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Code No. : 14142 AS

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD***Accredited by NAAC with A++ Grade***B.E. (Civil Engg.) IV-Semester Advanced Supplementary Examinations, September-2022****Fluid Mechanics**

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.	Compare absolute pressure atmospheric and gauge pressure with a diagram.	2	2	1	1
2.	Define buoyancy and center of buoyancy.	2	1	1	2
3.	Explain the concept of stream line with a sketch.	2	2	2	1
4.	List the various uses and limitations of flow net.	2	1	2	2
5.	Distinguish between Venturi-meter and Orifice-meter.	2	4	3	3
6.	Compare free vortex flow and forced vortex flow.	2	4	3	1
7.	Distinguish between TEL and HGL with a sketch.	2	4	4	4
8.	Develop an equation for Reynolds number from basics.	2	3	4	2
9.	Distinguish between laminar and turbulent boundary layer.	2	4	5	2
10.	Explain the concept of Magnus effect.	2	2	5	1
<b>Part-B (5 × 8 = 40 Marks)</b>					
11. a)	Show that the equation for total pressure is $P = w \cdot A \cdot y$ when an vertical plane surface is immersed in a static fluid of specific weight 'w', where A is area of plane surface and y is centre of gravity distance of plane surface from free liquid surface. also write its centre of pressure equation.	4	1	1	2
b)	Analyze the value of dynamic viscosity in N-sec/m <sup>2</sup> when density of fluid flowing is 0.8 gm/cm <sup>3</sup> and Kinematic viscosity of flowing fluid is 3 X 10 <sup>-4</sup> stokes.	4	4	1	1
12. a)	Derive general energy equation.	4	3	2	2
b)	Show that stream lines and potential lines are orthogonal to each other.	4	2	2	3
13. a)	Show that Bernoulli's equation is applicable for Irrotational flow by considering free vortex flow condition.	4	1	3	1
b)	Analyze the coefficient of discharge through horizontal Venturi meter of inlet diameter 300mm and throat diameter 150mm .The discharge of water flowing through it is 65 Litres/sec. A differential gauge is connected to it shows a deflection of fluid of specific gravity 1.6.	4	4	3	4

Contd... 2

14. a)	List out various minor losses and derive the equation for loss of head due to sudden contraction.	4	4	4	2
b)	Find the Pressure gradient and average velocity through pipe when a fluid of viscosity 8 poise and specific gravity 1.2 is flowing through circular pipe of diameter 100mm. consider the maximum shear stress at pipe wall as 210 N/m <sup>2</sup> .	4	1	4	3
15. a)	Explain the various characteristics of boundary layer over a flat plate with a diagram.	4	2	5	4
b)	Explain the drag force and lift forces in detail by writing the equations of them.	4	2	5	2
16. a)	Explain the working of a differential manometer with a neat sketch.	4	2	1	3
b)	Outline various characteristics of stream function and potential function.	4	2	2	4
17.	Answer any <i>two</i> of the following:				
a)	Develop Bernoulli's equation by integrating Euler's equation of motion.	4	3	3	2
b)	Distinguish between gradual closure of valve and sudden closure of valve.	4	4	4	4
c)	Distinguish between stream lined body and bluff body with sketches.	4	4	5	3

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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