SIDDARTHA INSTITUTE OF SCIENCE ANDTECHNOLOGY :: PUTTUR Siddharth Nagar, Narayanavanam Road – 517583



Subject with Code : Fluid Mechanics (18CE0104)

Course & Branch: B.Tech - CE

Year & Sem: II-B.Tech & I-Sem

Regulation: R18

<u>UNIT –I</u>

FLUID PROPERTIES AND STATICS

1. a) State Pascal's law. What do you understand the terms Absolute, Gauge, atmospheric & vacuum pressure? 5M

b) What is the gauge pressure at a point 3m below the free surface of a liquid having a density 1.53 x 10^3 kg/m^3 . If the atmospheric pressure is equivalent to 750mm of mercury? The Specific gravity of mercury is 13.6 and density of water = 1000 kg/m^3 5M

2. Define Manometer. Briefly explain the types of manometers in detail?

3. a) A simple U – tube manometer containing mercury is connected to a pipe in which a fluid of specific gravity 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to atmosphere. Find the pressure of fluid in the pipe if the difference of mercury level in the two limbs is 20 cm 5M

b) A hydraulic pipe has a ram of 30 cm diameter and a plunger of 4.5 cm diameter. Find the weight lifted by the hydraulic press when the force applied at the plunger is 500N?

4. a) An inverted U – tube manometer is connected to two horizontal pipes A and B though which water is flowing. The vertical distance between the axes of these pipes is 30cm. When an oil of specific gravity 0.8 is used as a gauge fluid, the vertical heights of water columns in the two limbs of the inverted manometer (when measured from the respective centre lines of the pipes) are found to be same and equal to 35 cm. Determine the difference of pressure between the pipes. 5M

b) Derive expression for surface tension on liquid droplet and soap bubble?

5. Derive expressions for the total pressure and centre of pressure for an inclined plane surface submerge in the liquid. 10M

6. Explain how you would find the resultant pressure on a curved surface immersed in the liquid.

10M

7. Define centre of pressure and derive an expression for centre of pressure for a vertically submerged surface. 10M

8. a) Write short notes on viscosity, kinematic viscosity and Newton's law of viscosity? 5M

b) The space between two square flat parallel plates is filled with oil. Each side of the plate is 60 cm. The thickness of the oil film is 2.5mm. The upper plate which moves at 2.5 m/sec requires a force of 9.81N to maintain the speed. Determine dynamic viscosity of the oil in poise and kinematic viscosity of oil if specific gravity of oil is 0.95

9. a) Explain the pressure variation in a fluid at rest?	5M
b) Define specific density and specific weight, viscosity, vapour pressure and cavitation?	5M

Fluid Mechanics



10.a) A rectangular plane surface 3 m wide and 4 m deep lies in water in such a way that its plane makes an angle of 30° with the free surface of water. Determine the total pressure force and position of centre of pressure, when the upper edge is 2 m below the free surface. 5M

b) Find the magnitude and direction of the resultant force due to water acting on a roller gate of cylindrical form of 4 m diameter, when the gate is placed on the dam in such a way that water is just going to spill. Take the length of the gate as 8 m. 5M

<u>UNIT –II</u>

FLUID KINEMATICS

1. a) Define stream line, streak line and path line, stream tube and control volume?	5M
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b) Write a brief note on continuity equation for a one- dimensional flow? 5M

2. Obtain an expression for continuity equation for a three - dimensional flow. 10M

3. a) The velocity potential function is given by $\emptyset = 5(x^2 - y^2)$. Calculate the velocity components at the point (4, 5). 5M

b) A stream function is given by $\psi = 5x - 6y$. Calculate the velocity components and also magnitude and direction of the resultant velocity at any point.

4. show that the product of equi- streamline and equi- potential line is "-1"? and define flow net, equi-potential line, equi-stream lines?

5. The velocity vector in a fluid flow is given by V=4x+10xy+2k find the velocity and acceleration at fluid particle (2,1,3) & t=1 10M

6 a) If for a two – dimensional potential flow, the velocity potential is given by $\emptyset = x(2y - 1)$. Determine the velocity at the point p (4, 5). Determine also the value of stream function Ψ at the point p.

b) The following case represent the two velocity components, determine the third velocity component such the they satisfy the continuity equation i) $u = x^2 + y^2 + z^2$, $v = xy^2 - yz^2 + xy$ and ii) $v = 2y^2$, w = 2xyz 5M

8. a) What is the relation between stream function and velocity potential function? 5M

b) Write a short notes on the following i) Equipotential line ii) Line of constant stream function iii) Flow net 5M

9. a) Define compressible and incompressible flows.

b) Define laminar and turbulent flows.

c) Define uniform and non uniform flow.

d) Distinguish between rotational and irrotational flow.

e) Distinguish between steady and unsteady flow

10. The velocity vector in a fluid flow $V = 4x^3i-10x^2yj+2tk$, find the velocity and acceleration of a fluid particle at (2, 1, 3) at time t=1.

Fluid Mechanics

5M

<u>UNIT –III</u>

FLUID DYNAMICS

1. a) State Bernoulli's theorem for steady flow of an incompressible fluid. Derive the expression for Bernoulli's theorem from first principle and state the assumption made for such a derivation. 5M

b) A 30 cm diameter pipe, conveying water, branches into two pipes of diameters 20 cm and 15 cm respectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s. Find the discharge in the pipe. Also determine the velocity in 15 cm pipe if the average velocity in 20 cm diameter pipe is 2 m/s.

