



- Notes :
1. All questions carry marks as indicated.
  2. Solve Question 1 OR Questions No. 2.
  3. Solve Question 3 OR Questions No. 4.
  4. Solve Question 5 OR Questions No. 6.
  5. Solve Question 7 OR Questions No. 8.
  6. Solve Question 9 OR Questions No. 10.
  7. Solve Question 11 OR Questions No. 12.
  8. Due credit will be given to neatness and adequate dimensions.
  9. Assume suitable data whenever necessary.
  10. Diagrams and chemical equations should be given whenever necessary.
  11. Illustrate your answers whenever necessary with the help of neat sketches.
  12. Use of non programmable calculator is permitted.

1. a) What are the different methods of classifying the hydro electric power plants? 7  
b) Explain high head diversion plants. 7

**OR**

2. a) What are the necessities of underground power station? 7  
b) What do you understand by Run – of – River plants? Draw a neat sketch of such a plant. 7
3. a) Why is it necessary to predict the future load demand? What are the methods of load forecasting? 7  
b) How are the load factor, capacity factor and utilization factor interrelated? 6

**OR**

4. When a run-of-river plant operates as a peak load station with a weekly load factor of 20%, all its capacity is firm capacity, what will be the minimum flow in the river so that the station may serve as the base load station? It is given that  
Rated installed capacity of generator = 10,000 kw  
Operating head = 15m  
Plant efficiency = 80 %  
Estimate the daily load factor of the plant if the stream flow is 15 cumecs 13
5. Write notes on : 13  
i) Intake gate  
ii) trash rack  
iii) Hydraulics of intake structures.

**OR**

6. a) What are the forces which should be taken into account in anchor blocks in their stability analysis. **6**
- b) What is meant by 'economical diameter of a Penstock'? **7**
7. What are the function of a surge tank? Describe with neat sketches the behaviour of various types of surge tanks. **13**

**OR**

8. A power station is fed through a 10,000 m long concrete lined tunnel of 5.0m diameter operating under a gross head of 200m. The discharge through the tunnel is 30 m<sup>3</sup>/sec. A surge tank of 300 sq. m. area has been provided at the end of tunnel calculate. **13**
- i) The maximum up-surge in the tank.
- ii) The Maximum down -surge in the tank
- Also calculate the factor of safety and ascertain whether this is adequate. Assume friction factor for concrete lining as 0.016.
9. Classify the Turbines on the basis of Head. What are the characteristics of different types of turbines. **13**

**OR**

10. a) What is draft tube? Explain. **6**
- b) Explain the function and types of tailrace. **7**
11. a) What are the advantages of pumped storage plants? **7**
- b) A 100 MW reversible pump turbine has to work under a head of 400m. Choose a suitable specific speed and running speed for the machine. **7**

**OR**

12. Write explanatory notes on **any two**. **14**
- i) Tidal power stations.
- ii) Economics of pumped storage plants.
- iii) General layout of – pumped storage schemes.

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