Code No. BTS 047B

B.Tech Degree (F.T) I semester examination in Civil Engineering (Habitat Engineering and construction management)   March 1998.

Sub: CE 104 Basic Mechanical Engineering.

Time: 3 Hours   Maximum Marks 100

Answer any one full question from each module

Module-1

I

a. Explain Clausius and Kelvin-Plank statements of Second law of thermodynamics. Show that both statements are equivalent   12 Marks

b. A tank contains N_2 at a pressure of 0.6 MPa and $40^{\circ}C$. A leak occurs in the tank which is not detected until the pressure falls to 0.4 MPa at which time the temperature is $25^{\circ}C$. Find the mass of N_2 that leaks out if the original mass was 40 kg.

8 Marks

OR

II

a   By means of a p-v diagram, explain the Otto cycle. How the theoretical cycle differ from an actual cycle   10 Marks

b   A diesel engine working on a four stroke diesel cycle has compression ratio of 10 and 25% cut off. Estimate the air standard efficiency of the cycle.   10 Marks

Module-2

III

a   Explain the working of four stroke petrol engine.   10 Marks

b   Explain the working of diaphragm pump used in a petrol engine 10 Marks

OR

IV

Draw a neat sketch of a diesel injector. Explain its working   20 Marks

Module-3

V

a   Explain the working of a simple reaction turbine.   10 Marks

b   Explain how air temperature and humidity is controlled in air conditioning

10 Marks

OR

VI

Draw a neat sketch of a vapour absorption type refrigeration system. Explain its working.   20 Marks

Module -4

VII

a   Explain Thermit welding   10 Marks

b   Explain Electro plating   10 Marks

(P.T.O)

OR

VIII

a What are the different methods of galvanising - Explain   10 Marks

b Explain chemical milling. What is etch factor associated with chemical milling.
         10 Marks

Module -5

IX

a Derive an expression for the ratio of belt tensions in a simple belt drive.
         10 Marks

b A rope drive is required to transmit 230 kW from a pulley of 1 m diameter running at 450 rpm. the safe pull in each rope is 800 N. The angle of lap and groove are 160° and 45° respectively. If $\mu = 0.3$ find the number of ropes required.   10 Marks

OR

X

Sketch and explain the general lay out of a thermal power plant bringing out clearly the function of each unit in the plant.   20 Marks