2. Derive the expression for actual discharge in venturimeter ?10M3. a) Find the expression for the Discharge over a Rectangular notch or weir10Mb) In a 100mm diameter horizontal pipe a venture meter of 0.5 contraction ratio has been fixed. The10Mhead of water on the meter when there is no flow in 3m (gauge). Find the rate of flow for which the10Mthroat pressure will be 2m of water is 0.97 take atmospheric pressure head = 10.3m of water.5M

4. A horizontal venture meter with 30cm diameter inlet and 10cm throat is used for measuring the flow of water through a pipeline. If pressure in pipe is 1.5kpa and the vacuum pressure at the throat is 40cm of mercury, calculate the rate of flow. It may be presumed that 5% of differential head is lost between the pipe main and the throat section. Also make calculations for the discharge co-efficient take specific weight of water = 10kN/m^3 10M

5. What is Euler's equation of motion? How do you obtain Bernoulli's equation from it? Name the different forces present in a fluid flow 10M

6. a) What is flowing through a pipe of 5 cm diameter under a pressure of 29.43 N/cm³ (gauge) and with mean velocity of 2.0 m/s. Find the total head or total energy per unit weight of the water at a cross section which is 5 m above the datum line. 5M

b) Water is flowing through a pipe has diameter 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 24.525 N/cm² and the pressure at the upper end is 9.81 N/cm². Determine the difference in datum head if the rate of flow through pipe is 40 lit/s. 5M

7. An external cylindrical mouth piece of diameter 150 mm is discharging water under a constant head of 6 m. Determine the discharge and absolute pressure head of water at B vena – contracta. Take $C_d = 0.855$ and C_c for vena contracta = 0.62 and atmospheric pressure head = 10.3 of water.10M 8. a) An oil of Sg=0.8 is flowing through a venturimeter having inlet diameter 20cm and throat dia 10cm . the oil – Hg differential manometer shows a reading of 25 cm . calculater discharge of oil through horizontal venturimeter ? take Cd = 0.98 5M

b) A horizontal venturimeter venturimeter having inlet diameter 20cm and throat dia 10cm is used to measure the flow of oil having Sg 0.8 the discharge of oil through venturimeter is 60l/s. find the reading of the oil – Hg in differential manometer ? C_d is 0.98 5M

b) Explain briefly the analysis of free liquid jets.

Fluid Mechanics

10. a) Explain Pitot tube with neat sketch ?

b) A sub-marine moves horizontally on a sea and has its axis 15m below the surface of water. A pitot tube properly placed just in front of a sub-marine and along its axis is connected to two limbs of a u – tube containing mercury. The difference of mercury level is found to be 170mm find the speed of the sub-marine knowing that the specific gravity of mercury is 13.6 and that of sea water is 1.026 with respect of fresh water 5m

UNIT –IV

FLOW THROUGH PIPES

1. Derive the expression for head loss in pipes due to friction by Darcy - Weisbach equation and chezy's formula 10M 2. a) Derive the expression for flow through pipes in series. 5M b) Derive the expression for flow through parallel pipes. 5M 3. Derive the expression for head loss in pipes due to sudden enlargement and sudden contraction formula 10M 4. The rate of flow of water through a horizontal pipe is $0.25 \text{m}^3/\text{s}$. The diameter of the pipe which is 200 mm is suddenly enlarged to 400mm. The pressure intensity in the smaller pipe is 1.772 N/cm². Determine the i) Head loss due to sudden enlargement ii) Pressure intensity in the large pipe iii) Power lost due to enlargement 10M 5. A horizontal pipe of diameter 500mm is suddenly contracted to a diameter of 250mm. The pressure intensity in the larger and smaller pipe is given as 13.734 N/cm² and 11.772 N/cm² respectively. Find the head lost due to contraction if C_{C} is 0.63. Also determine the rate of flow of water? 10M 6. A Siphon of diameter 200 mm connects two reservoirs having a difference in elevation of 20 m. The length of the siphon is 500 m and the summit is 3.0 m above the water level in the upper reservoir. The length of the pipe from upper reservoir to the summit is 100 m. Determine the discharge through the siphon and also pressure at the summit. Neglect minor losses. The co efficient of friction is 0.005. 10M 7. A horizontal pipe line 40m long is connected to a water tank at one end and discharges freely into the atmosphere at the other end. For the first 25m of its length from the tank, the pipe is 150mm diameter and its diameter is suddenly enlarged to 300mm. the height of water level in the tank is 8m above the centre of the pipe line. Considering all losses of head which occur and determine the rate of flow take f=0.01 for both sections of pipe. 10M 8. The difference in water surface levels in two tanks which are connected by three pipes in series of lengths 300m, 170m and 210m and diameters of 300mm, 200mm and 400mm respectively is 4m. Determine the rate of flow of water if coefficients of friction are 0.005, 0.0052, 0.0048 respectively, considering i) minor losses ii) neglecting minor losses 10M 9. A pipe line of 0.6 m diameter is 1.5 km long. To increase the discharge, another line of same diameter is introduced parallel to the first in the second half of the length .Neglecting minor losses, find the increase in discharge if 4f = 0.04. The head at inlet is 300 mm. 10 10. a) Find the head lost due to friction in a pipe of diameter 300 mm and the length 50 m, through which water is flowing at velocity of 3 m/s using i) Darcy formula ii) Chezy's formula for which C=60 and kinematic viscosity 0.01 stokes? 5M b) Find the loss of head when a pipe of diameter 200 mm is suddenly enlarged to a diameter of 400 mm. The rate of flow of water through the pipe is 250 lit/s. 5M

