

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER- IV EXAMINATION – SUMMER 2020****Subject Code: 2140907****Date: 26/10/2020****Subject Name: Applied Thermal and Hydraulic Engineering****Time: 10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) List the main component of Steam Power Plant and Describe the function of a condenser in steam power plant. **03**
- (b) Explain briefly the various modes of Heat Transfer with example. **04**
- (c) Explain with T-S and p-V diagram of Brayton cycle for Gas turbine Power plant. **07**

- Q.2** (a) Define Co-efficient of performance and 1 Ton of refrigeration (TR). **03**
- (b) In a constant pressure open cycle gas turbine air enters the compressor at 1 bar and 17°C where it is compressed to a pressure ratio of 7. The gases enter the gas turbine at 740°C and expand to original pressure. Calculate Turbine work output and Compressor work Input. Assume, $\gamma=1.4$, $C_p=1.0$ kJ/kg K for air & gases Neglect the mass of fuel. **04**
- (c) Describe the simple vapour compression refrigeration system with T-S and P-H Diagram. **07**

OR

- (c) Explain working of Rankine cycle with its P-V, T-S and h-s diagrams. **07**
- Q.3** (a) Define Natural and forced convection. **03**
- (b) State and derive Fourier's law of conduction heat transfer. **04**
- (c) Deduce the expression for conduction heat transfer through a composite wall. **07**

OR

- Q.3** (a) Define absorptivity, reflectivity and transmissivity. **03**
- (b) Explain different types of fins and their application. **04**
- (c) Explain with neat diagram, the arrangement and working of parallel flow heat exchanger. **07**

- Q.4** (a) Define the term: Specific gravity, kinematic viscosity, mass density. **03**
- (b) Explain the Pascal's law with usual notation. **04**
- (c) Classification of manometers and explain U-tube differential manometer. **07**

OR

- Q.4** (a) List the assumptions which are made while deriving Bernoulli's equation. **03**
- (b) Explain the surface tension. **04**
- (c) Deduce the Euler's equation of motion along a stream line. **07**

- Q.5** (a) Classification of reciprocating pump. **03**
- (b) Define NPSH? State its importance. **04**
- (c) Explain with neat sketch the function of main component of centrifugal pump. **07**

OR

- Q.5** (a) Define hydraulic turbine and classify hydraulic turbine. **03**
- (b) Explain draft tube and its importance. **04**
- (c) Explain with neat sketch the Kaplan turbine. **07**
