

# 17324

**13141**

**3 Hours / 100 Marks**

Seat No.

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- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

- 1. Attempt any TEN of the following: 20**
- a) List out any two conventional sources and non-conventional sources of energy.
  - b) State the function of chimney and superheater in thermal power station.
  - c) State why efficiency of thermal power station is about 29%.
  - d) State different types of turbine used in H.P.S. with requirement of different head.
  - e) Give three main constituents of hydro-electric power station.
  - f) List main stages of nuclear power station.
  - g) State what do you mean by “Nuclear waste disposal” in nuclear power station.

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- h) Why the diesel power station is used as stand by source of energy ?
- i) State what do you mean by base load and peak load power station.
- j) Define maximum demand and connected load.
- k) Define nuclear fission and nuclear chain reaction.
- l) State the advantages of captive power generation.

**2. Attempt any FOUR of the following:**

**16**

- a) State and explain the advantages of conventional energy sources over non-conventional energy sources. (Any four).
- b) Explain the function of each component in steam generating unit in thermal power station.
- c) Draw schematic block diagram of thermal power station and indicate following circuit in diagram clearly.
  - i) Fuel and ash circuit
  - ii) Feed water and steam circuit
  - iii) Air and flue gas circuit
  - iv) Cooling water circuit.
- d) Compare Pelton wheel and Kaplan turbine on the basis of type of flow of water, suitability for type of head and flow, construction and control of water.
- e) “Use of economiser, super heater and air preheater increase thermal efficiency of thermal power station”. Justify the statement.
- f) List major electrical equipment in thermal power station.

**3. Attempt any FOUR of the following:****16**

- a) Explain the following terms in connection with hydro electric power station.
  - i) Tunnel
  - ii) Surge tank
  - iii) Reservoir
  - iv) Tail race
- b) Explain the function and material used for the following in nuclear power station.
  - i) Fuel rod
  - ii) Control rod
  - iii) Moderator
  - iv) Shielding.
- c) Classify the types of engines on the basis of strokes, fuel used, type of cooling and arrangement of cylinder.
- d) Describe the construction of surface condenser with the help of diagram.
- e) Explain the water hammer effect and cavitation in hydro electric power station and state the arrangement to reduce these.
- f) Compare Boiling Water Reactor (BWR) and Pressurised Water Reactor (PWR) on the basis of principle, construction, fuel, cooling, cost, steam pressure and temperature.

**4. Attempt any FOUR of the following:****16**

- a) Distinguish between run off river plant with pondage and pumped storage power plant.
- b) State for application of diesel power plant.
- c) A power station has four consumers with their maximum demand as 40 MW, 30 MW, 20 MW, 50 MW. The maximum demand of power station is 90 MW. Calculate diversity factor. State the significance of diversity factor.
- d) Draw air and gas circuit block diagram of thermal power station.
- e) Show the schematic arrangement of diesel power station layout and give its principle of operation.
- f) Explain how flue gases are cleaned before their journey to atmosphere.

**5. Attempt any FOUR of the following:****16**

- a) Draw diagram showing the basic arrangement of nuclear reactor. State what do you mean by critical size of reactor.
- b) State with neat diagram the working and the material used of photo voltaic cells.
- c) Draw schematic diagram of solar power plant and how electricity is generated.
- d) Describe the construction of boiling water reactor with the help of sketch.
- e) Which water turbine should be selected for a water head of 300 m ? Draw its labeled sketch.
- f) Describe how gaseous, liquid and solid waste can be disposal off in case of nuclear power plant.

**6. Attempt any FOUR of the following:****16**

- a) Define the following terms related to solar radiation.
- i) Solar constant
  - ii) Beam radiation
  - iii) Diffuse radiation
  - iv) Insolation
- b) Define load curve. Explain how load curve help in the selection of size and no. of generating units in a given load curve and operation schedule.
- c) What are the basic requirement of locating wind power plant ?
- d) State the criteria for selecting the site for nuclear power plant (any four).
- e) A gas generating power station has the following daily load cycle.

Times in Hrs.	4-8	8-12	12-16	16-20	20-24	24-4
Load in MW	25	45	65	25	55	25

Plot the load curve and load duration curve. Also calculate the energy generated per day.

- f) State any four advantages of wind energy system.
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