LAMINAR FLOW TURBULENT FLOW 1. Derive the Expression for maximum velocity for a Laminar flow through circular pipes? 10M 2. An oil of viscosity 0.1 Pa.s and relative density 0.9 is flowing through a horizontal pipe of diameter 50mm. if the pressure drop per meter length od pipe is 12 Kpa, determine a) Rate of flow in N/minute b) Shear stress at pipe wall c) Reynolds number of flow d) power required in W Per 50m length to maintain the flow 10M 3. Derive the equation for the flow of viscous fluid between two parallel plates? When plates are fixed 10M 4. An oil of dynamic viscosity 1.05 poise and relative density 0.92 is flowing through a fixed parallel plates kept 1.2cm a part if the Mean Velocity is 1.40m/s. calculate a) The maximum velocity b) boundary shear stress c)velocity & shearstress at distance of 0.2 cm from plates d) Headloss at y=25m 10M 5. a) Explain the Reynolds's experiment with neat sketch 5M b) Define Reynolds's number and derive the expression for Reynolds's number? 5M 6. Explain the difference between turbulent flow and Laminar flow ?and explain the causes of turbulent flow 10M 7. An oil of viscosity 0.1 Ns/m^2 and relative density 0.9 is flowing through a circular pipe of diameter 50mm and length 300 m. The rate of flow of fluid through a circular pipe is 3.5 lit/sec. Find the pressure drop in a length of 300m and also the shear stress at the pipe wall? 10M 8 .Mean point velocities measured with the help of a pitot tube at mid point and quarter point of a 0.2m dia pipe were found tobe 1.50m/s and 1.35m/s respectively .if the flow in pipe is turbulent . determine discharge, friction factor, and average height of roughness projections 10M 9For a turbulent flow in appe diameter 300mm, find the discharge when center line velocity is 2m/s & velocity at appoint 100mm from center is 1.6m/s? 10M 10. Explain breifly about moodys diagram? 10M Prepared by:. T. BABU SARANAM

UNIT –V

QUESTION BANK 2019

RTHA INSTITUTE OF SCIENCE AND TECHNOLOGY :: PUTTUR Siddharth Nagar, Narayanavanam Road - 517583 **BIT BANK (OBJECTIVE)** Subject with Code : Fluid Mechanics (18CE0108) Course & Branch: B.Tech - CE Year & Sem: II-B.Tech & I-Sem **Regulation: R18** UNIT -I 1. The force per unit area is called Γ 1 C) Surface tension A) Pressure B) Strain D) none 2. The pressure _____as the depth of the liquid increases B) Decreases A) Increases C) Remain constant D) None 3. The simplest form of manometer which can be used for measuring moderate pressures of liquid is A) Piezometer B) Differential manometer C) U-tube manometer D) None 4. Which of the following is a mechanical gauge B) Dead weight pressure A) Diaphragm gauge C) Bourdon tube pressure D) All of the above 5. The devices used for measuring the pressure at a point in a fluid by balancing the column fluid by the same or another column liquid are known as B) Manometers C) U-Tube manometer A) Mechanical gauges D) None 6. Which of the following is a possibility of dam failure] A) Failure due to sliding along its base B) Failure due to tension or compression C) Failure due to shear at the weakest section D) All of the above 7. The surface tension is due to 1 B) Cohesion only C) Adhesion only D) None of the above A) Cohesion and Adhesion 8. Cavitation is caused by Т A) High velocity B) Low pressure C) High pressure D) High temperature 9. Centre of pressure (h) in case of inclined immersed surface is given by C) $h = I_G^2 \sin \Theta / Ax + x$ D) $h = I_G \sin^2 \Theta / Ax + x$ A) $h=I_G \sin \Theta/Ax + x$ B) $h=I_G \sin \Theta/A^2x + x$ 10. Total force on a curved surface is given by A) $p = (p_{h}^{2} + p_{v}^{2})^{3/2}$ B) $p=(p_{h}^{2}+p_{v}^{2})^{1/2}$ \dot{C}) p=(p²_h+p²_v)^{5/2} D) $p=p_h+p_v$ 11. The ideal fluid is defined as the fluid which is A) Is compressible B) is incompressible C) is incompressible and non-viscous D) Real fluid 12. A Newtonian fluid is defined as the fluid which 1 A) Is incompressible and non-viscous B) obey Newton's law of viscosity C) is highly viscous D) is compressible and viscous 13. Kinematic viscosity is defined as equal to ſ 1 A) Dynamic viscosity x density B) dynamic viscosity /density C) Dynamic viscosity x pressure D) pressure x density 14. The dimensions of dynamic viscosity is 1 ſ D) $M^{-1}L^{-1}T^{-1}$ C) $ML^{-1}T^{-2}$ A) MLT^{-2} B) $ML^{-1}T^{-1}$ 15. Poise is the unit of] D) Velocity gradient A) Mass density B) Kinematic viscosity C) Viscosity Fluid Mechanics Page 1

