No. of Printed Pages : 5 **BICEE-007**

DIPLOMA IN CIVIL ENGINEERING (DCLEVI)
Term-End Examination
December, 2014

00505

BICEE-007 : WATER POWER ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt **five** questions in all. Question no. **7** is **compulsory**. All questions carry equal marks.*

1. (a) Discuss the different methods of classifying the hydroelectric power plants. 7

(b) What is meant by flow-duration curve and power duration curve ? How do you differentiate between them ? 7

2. Discuss the salient features of the following types of dams, with neat diagrams : *4+3+3+4*

(i) Gravity dam

(ii) Earth dam

(iii) Rock-fill dam

(iv) Arch dam

3. (a) What are spillways ? How are spillways classified ? 7

(b) Discuss the relative advantages and disadvantages of Hydro and Thermal power plants. 7

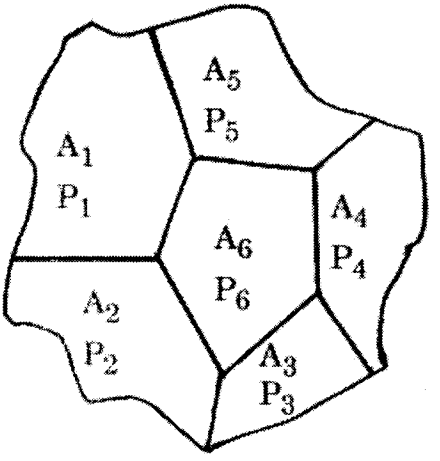
4. (a) Discuss various types of intake with their neat sketches. 7

(b) What are the functions of a surge tank ? With a neat sketch, describe the behaviour of various types of surge tanks. 7

5. (a) What is Hydrometeorology ? Discuss its scope in Water Power Engineering (WPE). 7

(b) Discuss various types of valves used in Hydroelectric Installation. 7

6. (a)



Area and rainfall in each station is given below :

S.N.	Area (A_n) km^2	Rain Gauge Reading (cm)
1	80	6·5
2	80	8·3
3	90	9·2
4	76	11·8
5	30	12·7
6	49	5·0

Calculate 7

(i) Average Rainfall by Arithmetical Average Method.

(ii) Average Rainfall by Thiessen Polygon Method.

(b) How will you classify penstocks ? Write the empirical formula which is used to estimate economical diameter of penstock. 7

7. Select one correct answer from the following : $7 \times 2 = 14$

(a) Which is ***not*** Infiltration Index ?

(i) ϕ – Index

(ii) F_{av} – Index

(iii) W – Index

(iv) P – Index

(b) High Capacity Plants range from

(i) < 5 MW

(ii) 5 to 100 MW

(iii) 101 to 1,000 MW

(iv) None of these

(c) Assuming that daily flow in a river is constant at 15 m^3/s. What would be the firm capacity of a run-of-river plant, to be used as an 8-hour peaking station ? Find Firm Capacity with Pondage (Assume head of plant = 10 m, overall efficiency = 80%).

(i) 48 hp

(ii) 480 hp

(iii) 4,800 hp

(iv) 48,000 hp

(d) Total discharge (Q) over the spillway

(i) $Q = C\,L^{2.5}\,H$

(ii) $Q = C\,L^{1.5}\,H$

(iii) $Q = C\,L\,H^{2.5}$

(iv) $Q = C\,L\,H^{1.5}$

where

C = Coefficient of discharge

L = Effective length of the weir crest (m)

H = Measured head above the crest (m)

(e) "Sarkaria formula" is used for

(i) Penstock diameter

(ii) Valve opening calculation

(iii) Turbine velocity

(iv) None of these

(f) Which are not regulating valves among the following ?

(i) Howell-Bunger Valves

(ii) Needle Valves

(iii) Tube Valves

(iv) Hollow-Jet Valves

(g) World's largest Dam is

(i) Fort Peck, USA

(ii) New Cornelia Tailings, USA

(iii) Oahe, USA

(iv) Rogunsky, Tajikistan