Hall Ticket Number:

Code No. : 15137 S

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (Civil Engg.) V-Semester Supplementary Examinations, July-2022

Hydraulics and Hydraulic Machinery

Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Distinguish between open channel flow and pipe flows.	2	4	1	1
2.	Explain the significance of channels of most efficient section.	2	2	1	1
3.	Classify hydraulic jumps based on Froude's number.	2	2	2	1
4.	Classify and explain non-uniform flow.	2	2	2	1
5.	What is meant by boundary layer?	2	1	3	1
6.	Define separation.	2	1	3	1
7.	Explain about various parts of Pelton wheel.	2	2	4	1
8.	List the purpose of draft tube.	2	4	4	1
9.	Define static and manometric head of a centrifugal pump.	2	1	5	1
10.	What is meant by priming?	2	1	5	1
	Part-B (5 × 8 = 40 Marks)				
11. a)	State the conditions under which the rectangular section of an open channel will be most economical. Derive these conditions.	4	3	1	1
b)	A rectangular channel 2.50 m wide has a specific energy of 1.50m when carrying a discharge of 6.48 m^3/s. Calculate the alternate depths and corresponding Froude numbers.	4	3	1	2
12. a)	Demonstrate a neat diagram of specific energy curve for a channel and mark its salient features.	4	2	2	1
b)	A rectangular channel of 8m wide discharge water through a sluice gate with a depth of flow of 0.35m and velocity 6 m/s. Identify whether hydraulic jump will occur and if so, find the height of hydraulic jump and loss of energy per kg of water.	4	3	2	2
13. a)	List and explain the methods to control separation.	4	4	3	1
b)	Explain Magnus effect	4	2	3	1

Contd... 2

14. a)	Write a brief note on classification of turbines.	4	4	4	1
b)	A Pelton wheel has to be designed for the following data. Power to be developed = 5000 kW. Net head available = 250 m; speed = 500 r.p.m.; Ration of jet diameter to wheel diameter = 1/10; and overall efficiency = 85%. Find the number of jets.	4	2	4	2
15. a)	What are the different efficiencies of a centrifugal pump?	4	1	5	1
b)	The centrifugal pump has the following characteristics; outer diameter of the impeller = 850mm; width of impeller vanes at outlet = 100 mm; angle of impeller vanes at outlet = 40^0. The impeller runs at 500 r.p.m. and delivers 0.97 cubic meters of water per second under an effective head of 35m. A 500 KW motor is used to drive the pump. Determine the manometric and mechanical efficiencies of the pump. Assume water enters the impeller vanes radially at inlet.	4	3	5	2
16. a)	Determine the most efficient section of a trapezoidal channel with side slopes 1 vertical to 2 horizontal, carrying a discharge of 11.50 m^3/s with a velocity of 0.80 m/s. what should be the bed slope of the channel? Take manning's n=0.025	4	3	1	2
b)	Classify flow profiles of a gradually varied flow.	4	4	2	1
17.	Answer any ***two*** of the following:				
a)	Explain the principle of stream lining.	4	2	3	1
b)	What are the different efficiencies of hydraulic turbines?	4	1	4	1
c)	Explain the component parts of a centrifugal pump.	4	2	5	1

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	35%
iii)	Blooms Taxonomy Level – 3 & 4	45%

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