Instructions:  
(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.
(5) Preferably, write the answers in sequential order.

1. Attempt any five of the following:  
   a) Define wet steam and dry steam.
   b) Define boiler mountings with two examples.
   c) Explain the functions of following parts in I.C. engine:
      i) Piston
      ii) Cylinder.
   d) It is observed that in device, feed water heated by utilising the heat in exhaust flue gases before it leaving through the chimney in steam power plant, sketch and identify the device.
   e) Define brake power and brake thermal efficiency.
   f) List the applications of refrigeration system.
   g) Define Ton of refrigeration.

2. Attempt any three of the following:  
   a) Explain working of impulse steam turbine with neat sketch.
   b) Sketch the layout of steam power plant and –
      i) Label the components
      ii) Describe the function of any two major components.
   c) State the need of compounding of steam turbines and give its types.
   d) State the effect of pollution on environment due to steam power plants.
3. Attempt any three of the following:

   a) Suggest the remedies in following situations for diesel engine
      i) Piston seizure
      ii) Engine overheating
      iii) Low power developed
      iv) Smokey exhaust of diesel engine.

   b) List any four pollutants in exhaust gases of I.C. engine with their effects on environment.

   c) Explain working of closed cycle gas turbine with neat sketch.

   d) A dam is constructed to provide a high head of water
      i) Name the relevant turbine that used to generate power
      ii) Sketch the turbine you suggest.

4. Attempt any three of the following:

   a) Explain working of centrifugal compressor with sketch.

   b) Suggest the suitable compressor with justification for following applications
      i) Automobile washing centre
      ii) Gas turbine.

   c) State different applications of compressed air (min-4 applications).

   d) In a diesel engine, heat is supplied at a rate of 13.43 kW. Engine produces brake power at a rate of 2.83 kW. Estimate brake thermal efficiency.

   e) Two sets strike the bucket of Pelton wheel which develops 15000 kW. The discharge is 6 m³/sec. If the net head on turbine is 350 m. Find overall efficiency of turbine.

5. Attempt any two of the following:

   a) Describe the functions in refrigeration system
      i) OLP
      ii) Thermostat
      iii) Defrost heater.

   b) Explain working of simple vapour compression system with neat sketch of its layout.

   c) It is observed that when refrigerator is switched on, the compressor does not start. Mention the possible causes with remedies.

6. Attempt any two of the following:

   a) Draw neat sketch of window air conditioner and explain its working.

   b) Explain the working of Babcock and Wilcox boiler with neat labelled sketch.

   c) Explain working of single acting reciprocating pump with neat sketch.