QUESTION BANK 2019 16. Stoke is the units of 1 B) Viscosity D) Velocity gradient A) Surface tension C) Kinematic viscosity 17. Pascal's law states that pressure at a point is equal in all directions A) In a liquid at rest B) In a fluid at rest C) In a laminar flow D) In a turbulent flow 18. The hydrostatic law states that rate of increase of pressure in a vertical direction is equal to 1 A) Density of fluid B) Specific weight of fluid C) weight of fluid D) None of the above 19. Gauge pressure at a point is equal to A) Absolute pressure plus atmospheric pressure B) Absolute pressure minus atmospheric pressure C) Vacuum pressure plus absolute pressure D) None of the above 20. Atmospheric pressure held in terms of water column is D) 10.3 m A) 705 m B) 8.5 m C) 9.81 m 21. The resultant hydrostatic pressure acts through a point known as A) Centre of gravity B) Centre of buoyancy C) Centre of pressure D) None of an above 22. Which of the following denotes the effect of compressibility in fluid flow 1 B) Mach number C) Weber number A) Euler number D) Reynolds number 23. The fluid in which the shearing stress within it is proportional to the velocity gradient across the sheared section, is called a A) Bingham C) Perfect B) Newtonian D) None of these 24. The ratio of average fluid velocity to the maximum velocity in case of laminar flow of a Newtonian fluid in a circular pipe is 1 ſ D) 0.66 A) 2 B) 0.5 C) 1 25. If the change in density occurs at constant temperature then the process is 1 A) Isothermal process B) Adiabatic process C) Insulation process D) vapour pressure 26. If the change in density occurs with no exchange of temperature then the process is ſ 1 A) Isothermal process B) Adiabatic process C) Insulation process D) vapour pressure 27. If the temperature of liquid is increase then the viscosity of liquid is ſ 1 A) Increases B) Constant C) Proportional D) Decreases 28. The density of mercury is 1 B) 13400 kg/m^3 C) 12600 kg/m³ D) 11600 kg/m³ A) 13600 kg/m³ 29. The relation be the specific volume and specific density is **B**) Proportional D) Reciprocal A) Equal C) Constant 30. A fluid which possesses viscosity is known as C) Real fluid B) Newtonian fluid A) Ideal fluid D) Ideal plastic fluid 31. The formula for calculating the pressure in case of surface tension on a liquid jet is A) P=4*σ/L B) P=2*σ/L C) P=8*σ/L D) $P=\sigma/L$ 32. The angle of contact between liquid and glass tube for capillary fall is D) 140° C) 240⁰ A) 128⁰ B) 120⁰ 33. The rate of increase in pressure in a vertical downward direction is equal to the specific weight A) Pascal's law B) Constitutive law C) Column law D) Hydrostatic law 34. The pressure which is measure with reference to absolute vacuum pressure is A) Absolute pressure B) Gauge pressure C) Vacuum pressure D) None of these 35. The point of application of total pressure on a liquid surface is E 1 B) Centre of pressure C) Surface tension A) Total pressure D) Viscosity 36. The total pressure on a curved surface is 1 B) $F = \sqrt{FX2 + FY}$ C) $F^2 = FX^2 + FY^2$ A) $F = \sqrt{Fx + Fy}$ D) $F=\sqrt{FX+FY2}$ 37. Difference between atmospheric pressure and absolute pressure is called 1 A) Vacuum pressure B) Absolute pressure C) Gauge pressure D) Intensity of pressure

	QUESTION BANK 2019
 38. The sum atmospheric pressure and gaug A) Vacuum pressure B) Absolute pressure 39. Inclined single column manometer is use A) Pressure in tube B) Pressure in manom 40. Any pressure measured above the absol A) Gauge pressure B) Absolute pressure 	e pressure is called[C) Gauge pressureD) Intensity of pressureeful for the measurement of[eful for the measurement of[meterC) Pressure in free endD) None of theseute zero of pressure is termed as[C) Atmospheric pressureD) Vacuum pressure
	<u>UNIT –II</u>
<u>FLUI</u>	D KINEMATICS
1. Shear stress develops on a fluid element, A) is at rest B) if the conta C) is viscous D) is viscous a 2. The resultant hydrostatic force acts throug A) Centre of gravity B) Centre of buoyance 3. Resultant pressure of the liquid in case of A) Centre of gravity B) Centre of pressure 4. What are the forces that influence the prod A) Gravity and viscous forces C) Viscous and surface tension forces 5. The fluid characteristics like pressure, vel A) Steady flow B) Uniform flow 6. The Euler equations of motion for the flor conservation of A) Mass and the fluid as incompressible and B) Momentum and the fluid as incompressible C) Momentum and the fluid as incompressible and B) Momentum and the fluid as incompressible and C) Momentum and the fluid as incompressible and C) Momentum and the fluid as incompressible and C) Momentum and the fluid as incompressible and B) Energy and the fluid as incompressible and C) Total energy per unit mass C) Total energy per unit wolume 8. Bernoulli's equation is derived making as A) The flow is uniform and incompressible C) The flow is steady, ideal, incompressible 9. The Bernoulli's equation can take the form A) $\frac{p}{pg} + \frac{v^2}{2g} + z$ =Constant C) $\frac{p}{g} + \frac{v^2}{2g} + z$ =Constant 10. If the flow is assumed to be ideal, the via A) Reynolds's equation B) Navier-Stokes 11. The flow in which the fluid particles mod A) Steady flow B) Uniform flow 12. The fluid characteristics like pressure, via A) Steady flow B) Uniform flow 13. For a fluid element in a two dimensional	if the fluid [] uner is subjected to uniform linear acceleration and the flow is non-uniform gh a point known as [] y C) Centre of pressure D) None of the above an immersed body acts through which one of the following e C) Metacenter D) Centre of buoyancy [] blem of fluid static [] B) Gravity and pressure forces D) Gravity and surface tension locity, density does not change w.r.t to time is [] C) Unsteady flow D) Laminar flow w of an ideal fluid is derived considering the principle of [] H inviscous ble and viscous. ble and viscous. ble and inviscous nly used to express Bernoulli's equation, has units of B) Total energy per unit weight [] D) Total energy per unit cross - sectional area of flow ssumption that [] B) The flow is uniform and turbulent and inrotational D) The flow is ideal, uniform m [] B) $\frac{1}{\rho g} + \frac{v^2}{2g} - z = Constant$ scous force is zero then the equation is [] equation C) Euler's equation D) Bernoulli's equation ves in a zigzag path is called [] C) Unsteady flow D) Laminar flow elocity, density changes w.r.t to time is [] C) Unsteady flow D) Laminar flow elocity, density changes w.r.t to time is [] C) Unsteady flow D) Laminar flow elocity, density changes w.r.t to time is [] C) Unsteady flow D) Laminar flow
13. For a fluid element in a two dimensionalA) Translation onlyB) Translation	I flow field (x-y plane), if it will undergo [] Inslation and rotation
C) Translation and deformation D) De Fluid Mechanics	Page 1

