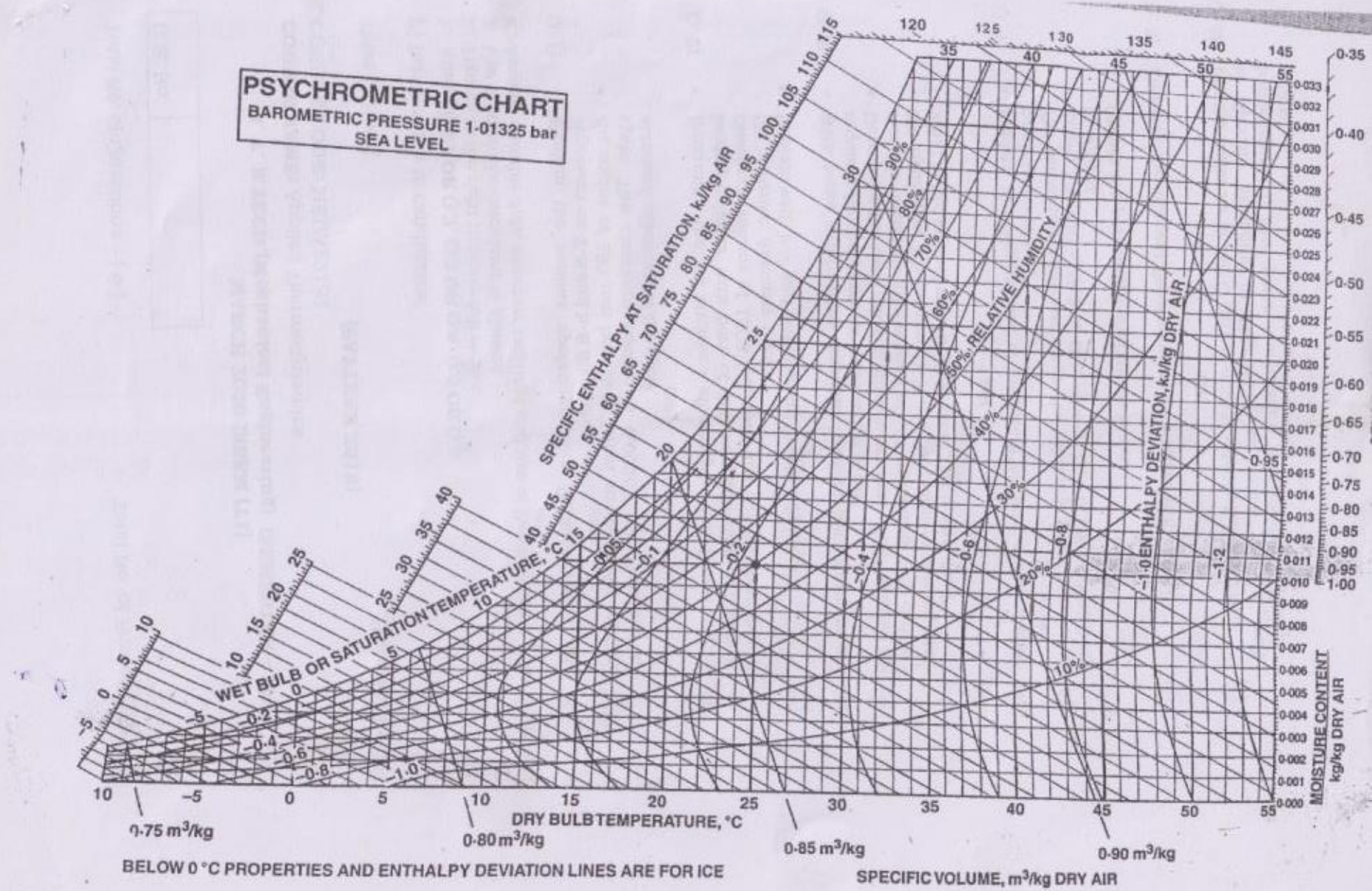
Q. 4)
- Explain the requirement of minimum air and excess air for combustion of fuel. [4]
- The percentage analysis of a gas by volume is given as, CO_2=5.5 %, CO = 38.3 %, CH_4 =0.4 %, O_2 = 0.1 %, H_2 =52.8 %, N_2 =2.9 %. Obtain the percentage analysis by mass. [4]

Q. 5) Describe the different Psychrometric processes with sketch. [4]

OR

Q. 6) For the moist air at 30° C DBT and 30 % relative humidity find a) Specific humidity b) Degree of saturation c) Wet bulb temperature d) Due point temperature e) Enthalpy f) Specific volume [4]

P.T.O.


PSYCHROMETRIC CHART
BAROMETRIC PRESSURE 1·01325 bar
SEA LEVEL
SPECIFIC ENTHALPY AT SATURATION, kJ/kg AIR
RELATIVE HUMIDITY
ENTHALPY DEVIATION, kJ/kg DRY AIR
WET BULB OR SATURATION TEMPERATURE, °C
DRY BULB TEMPERATURE, °C
MOISTURE CONTENT kg/kg DRY AIR
0·75 m³/kg
0·80 m³/kg
0·85 m³/kg
0·90 m³/kg
SPECIFIC VOLUME, m³/kg DRY AIR
BELOW 0 °C PROPERTIES AND ENTHALPY DEVIATION LINES ARE FOR ICE