Instructions:  
(1) All questions are compulsory.  
(2) Answer each next main question on a new page.  
(3) Illustrate your answers with neat sketches wherever necessary.  
(4) Figures to the right indicate full marks.  
(5) Assume suitable data, if necessary.  
(6) Use of Non-programmable Electronic Pocket Calculator is permissible.  
(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.  
(8) Use of Steam tables, logarithmic, Mollier’s chart is permitted.

Marks

1. Attempt any ten of the following: 20
   a) Write the functions of reheater in steam plant.
   b) What are the steam prime movers?
   c) What is penstock? What is its function?
   d) List out purpose and functions of power house.
   e) Write function of control rods in nuclear power plant.
   f) Write down any two advantages of nuclear power station.
   g) Name the different types of engines in diesel power plant.
   h) Define each of following terms:
      i) Connected load  
      ii) Spinning reserve.
   i) What is the choice of size and number of generator units in interconnected power system?
   j) Define the term solar constant.
k) State the meaning of following terms:
   i) Power in wind
   ii) Maximum power.

l) State the types of wind turbines.

2. Attempt any four of the following: 16
   a) What is renewable source of energy? State two examples for the same.
   b) Give examples of different types of fuels. Also state any two advantages of liquid fuels over solid fuels.
   c) State any four factors governing selection of site for thermal power station.
   d) With the help of schematic diagram, state various stages in coal handling unit.
   e) List any four hydro-electric power plants in Maharashtra with their location and capacity.
   f) State the significance of following terms:
      i) Hydrology
      ii) Surface run-off
      iii) Evaporation
      iv) Precipitation

3. Attempt any four of the following: 16
   a) Distinguish between fire tube and water tube boilers in steam power plant.
   b) Define natural, mechanical, forced and induced draught systems.
   c) State the function of following elements:
      i) Storage reservoir
      ii) Intake
      iii) Trash rack
      iv) Tail race.
   d) Classify hydro-electric power plants according to water flow regulation and explain in brief.
   e) List any four nuclear power plants in India with their location and capacity.
   f) State any four factors for selecting location of nuclear power plant.
4. Attempt **any four** of the following:

a) State the location and function of
   i) Economizer
   ii) Feed water heater.

b) Explain ash disposal and dust collection in a thermal power plant.

c) List out any four salient features of hydrogenerator.

d) What is mass energy equivalence? Give one example. Define mass defect and binding energy.

e) State the term nuclear fuel. Also state its properties.

f) State the functions of following elements:
   i) Diesel engine system
   ii) Air intake system
   iii) Engine exhaust system
   iv) Engine starting system.

5. Attempt **any four** of the following:

a) Explain the operation of advanced gas cooled reactor.

b) Show the schematic arrangement and explain the working of nuclear power plant.

c) List out the four applications of diesel electric power plant.

d) A generating power station has the following daily load cycle:

   **Time (Hours):** 0 – 6 6 – 10 10 – 12 12 – 16 16 – 20 20 – 24
   **Load (M. W.):** 12 24 18 12 28 20

   Draw the load curve and find
   i) Maximum demand
   ii) Units generated per day
   iii) Average load
   iv) Load factor.

e) Explain the importance of renewable energy sources in the energy deficient India.

f) Draw schematic representation of distribution of solar energy as direct, diffuse, total radiation.
6. Attempt any four of the following:

a) State why efficiency of thermal power station is about 29%. How it can be improved?

b) List out the four advantages and four disadvantages of captive power generation.

c) Define each of the following terms:
   i) Average demand
   ii) Demand factor
   iii) Plant capacity factor
   iv) Plant use factor.

d) Compare flat plate collectors with concentrating type solar collectors.

e) State the principle of solar cell. What is necessity of series and parallel connection of solar cells.

f) State any four factors for selection of site of wind power plant.