age 1

14. In adiabatic flow with friction, the stagnation temperature along a streamline [] 1 A) Increases B) Decreases C) Remains constant D) None [] 15. Streamlines, path lines and streak lines are virtually identical for [] [] 16. Existence of velocity potential implies that [] A) Fluid is in continuum B) Fluid is irrotational C) Fluid is ideal D) Fluid is compressible [] 17. In a flow field, the streamlines and Equipotential lines [] A) Are Parallel B) Are orthogonal everywhere in the flow field C) Cut at any angle D) Cut orthogonal everywhere in the flow main opoints [] 18. The flow in pipe is laminar if [] [] A) Which is along the path of particle B) Which is always parallel to the main flow [] (C) Reynolds number is more than 4000 D) None of the above [] 20. Continuity equation can take the form [] [] A) Aiv[-A/v2 B) B) QiV(-QiV2 C) (AiV2-A2V1 D) AiA2=V1V2 [] A) Aiv[-A/v2 B) B) ON (cont pressent the velocity potential of a function [] [] A) Aiv [-A/v2 B] B) $Q = X^2 + Y^2 C) (P = 2X^2 + Y^2 D) (P = X^2 + Y^2 D) (P = X^2$		QUESTION BANK 2019
A) Increases B) Decreases C) Remains constant D) None 15. Streamlines, path lines and streak lines are virtually identical for [] A) Uniform flow B) Flow of ideal fluids C) Steady flow D) Non uniform flow 16. Existence of velocity potential implies that [] A) Fluid is in continuum B) Fluid is irrotational C) Fluid is ideal D) Fluid is compressible 17. In a flow field, the streamlines and Equipotential lines [] A) Are Parallel B) Are orthogonal everywhere in the flow field C) Cut at any angle D) Cut orthogonal everywhere in the flow field C) Cut at any angle D) Cut orthogonal everywhere in the flow field C) Cut at any angle D) Cut orthogonal everywhere in the flow field C) Cut at any angle D) Cut orthogonal everywhere in the flow field C) Cut at any angle D) Cut orthogonal everywhere is more than 2000 C) Reynolds number is less than 2000 B) Reynolds number is more than 2000 C) Reynolds number is less than 2000 B) None of the above 19. A stream line is a line [] A) Which is along the path of particle B) Which is always parallel to the main flow C) Across which there is no flow D) None of these 20. Continuity equation can take the form [] A) A ₁ V ₁ =A ₂ V ₂ B) Q ₁ V ₁ =Q ₂ V ₂ C) A ₁ V ₂ =A ₂ V ₁ D) A ₁ A ₂ =V ₁ V ₂ 21. Continuity equation cans take the of conservation of [] A) $\Phi_2X^2+Y^2$ B) $\Phi_2X^2-Y^2$ C) $\Phi_2X^2+Y^2$ D) $\Phi_2X^3+Y^3$ 23. In an immersed body, centre of pressure is [] A) A the centre of gravity B) Above the centre of gravity C) Below be centre of gravity D) Could be above or below 24. A flow is called super-sonic if the B) Discharge is difficult to measure C) Mach number is between 1 and 6 D) None of these 25. A one dimensional flow is one which [] A) Energy B) Mas C) Pressure D) Momentum C) Takes place in straight lines D) Involves zero transverse component of flow 26. Navier Stoke's equation represents the conservation of [] A) Energy B) Mas C) Pressure D) Momentum C) Transcompressible flow the density of fluid is [] A) $\frac{\partial_x}{\partial_x} \frac{\partial_y}{\partial_y} \frac$	14. In adiabatic flow with friction, the stagnation te	mperature along a streamline []
15. Streamlines, path lines and streak lines are virtually identical for [] 14. Duriform flow B) Flow of ideal fluids C) Steady flow D) Non uniform flow [] 16. Existence of velocity potential implies that [] 17. In a flow field, the streamlines and Equipotential lines [] 18. The flow in pipe is laminar if [] [] 19. Are Parallel B) Are orthogonal everywhere in the flow field C) Cut at any angle D) Cut orthogonally except at the stagnation points [] 18. The flow in pipe is laminar if [] [] 19. Are parallel B) Are orthogonal everywhere in the flow field C) Cut at any angle D) Cut orthogonally except at the stagnation points [] 10. Are Parallel B) Are orthogonally except at the stagnation points [] 11. A Reynolds number is less than 2000 B) Reynolds number is more than 2000 C) Reynolds number is more than 4000 D) None of the above [] 19. A stream line is a line [[]] 10. Which is along the path of particle B) Which is always parallel to the main flow C) C Across which there is no flow D) None of these [] 10. Ontinuity equation deals with the law of conservation of [] 11. An immersed body, centre of pressure is [] 10. Alv ₁ -A ₂ V ₂ B) $D_{0}=X^{2}+Y^{2}$ C) $\Phi_{0}=X^{2}+Y^{2}$ D) $\Phi_{-}X^{2}+Y^{3}$ [] 11. An immersed body, centre of pressure is [] 11. At the centre of gravity B) Above the centre of gravity [] 12. Boltow be centre of gravity B) Above the centre of gravity [] 13. B the flow is very high B) Discharge is difficult to measure C) Mach number is between 1 and 6 D) None of these [] 14. A low is called super-sonic if the [] 15. Stady uniform flow [] 15. Stady uniform flow [] 16. Aniver Stoke's equation represents the conservation of [] 17. For incompressible flow the density of fluid is [] 18. The continuity equation is not which [] 19. $\Delta_{\frac{1}{2}} \frac{\partial_{\frac{1}{2}}}{\partial_{\frac{1}{2}}} \frac{\partial_{\frac{1}{2}}}{\partial_{\frac{1}{2}}} \frac{\partial_{\frac{1}{2}}}{\partial_{\frac{1}{2}}} \frac{\partial_{\frac{1}{2}}}{\partial_{\frac{1}{2}}} \frac{\partial_{\frac{1}{2}}}{\partial_{\frac{1}{2}}} \frac{\partial_{\frac{1}{2}}}{\partial_{\frac{1}{2}}} \frac{\partial_{\frac{1}{2}$	A) Increases B) Decreases C) Remains co	nstant D) None
