Note: Do not write on back side pages

Certified that this question paper, contains questions set from the PESCE approved Prescribed books, covering the entire syllabus and there are no

- OUT OF SYLLABUS QUESTIONS
- Questions with missing DATA/FIGURE/MARKS/SUBDIVISIONS

Total number of pages Submitted: …….

PAPER SETTER SIGNATURE:

Question Paper

Accepted Rejected

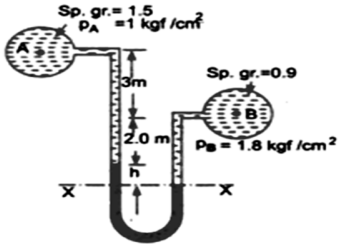
Accepted With modification

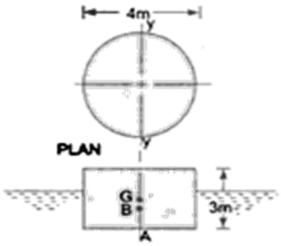
SCRUTINIZER'S SIGNATURE

Exam: B.E. / ~~M. Tech / MCA / MBA~~ Branch: AUTOMOBILE ENGINEERING
Sem: IV Semester Course Code: P15AU42
Course Title: Fluid Mechanics.
Duration of Paper: 03 HOURS Maximum Marks: 100

Note:

Answer any five full questions selecting at least one full question from each unit .

Q NO	Questions	Marks	Bloom's Taxonomy		
			BL	CO	PO
	UNIT-1				
1	a) Define the following ? I. Density II. Specific weight III. Kinematic viscosity IV. Surface tension. V. Capillarity.	10	L1	CO1	
	b) Derive the expressions for Capillary rise andCapillary fall.	10	L2		
	Or				
2	a) List the different types of simple manometer and explain any two with neat sketch?	10	L2		
	b) A differential manometer is connected at two points A and B of two pipes as shown in figure 2(b). Pipe A contains a liquid ofspecific gravity =1.5 while pipe B contains a liquid of specific gravity=0.9. the pressures at A and B are 1kgf/cm^{2}and 1.80kgf/cm^2 respectively. Find the difference in mercury level in the differential manometer.  Fig 2(b)	10	L1,2		

	UNIT-II				
3	a) Derive the expression for total pressure and center pressure for vertical plane surface submerged in liquid?	10	L2,3	**CO2**	
	b) Determine the total pressure on a circular plate of diameter 1.5m which is placed vertically in water in such a way that the center of the plate is 3 m below the free surface of water . Find the position of center and totalpressure .	10	L3		
	Or				
4	a) Explain the various conditions for equilibrium of a submerged and floating bodies ?	12	L2		
	b) A Solid Cylinder of diameter 4.0m has a height of 3 meters. Find the metacentric height of the cylinder when it is floating in water with its axis vertical. The specific gravity of the cylinder=0.6 ?	8	L3		
	 Fig 4.b				
	UNIT-III				
5	a) Explain briefly any five types of fluid flow?	10	L2		
	b) Define the equation of continuity. Obtain an expression for continuity equation for a three dimensional flow	10	L3	**CO3**	
	Or				
6	a) Derive the Euler's equation of motion ?	10	L1		
	b) An oil of specific gravity 0.8 is flowing through a venturi meter having inlet diameter 20cm and throat diameter 10 cm . the oil mercury differential manometer shows a reading of 25 cm. calculate discharge of oil through the horizontal venturi meter .Take C_d =0.98 ?	10	L2		
	UNIT- IV				
7	**a)** Derive the **HAGEN-POISEUILLE** equation for laminar flow through circular pipe, explain shear stress distribution and velocity distribution .	12	L2,2		
	b) A fluid of viscosity 0.7 Ns/m^2 and specific gravity 1.3 is flowing through a circular pipe of diameter 100 mm. the				

	maximum shear stress at the pipe wall is given as 196.2 N/m^2 Find the pressure gradient and average velocity ?	8	L1,3		
	Or			**CO4**	
8	a) Define sub-sonic, sonic and supersonic flow, on the basis of Mach Number for compressible fluid flow.	6	L2		
	b) Find the sonic velocity for the following fluids: (i)Crude oil of sp.gr. 0.8 and bulk modulus 153036N/cm^2,		L2		
	(ii) mercury having a bulk modulus of 2648700 N/cm^2	6			
	c) Explain any two cases for propagation of sound waves in a compressible fluid ?	8	L1		
	UNIT- V				
9	a) What do you understand by the terms: Major energy loss and minor energy losses in pipes? Derive Darcy-Weisbach equation? b) Explain any 4 minor head losses ?	12	L1,2		
	Or	8	L2		
10	a) Explain the following dimensionless number : I. Reynold's number II. Mach's number III. Weber's number IV. Euler's number V. Froude's number	10	L2	**CO5**	
	b) The frictional torque T of a disc of diameter D rotating at speed N in a fluid of viscosity μ and density ρ in a turbulent flow is given by $T = D^5N^2\rho\,\varphi\,[\frac{\mu}{D^2N\rho}]$. Prove this by the method of dimensions.	10	L2,3		