Total No. of Questions : 12]

SEAT No. :

P2004

[Total No. of Pages :3

[4759] - 26
B.E. (Civil)
HYDROPOWER ENGINEERING
(2008 Course) (Semester - II) (Open Elective) (401008)

Time : 3Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any three questions from each seciton.***
2) ***Answer to the two sections should be written in separate answer booklet.***
3) ***Neat diagrams should be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain hydroelectric power in India and estimation of hydropower potential with flow duration curve. **[8]**

b) Explain the process of Nuclear power generation? What are its limitations? **[8]**

OR

Q2) a) Describe briefly the sources of hydrologic data in India. Explain hydrological analysis for the water power projects. **[8]**

b) Discuss the relative merits and demerits of hydropower as compared to other power sources. **[8]**

Q3) a) Write short note on: **[8]**

i) Micro hydro plant.

ii) Valley dam plant.

b) What are the principle components of hydroelectric plants? Draw the typical sketch and discuss the utility of each component. **[8]**

OR

Q4) a) Explain the location and main components of tidal plant in detail. **[8]**

b) What is run of river plant? What are the parts and arrangements of such a plants? Explain with neat sketch. **[8]**

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Q5) a) Show that capacity factor is equal to product of load factor and utilization factor. **[4]**

b) Explain the significance of load duration curve. **[4]**

c) A run-of-stream station with an installed capacity of 14,000 kW operates at 30% weekly load factor when it serves as a peak load stationand its entire capacity is firm capacity. What should be the lowest discharge in the stream so that the station may serve as the base load station? It is given that the plant efficiency is 70% when working under a head of 22 m. Also calculate the daily load factor of the plant when the discharge in the stream rises to 15 cumec. **[10]**

OR

Q6) a) Why it is necessary to predict future load demand? What are the methods of load forecasting? **[8]**

b) The load on hydel plant varies from a minimum of 12,000 kW to maximum of 44,000 KW. Two turbo generators of capacities 22,000 kW each have been installed. Calculate **[10]**

i) Total installed capacity of the plant

ii) Plant factor

iii) Maximum demand

iv) Load factor

v) Utilization factor

SECTION - II

Q7) a) Explain any four electrical equipments for the power house. **[8]**

b) Explain underground powerhouse and types of arrangement of underground powerhouse with sketch. **[8]**

OR

Q8) a) Explain the criteria for dimensions of superstructures bays for the powerhouse. **[8]**

b) Explain constructional and design features of generator in hydropower generation. **[8]**

Q9) a) Write short notes on: **[8]**

i) Cavitation of turbines

ii) Water hammer in turbines

b) The internal and external diameters of an outward flow reaction turbine are 2 m & 2.5 m respectively. The turbine is running at 280 rpm and the rate of flow of water through the turbine is 6.5m^3/sec. The width of runner at inlet and outlet is equal to 300 mm. The head on turbine is 140 m. Neglecting the thickness of vanes and taking the discharge radial at outlet, determine: **[10]**

i) Velocity of flow at inlet and outlet

ii) Vane angle at inlet and outlet

OR

Q10)a) Explain classification of turbines according to various criteria in detail.**[8]**

b) Determine the number of turbines and diameter of runner for a power plant having 40 cumecs inflow, 20 m head. The efficiency of turbine is 75% with the speed of 200 rpm. Assume the specific speed as 250 and speed ratio as 0.80. **[10]**

Q11)a) Explain the concept of carbon credit? Give its significance. **[8]**

b) Explain in detail different criteria for economic considerations of hydroelectric power plant. **[8]**

OR

Q12)a) Explain the duties of electricity generating companies in detail. **[8]**

b) What are the factors governing the pricing of electricity? **[8]**