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28. The continuity equation in three dimensions is [] A) $\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial x}$ B) $\frac{\partial v}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial w}{\partial x}$ C) $\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z}$ D) $\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial x}$ 29. For steady flow in velocity potential, the velocity in x-direction is [] A) $u = -\frac{\partial \varphi}{\partial y}$ B) $u = -\frac{\partial \varphi}{\partial x}$ C) $u = -\frac{\partial \varphi}{\partial z}$ D) $u = \frac{\partial \varphi}{\partial y}$ 30. For steady flow in stream function, the velocity in x-direction is [] A) $u = -\frac{\partial \Psi}{\partial y}$ B) $u = -\frac{\partial \Psi}{\partial x}$ C) $u = -\frac{\partial \Psi}{\partial z}$ D) $u = \frac{\partial \varphi}{\partial y}$ 31. For steady flow in velocity potential, the velocity in y-direction is [] A) $u = -\frac{\partial \varphi}{\partial y}$ B) $u = -\frac{\partial \varphi}{\partial x}$ C) $u = -\frac{\partial \varphi}{\partial z}$ D) $v = -\frac{\partial \varphi}{\partial y}$ 32. For steady flow in stream function, the velocity in y-direction is [] A) $u = -\frac{\partial \varphi}{\partial y}$ B) $u = -\frac{\partial \varphi}{\partial x}$ C) $u = -\frac{\partial \varphi}{\partial z}$ D) $v = -\frac{\partial \varphi}{\partial y}$ 32. For steady flow in stream function, the velocity in y-direction is [] A) $v = -\frac{\partial \Psi}{\partial y}$ B) $v = \frac{\partial \Psi}{\partial x}$ C) $u = -\frac{\partial \Psi}{\partial z}$ D) $u = \frac{\partial \varphi}{\partial y}$	A) Constant B) Proportional C) No	t constant D) Equal
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29. For steady flow in velocity potential, the velocity in x-direction is A) $u = -\frac{\partial \varphi}{\partial y}$ B) $u = -\frac{\partial \varphi}{\partial x}$ C) $u = -\frac{\partial \varphi}{\partial z}$ D) $u = \frac{\partial \varphi}{\partial y}$ 30. For steady flow in stream function, the velocity in x-direction is A) $u = -\frac{\partial \Psi}{\partial y}$ B) $u = -\frac{\partial \Psi}{\partial x}$ C) $u = -\frac{\partial \Psi}{\partial z}$ D) $u = \frac{\partial \varphi}{\partial y}$ 31. For steady flow in velocity potential, the velocity in y-direction is A) $u = -\frac{\partial \varphi}{\partial y}$ B) $u = -\frac{\partial \varphi}{\partial x}$ C) $u = -\frac{\partial \varphi}{\partial z}$ D) $v = -\frac{\partial \varphi}{\partial y}$ 32. For steady flow in stream function, the velocity in y-direction is A) $v = -\frac{\partial \varphi}{\partial y}$ B) $v = -\frac{\partial \varphi}{\partial x}$ C) $u = -\frac{\partial \varphi}{\partial z}$ D) $v = -\frac{\partial \varphi}{\partial y}$ 32. For steady flow in stream function, the velocity in y-direction is A) $v = -\frac{\partial \Psi}{\partial y}$ B) $v = \frac{\partial \Psi}{\partial x}$ C) $u = -\frac{\partial \Psi}{\partial z}$ D) $u = \frac{\partial \varphi}{\partial y}$	A) $\frac{1}{ar} + \frac{1}{ar} + \frac{1}{ar}$ B) $\frac{1}{ar} + \frac{1}{ar} + \frac{1}{ar}$ C) $\frac{1}{ar} + \frac{1}{ar}$	-+- D) $-+-+-+$
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31. For steady flow in velocity potential, the velocity in y-direction is () $A = -\frac{\partial \varphi}{\partial y}$ () $B = -\frac{\partial \varphi}{\partial x}$ () $u = -\frac{\partial \varphi}{\partial z}$ () $u = -\frac{\partial \varphi}{\partial z}$ () $v = -\frac{\partial \varphi}{\partial y}$ () $v = -\partial$	A) $u = -\frac{a_{11}}{a_{22}}$ B) $u = -\frac{a_{11}}{a_{22}}$ C) $u = -$	$D) u = \frac{\partial \varphi}{\partial u}$
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$\frac{\partial y}{\partial x} \qquad \frac{\partial z}{\partial z} \qquad \frac{\partial y}{\partial y}$ 32. For steady flow in stream function, the velocity in y-direction is (I) $A) v = -\frac{\partial \Psi}{\partial y} \qquad B) v = \frac{\partial \Psi}{\partial x} \qquad C) u = -\frac{\partial \Psi}{\partial z} \qquad D) u = \frac{\partial \varphi}{\partial y}$	A) $u = -\frac{\partial \varphi}{\partial u}$ B) $u = -\frac{\partial \varphi}{\partial u}$ C) $u = -\frac{\partial \varphi}{\partial u}$	$\frac{\partial \varphi}{\partial t}$ D) v= - $\frac{\partial \varphi}{\partial t}$
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A) $v = -\frac{\partial \Psi}{\partial y}$ B) $v = \frac{\partial \Psi}{\partial x}$ C) $u = -\frac{\partial \Psi}{\partial z}$ D) $u = \frac{\partial \varphi}{\partial y}$	32. For steady flow in stream function, the velocity	in y-direction is
$\partial y \qquad \partial x \qquad \partial z \qquad \partial y$	A) $v = -\frac{\sigma \Psi}{2}$ B) $v = -\frac{\sigma \Psi}{2}$ C) $u = -\frac{\sigma \Psi}{2}$	$\frac{\sigma \varphi}{D}$ D) u = $\frac{\sigma \varphi}{D}$
	∂y ∂x	∂z ∂y

