M. E. Power Engineering Examination, 2018 1⁵⁴ yr. 2nd Semester Subject: Non -Conventional Power Engineering

Time: Three hours

Full marks: 100

Answer any Five questions

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2	35	10.0	11	10	2.3	-			
3	40	13.8	12	8	1.6	ļ			
4	30	8.2	,		1.0				
5	15	3.1			 				
6	10	3.2							i
7	5	0.1							
8	31	12.0		<u> </u>					
9	36	16.0							
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The following are the measured value in a laboratory test of a small wind turbine of blade length of 0.33m.

Angle of Attack of the turbine blade: 25°

Wind Speed, m/s	RPM of the turbine	Generator output reading		
		Voltage (V)	Current	
10	19	7.2	(A) 0.013	
12	92	3.5	0.005	
17	350	13.9	0.026	
20	240	9.6	0.019	
22	115	9.9	0.02	
25	-75	8.9	0.018	

Draw wind turbine performance curve, such as output power vs. wind speed and output power vs. tip-speed ratio.

16+4

20

A reaction turbine works at 450rpm under a head of 120 m. Its diameter at inlet is 1.2 m and 6. the flow area at inlet is 0.4 m². The angles made by absolute and relative velocities at inlet are 20 and 120 respectively with the tangential velocity. Determine the volume flow rate, power developed and the hydraulic efficiency.

What is the function of a surge tank?

The data collected during performance testing of a Full Kaplan turbine based SHP 7. (2x1.25MW) at different loads are tabulated below

Item/Load	100%
Discharge (cumec)	22.31
Pressure at inlet (kg/cm ²)	0.43
Duration of test (minute)	30
Freray reading (Wh)	52.656
CTR	400A/1A
VTR	3.3kV/110V
TWL (right bank), m	2.858
TWL (left bank), m	2.362
Center line of Penstock (Bench mark): 42	26.50m above MSI
Level of pressure transmitter diaphragm:	428 55m above MSI
Elevation of ULS (left bank): 428.889m	above MSI
Elevation of ULS (Right bank): 429.411r	n above MSI
Density of water: 997.0kg/m ³	ii doove wist
Accleration due to gravity: 9.781m/s ²	
Diamter of penstock where pressure trans	emitter is fitted, 2000
Find the efficiency of the plant	stituer is fitted: 3000mm