Full Marks: 70   Time: 3 hrs

(i) Use separate answer script for each half
(ii) Answer any *three* questions from first half
(iii) **Two marks** reserved for neatness in first half

FIRST HALF

1. (a) Draw a neat single line diagram showing the power distribution system to the auxiliaries i) during start up and ii) at full load condition.   (2.5+2.5)

   (b) Name the major components of a thermal power station. State the function of each component. Name different unit auxiliaries. State the auxiliary consumption pattern of different types of power generating station.   (4+1+1)

2. (a) Draw a neat diagram showing "Boiler Auxiliaries" and "Primary and Secondary Air System" of a thermal power station.   (4+2)

   (b)Explain Mill temperature control and forced draught control.   (2+3)

3. (a)Explain the principle of operation of Electrostatic Precipitator(ESP). State it's purpose.   (4+1)

   (b)Name different types of pre-commissioning tests of Power transformer. Explain Vector Group and Core balance test.   (2+2+2)

4. (a)State the basic function and the aims of an excitation system. Also state the requirements of the excitation system from Generator point of view as well as from power system point of view. (2+2+2)

   (b) What are the factors which govern the selection (particularly size) of the alternators ?   (5)

5. (a) *"Power system stabilizer is basically a lead compensator"* - Justify   (6)

   (b)Explain with necessary diagram/block diagram different types of excitation systems.   (5)

SECOND HALF

(Q. 10 is compulsory; answer any two from the rest in the second half)

6. (a) Classify different types of turbo-generator cooling and explain their principle operation With the help of suitable diagrams.   (9.5)

   (b) State and explain the relative advantages of different types cooling.   (3)

7. (a) Explain the effect of change of excitation on the power factor of an alternator.   (4)

   (b) An alternator delivers 1 p.u. current at 1.0 p.u. voltage and at power factors (i) 0.8 lag and (ii) 0.8 lead to an infinite bus. The reactance of the alternator X_d is 1.0 p.u. Determine P, Q, E, and δ . If the excitation is increased by 20%, calculate P, Q, E, δ, $\cos\varphi$ and I.   (8.5)

8 (a) Classify boilers.   (3)

   (b) Explain the function of a boiler in a thermal power station.   (3)

   (c) State and explain the differences between a fire tube and a water tube boiler.   (3)

(d) State the advantages of a high pressure boiler. (3.5)

9. (a) Why is pulverized fuel used in a modern power station ? (4)

   (b) State and explain the advantages of a steam turbine over a steam engine (5)

   (c) *Thermal plants are not suitable for supplying fluctuating loads"* – Justify (3.5)

10. Write short notes on: (4 x 2.5)

   (a) Nominal exciter response

   (b) Generation system reliability

   (c) Non-weather sensitive forecast

   (d) Peak demand forecasting methods

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