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 33. For Equipotential line, th A) Constant B) San 34. A grid is obtained by drav A) Stream function B) Vel 	ne velocity function ne C) wing a series of Equ ocity potential C)	is Reciprocal apotential line is Flow net	D) Proj called D) Free	[portional [e vortex flow]]
35. The continuity equation at A) $\frac{\partial u}{\partial x} + \frac{\partial w}{\partial z}$ 36. The velocity of flow does A) Steady flow 37. The fluid particles are flo A) Rotational flow B) Irror 38. The fluid particles are flo A) Rotational flow B) Irror 39. For two dimensional flow A) Constant B) Unit 40. Irrotational flow means A) The fluid does not rotate w C) The net rotation of fluid p	in two dimensions in B) $\frac{\partial u}{\partial y} + \frac{\partial w}{\partial x}$ is not change with results of the B) Uniform flow we along stream lines that ional flow C) we along stream lines that ional flow C) we along stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction of the stream lines that ional flow C) we have a construction	$C)\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial i}{\partial x}$ espect to space is C) Unsteady es and also rotate Turbulent flow es and not rotates Turbulent flow direction is function of z The fluid particle mass centre is ze IT -IV	 <u>w</u> z flow s about its own at D) Compressit about its own ax D) Compressit D) Compressit D) Zero es moves in straig oro D) None of th 	D) $\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y}$ D) Laminar f xis is [ble flow is is [ble flow [the line ne above] [low]]]
	FLOW '	THROUGH I	PES		
1. Friction factor for pipes de A) Rate of flow & density 2. An ideal fluid is A) Similarly to the perfect ga C) Obey Newton's law of vis 3. For transition flow, the Re A) Less than 2000 4. 12. The pipe bend causing A) 30^{0} bend 5. For pipes, laminar flow oc A) Less than 2000 6. Head loss in turbulent flow A) Square root of velocity 7. The loss of pressure head ff A) As the square of velocity C) As the inverse of velocity 8. Hydraulic gradient line for A) Always above the centre for C) Always sloping downward 9. The head losses in a sudde velocity V ₁ in the 6 cm pipe in	pends on B) Viscosi s cosity ynolds number vari B) More than 4000 maximum head los B) 45 ⁰ bend curs when the Reyr B) Between 2000 v in pipe varies dire B) Velocit for the laminar flow	ty C) Pipe rou B) Frictionle D) Satisfies of es C) Between s is C) 60^0 bence nolds number is and 4000 C) M ctly as the y C) Square of through pipes va B) Directly a D) None of t onstant diameter B) A f flow D) C 5 cm diameter pip	ighness ess and incompress continuity equation 2000 & 4000 1 fore than 2000 f velocity aries as the velocity the above is lways below the oincides with the pe to 12 cm dian	[D) All the ab [ssible on [D) Less than [D) 90 ⁰ bend [D) More than [D) Cube of v [energy grade pipe centre lineter pipe, in [] ove] 4000] a 4000] relocity] line ine terms of]
A) $\frac{15}{16} \frac{V_1^2}{2g}$	B) $\frac{3}{4} \frac{V_1^2}{2g}$	C) $\frac{1}{4} \frac{V_1^2}{2g}$		D) $\frac{9}{16} \frac{V_1^2}{2g}$	
10. In a sudden contraction, t contraction is 0.66. The head A) 0.133m	he velocity head ch loss in this contrac B) 0.332m	anges from 0.5m tion is C) 0.644m	to 1.25m. The co	Defficient of [D) 0.750m]
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11. The minor loss due to suc	den contraction		[]
A) Flow contraction		B) Expansion of flow after co	ontraction
C) Boundary friction		D) Cavitation	
12. A flow is said to be lamir	nar	_ ,	[]
A) The fluid particles are mo	ve in zig-zag way	B) The Reynolds number is h	nigh
C) The fluid particles are mo	ve parallel to the laver	D) None of the above	0
13. The frictional head loss in	n a turbulent flow throu	igh a pipe varies	[]
A) Directly as the average ve	elocity.	B) Directly as the square of the	ne average velocity.
C) Inversely as the square of	the average velocity.	D) Inversely as the square of	the internal diameter
14. Two pipes systems can be	e said to be equivalent.	when the quantities same are	[]
A) Frictionless loss and flow	B) Length and diam	neter C) Flow and length	D) Length and flow
15. The Darcy-Weisbach equ	ation for loss of head i	s	
$4fLV^2$	fLV^2	$4LV^2$	$4 f L V^2$
A) $\frac{1}{2ad}$	B) $\frac{2ad}{2ad}$	$C)$ $\overline{2ad}$	$D) \frac{2a}{2a}$
-8	-8	-9	-0
16 The Chezy's formula is			[]
A) $V = C_2 \sqrt{m}$	B) $V = \sqrt{mi}$	$C) V = C \sqrt{mi}$	$V = C \sqrt{i}$
$\frac{1}{2} = \frac{1}{2} $	\mathbf{D} $\mathbf{V} = \mathbf{V} \mathbf{n} \mathbf{c}$	C) V = C V ma	D) V = C V C
17. The formula for Reynold	s number 1s	V.d.	oVd
A) $\frac{ra}{r}$	B) $\frac{\mu a}{2}$	C) $\frac{va}{c}$	$D) \frac{p r u}{d}$
μ	μ	ρ	μ
18. The loss of head due to si	udden enlargement is	··· ·· · · · · · · · · · · · · · · · ·	
A) $\frac{(V_1 - V_2)}{(V_1 - V_2)}$	B) $\frac{(V_1 - V_2)^2}{(V_1 - V_2)^2}$	C) $\frac{(V_1 - V_2)^2}{(V_1 - V_2)^2}$	D) $\frac{(V_1 - V_2)^2}{(V_1 - V_2)^2}$
2 <i>g</i>	2g	2	<i>g</i>
19. The loss of head at the ex	it of the pipe is	_	[]
