

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2064)

14629

B. Tech 4th Semester Examination
Hydro Power & Fluid Machines (N.S.)
CE-223

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all selecting one question from each of the Sections A, B, C & D and all the sub parts of Section - E.

SECTION - A

- Discuss the future of Hydro power in the light of thermal and nuclear power. (10)
 - How the hydro power plants are classified, based on storage, head, capacity and load. (10)
- From the following data of flow at a given site for an average year compute and draw a power duration curve. Assume an average net available head of 10 m and combined turbine generator efficiency of 89%. Also determine the primary and secondary power available during a year if the wheel capacity is fixed at the power corresponding to the flow available for 25% of the time.

Flow in cubic meter/s	900	600	500	450	400	360	340	300	280	200	140	100
%age time flow equaled or exceeded	1	10	20	30	40	50	60	70	80	90	95	100

(20)

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SECTION - B

3. (a) Explain the various components of a hydro- electric scheme and discuss their functions. (10)
- (b) Mean monthly flows in a river are given in the table below. Calculate the minimum storage required to maintain a demand of 40 cubic meter per second.

Month	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
Flow in cubic meter per sec.	60	45	35	25	15	22	50	80	105	90	80	70

(10)

4. (a) Explain various types of power houses for different situations. (10)
- (b) Discuss the water hammer pressure and its effect in penstock. (10)

SECTION - C

5. (a) Derive an expression for the force exerted by a jet of water striking on a vertical stationary flat plate. (10)
- (b) A 4 cm dia. jet of water strikes a stationary vertical flat plate with a velocity 10 m/s., the plate is perpendicular to the axis of the jet. Determine the force exerted by the jet on the plate. 10
6. (a) Define unit speed, unit discharge and unit power of a turbine and explain their importance. (10)
- (b) Discuss specific speed and selection of turbines. (10)

SECTION - D

7. (a) Describe the classification and working of Centrifugal pumps. (10)

- (b) Draw characteristic curves of a centrifugal pump. (10)
8. (a) Explain the features of an ideal indicator diagram along and discuss the effect of friction and acceleration. (10)
- (b) Discuss the advantages of providing air vessels in the reciprocating pumps. (10)

SECTION - E (Compulsory)

9. Use correct options to fill up the blanks
- (a) storage plants can be operated as.....plant.
(base load, peak load)
- (b) The slope of mass inflow curve at any time represents..... (rate of flow, volume)
- (c) The storage takes care of fluctuations of flow. (short term, long term)
- (d) Life of the reservoir depends on the provision of.....storage. (dead, live, flood)
- (e) The main function of surge tank is to..... (provide free water surface near turbine, Restrict the water hammer effects to a small length of penstock)
State true or false for the following statements—
- (f) The pressure wave in water travels as sound wave.
- (g) Spiral casing transforms the hydraulic energy into mechanical energy.
- (h) Slip in some case can be negative in reciprocating pumps.
- (i) For high specific speed Pelton turbines are suitable.
- (j) Pondage is provided in case of runoff river plants.
(10×2=20)