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I.A. Question & Answer of 3rd Semester Electrical Engineering

Subject : Th-3-Element of Mechanical Engineering

1. Answer the following questions (any Five). [2 x 5]

(a) Define heat and write it's unit.

Ans. ❖ Heat in the transfer of Kinetic Energy from one medium / object to another, or from an energy source to a medium or object.

❖ It is always transfer from high temperature body to lower temperature body.

❖ It is denoted by the symbol Q.

❖ Unit of heat. (i) Joule (ii) Calorie (iii) BTU

(b) Write the statement of 1st law of thermodynamics.

Ans. Statement : ❖Both heat and mechanical work are mutually convertable.

❖When a system undergoes a thermodynamic cycle the net heat transfer is equal to the net work transfer.

Mathemetically $\Delta U = Q - W$

(c) Define steam and classify it.

Ans. Steam may be defined as a vapour arising from a heated substance which is invisible when pure and dry.

Classification of Steam :

Steam may be classified in to following categories.

(i) Wet Steam (ii) Dry Steam (iii) Saturated Steam (iv) Superheated Steam

(d) Define flue gas.

Ans. Flue gas may be defined as the gas which is produced from the combustion of fuel. The flue gas contains CO, CO_2, N, P & Ash etc.

(e) What is boiler and briefly classify it ?

Ans. Boiler is a closed in which steam is produced from water by combustion of fuel. Boiler may be classified into following categories.

(i) According to the contents in the tube (a) Fire Tube Boiler (b) Water Tube Boiler.

(ii) According to the axis of the tube. (a) Horizental Boiler (b) Vertical Boiler (c) Inclind Boiler

(iii) According to the position of the furnace (a) Externally Fired Boiler (b) Internally Fired Boiler

(f) Write five example of fire tube and water tube boiler.

Ans. Example of Fire Tube Boiler (a) Simple Vertical Boiler (b) Cochran Boiler (c) Lancashire Boiler (d) Cornish Boiler (ve) Velcon Boiler

Examples of Water Tube Boiler : (a) Babcock-Willcox Boiler (b) Benson Boiler (c) Yarrow Boiler (d) Lamont Boiler (e) Loffler Boiler.

(g) What is the meaning of quality of steam and also write the values of the different types of steam ?

2. Answer the following questions (any Two) [5 x 2]

(a) Prove Cp - Cv = R

(b) Write construction and working principle of Cochran boiler.

(c) Difference between water tube and fire tube bulet.