

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-IV (NEW) EXAMINATION – SUMMER 2021****Subject Code:2140907****Date:03/09/2021****Subject Name:Applied Thermal and Hydraulic Engineering****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Define the following: **03**  
 1) Fluid, 2) Specific speed, 3) Priming of pump.
- (b) How the subject 'ATHE' is related to electrical branch. **04**
- (c) With a neat sketch, explain the working principle of a Pelton wheel. **07**
- Q.2** (a) Differentiate between conduction, convection and radiation. **03**
- (b) Give comparison between open cycle and closed cycle gas turbines. **04**
- (c) Explain in brief about various modes of heat transfer. **07**
- OR**
- (c) Derive expression for LMTD for parallel flow heat exchanger **07**
- Q.3** (a) Plot schematic p-v and T-s diagram for open gas turbine power plant. **03**
- (b) Explain construction and working of double acting reciprocating pump. **04**
- (c) With neat sketch explain simple vapor compression refrigeration (VCR) cycle. Plot the same cycle on T-s and p-h diagram also. **07**
- OR**
- Q.3** (a) What is the function of fins in heat transfer? State applications of fins. **03**
- (b) Enlist the different methods of improving efficiency of Brayton cycle and explain any one in detail. **04**
- (c) State and prove Bernoulli's equation. **07**
- Q.4** (a) State and explain Hydrostatic law. **03**
- (b) Define dry air, relative humidity, dry bulb temperature and dew point depression. **04**
- (c) With neat sketch explain working and construction of Francis Turbine. **07**
- OR**
- Q.4** (a) What are the main components of simple gas turbine plants? **03**
- (b) With neat sketch explain in brief Venturimeter. **04**
- (c) Explain the working of simple air cooling system used in for aircraft. **07**

- Q.5** (a) Explain cavitation in detail. **03**  
(b) Explain the concept of overall heat transfer coefficient. **04**  
(c) Explain performance characteristics curve of hydraulic turbines. **07**

**OR**

- Q.5** (a) Differentiate Francis and Kaplan turbines. **03**  
(b) Explain draft tube and its importance. **04**  
(c) Briefly explain Net Positive Suction Head (NPSH). **07**

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