(3 Hours) [Total marks: 80]

N.B. 1) Question No. 1 is compulsory.

2) Attempt any three out of the remaining questions.

3) Draw neat sketches and graphs to illustrate your answers.

4) Assume suitable data wherever necessary.

Qu.1 Explain in brief: [20]

a) Expression for economic load sharing in power plant.

b) Parameters affecting thermodynamic efficiency of combined cycle.

c) Rainfall measurement methods.

d) Essential components of nuclear reactors.

Qu.2 a) Explain the stages of coal handling system in detail. [10]

b) Following data pertains to a power plant of 120MW capacity.

Capital cost = Rs. 1500 per kW

Interest and Depreciation = 10%

Annual running charges = Rs. 20 x 10^6

Profit to be gained = 10% on capital

Energy consumed by the power plant auxiliaries = 5 % of generated.

Annual load factor = 0.6, Annual capacity factor = 0.5

Calculate:- 1) Reserve capacity of the plant

2) Cost of generation per kWh [10]

Qu.3 a) With a neat diagram discuss the working of Liquid Metal Sodium Graphite Reactor power plant with its advantages and disadvantages. [10]

b) The run off data of a river at a particular site is tabulated below as shown in table:

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Month	Mean discharge per month (Millions of Cu. m)	Month	Mean discharge per month (Millions of Cu. m)
Jan	40	July	75
Feb	25	Aug	100
Mar	20	Sept	110
Apr	10	Oct	60
May	0	Nov	50
June	50	Dec	40

1) Draw hydro-graph and find the mean flow.

2) Draw the flow duration curve

3) Find the power in MW available at mean flow if the head available is 95m and overall efficiency of generation is 87%.

Take each month of 30 days. [10]

Qu.4 **a)** Explain construction and operation of different components of hydro-electric power plant with neat diagram. [10]

b) Classify dust collector and explain Cyclone separator with neat diagram. [10]

Qu.5 **a)** Comment and discuss the issue of energy crisis in developing countries like India. [10]

b) What are the advantages of Fluidised Bed Combustion? Explain PFBC with neat sketch. [10]

Qu.6 **Write short note on following:** [20]

a) Boiling Water Reactor.
b) Tariff methods of Electrical Energy.
c) Ash handling systems.
d) Run-off measurement systems.

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