# Sanjay Ghodawat University, Kolhapur

2020-21

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

EXM/P/09/00

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| **Year and Program: 2020-21 S.Y. B Tech** | **School of Technology** | **Department: Aeronautical** |
| **Course Code: AET205** | **Course Title: Aero Thermodynamics** | **Semester :III** |
| **Day :Friday**<br>**Date :05-02-2021** | **End Semester Examination** | **Time : 10.30-12.30**<br>**Max Marks : 50** |

**Instructions**: 1) All Questions are compulsory.
2)Figure to the right indicates full harks.
3) Assume suitable datawherevernecessary and state it clearly.
4) Use ofscientific calculators is permitted.

| | | Marks | Bloom's Level | CO |
|---|---|---|---|---|
| **Q.1** | **Answer the following (any Two)**– | | | |
| a) | What do you mean by thermal equilibrium? State Zeroth law of thermodynamics with example. | 8 | L1 | CO205.1 |
| b) | Write down the general energy equation for steady flow system and simplify when applied for the followingsystems :<br>i) Gas turbine<br>ii) Centrifugal water pump<br>iii) throttle valve<br>iv) boiler | 8 | L3 | CO205.2 |
| c) | In a steady flow apparatus, 135 kJ of work is done by each kg of fluid. The specific volume of the fluid, pressure, and velocity at the inlet are 0.37 $m^3$/kg, 600 kPa, and 16 m/s. The inlet is 32 m above the floor, and the discharge pipe is at floor level. The discharge conditions are 0.62 $m^3$/kg, 100 kPa. and 270 m/s. The total heat loss between the inlet and discharge is 9 kJ/kg of fluid. In flowing through this apparatus, does the specific internal energy increase or decrease, and by how much? | 8 | L3 | CO205.2 |
| **Q.2** | **Answer the following (any two)** – | | | |
| a) | Write the following<br>i) Stoichometric A-F ratio<br>ii) Adiabatic flame temperature | 8 | L2 | CO205.3 |
| b) | Explain equivalence of Kelvin-Plank and Clausius statements. | 8 | L1 | CO205.3 |
| c) | Three Carnot engines E1, E2 and E3 operate between two heat reservoir which are at temperature 627$^o$C and 27 $^o$C. Calculate the temperature of intermediate heat reservoirs if amount of work produced these engines is in the ratio of 4:3:2. | 8 | L3 | CO205.4 |

**Q.3 Answer the following (any two) –**

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| a) | Derive the general expression of change of entropy for any process. Deduce the expression for constant volume process. | 9 | L2 | CO205.5 |
| b) | Describe Vapor absorption refrigeration system with neat sketch. | 9 | L2 | CO205.5 |
| c) | Write the effect of followingfactors on the performance of Vapor compression refrigeration system<br>i) Suction pressure<br>ii) Discharge pressure<br>iii) superheating | 9 | L3 | CO205.5 |

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