$(\Delta) \frac{0.5 V^2}{V}$	B) $\frac{0.1 V^2}{1000}$	C) $\frac{1.0 V^2}{V^2}$	D) $\frac{0.25 V^2}{V^2}$
2g	2g	2g	2g
20. A pipe has well rounded	entrance from a reserve	oir. If the head loss at the entra	ance is expressed as
$K \frac{V^2}{2a}$, the value of K is			[]
$\Delta 0.02$	$\mathbf{P} \mid 0.2$	C) 0.5	\mathbf{D}) 0.1
A) 0.02 21 Minor losses in a pipe fle	D) 0.2	C) 0.3	
A) Which are insignificantly	small	P) Which can be perfected a	
C) Caused by local disturban	sinan	D) Caused by frictional resis	tance
22 Two identical pipes of lea	ngth L Diameter D and	d friction factor f are connect	ad in carias batwaan
two reservoirs. The size of a	night L, Diameter D and	the same friction factor f equi	ivalent to the above
nine lines	pipe of a length L and	the same metion factor i, equ	
Δ) 0 5D	B) 0.87D	C) 1 15D	(1) 1 40D
23 Two identical pipes of let	D) 0.07D noth I Diameter D and	d friction factor f are connected	ed in parallel between
two reservoirs. The size of a	night L, Diameter D and	the same friction factor f equi	ivalent to the above
nine lines		the same metion factor i, equ	
Δ) 0 5D	B) 0.87D	C) 1 15D	(1) 1 40D
24 In Darcy's equation for a	flow the friction facto	- C) 1.15D or is missibilited by $\pm 25\%$ the	D) 1.40D
24. In Darcy's equation for a	now, the metion facto	313 misadjusted by $+23%$, the	
$(\Delta) \pm 25\%$	B) -16 67%	C) -5%	L J
-25 For maximum transaction	D) -10.07 /0	C = 5.0	D) = 12.570
25.101 maximum transaction friction he is given by	i or power unough a pi	pe me with a total fiead 11, th	
H	2	Н	L J
A) $\frac{-}{3}$	$B) - \Pi_{3}$	$C) - \frac{1}{2}$	D) 0.1H
26. Three pipes are connected	d in series then	_	[]
· ·			_
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A) The head loss in each pipe is same B) The Discharge through each pipe is same C) The total discharge is the sum of the discharges in the individual pipe D) The Reynolds number for each pipe is same 27. Two reservoirs are connected by two pipes A and B of identical friction factor and length in series. If the diameter of A is 30% larger than that B the ratio of the head loss in A to that in B ſ 1 A) 0.77 B) 0.59 C) 0.50 D) 0.27 28. The discharge Q in a pipe of known f is estimated by using the head loss h_f in a length L and diameter D. If an error of 1% is involved in measurement of D, the corresponding error in the estimation of O 1 D) 5% C) 0.4% A) 2.5% B) 1.0% 29. A rectangular conduit 0.8m * 0.4m carries air (kinematic viscosity $1.5*10^{-2}$ m²/sec) at a velocity of 3m/sec. The Reynolds number of the flow for the calculation of friction factor is A) 8*10⁴ B) 1.07*10⁵ C) 1.6*10⁵ D) 6*10⁴ 30. Which one of the following is a major loss? 1 Γ A) Frictional loss B) Shock loss C) Entry loss D) Exit loss 31. The frictional resistance for fluids in motion is ſ 1 A) Dependent on the pressure for both laminar and turbulent flows B) Independent of the pressure for both laminar and turbulent flows C) Dependent on the pressure for laminar flow and independent of the pressure for turbulent flow D) Independent of the pressure for laminar flow and dependent on the pressure for turbulent flow 32. The head loss at the entrance of the pipe is that at its exit 1 A) Equal to D) Half B) Twice C) Four times 33. On which of the factors does the co-efficient of bend in a pipe depend? A) Angle of bend and radius of curvature of the bend B) Angle of bend and radius of the pipe C) Radius of curvature of the bend and pipe D) Radius of curvature of the bend and pipe radius and angle of bend 34. Which property of the fluid accounts for the major losses in pipes? E A) Density B) Specific gravity C) Viscosity D) Compressibility 35. Minor losses do not make any serious effect in A) Short pipes B) Long pipe C) Both the short as well as long pipes D) Cannot say 36. What is the formula for determining the size of equivalent pipe for two pipes of lengths L_1 , L_2 and diameters d_1 , d_2 respectively? Where, $L = L_1 + L_2$ B) $(L / d_1^2) = (L_1 / d_1^2) + (L_2 / d_2^2)$ A) $(L / d) = (L_1 / d_1) + (L_2 / d_2)$ D) $(L/d^5) = (L_1/d_1^5) + (L_2/d_2^5)$ C) $(L/d^3) = (L_1/d_1^3) + (L_2/d_2^3)$ 37. The highest point of syphon is called as A) Syphon top B) Summit C) Reservoir D) one of the above 38. Two identical pipes of length L, Diameter D and friction factor f are connected in parallel between two points. The length of a single pipe of a diameter D and the same friction factor f, equivalent to the above pair is 1 D) $\frac{L}{L}$ B) $\frac{L}{L}$ C) $\frac{L}{\Gamma}$ A) $\sqrt{2L}$

	2	V2	4	
39. The loss of head at t	the entrance of the pipe	e is	[]
A) $\frac{0.5 v^2}{v^2}$	B) $\frac{0.1 V^2}{2}$	$C)\frac{1.0 V^2}{2}$	D) $\frac{0.25 V^2}{V^2}$	
2g	2g	2g	2g	
40. Flow through branch	hed pipes can be solve	d by the following equations	[1

A) Continuity equation B) Bernoulli's equation C) Darcy-Weisbach equation D) All the above

<u>UNIT –III</u>

FLUID DYNAMICS

1. The ratio of area of jet at vena-contr	act to the are	ea of orifice is	*/	[]
C) Coefficient of contraction	D)	None of the above	y		
2. The ratio of actual discharge to theory	retical disch	arge is		Г	1
A) Coefficient of discharge	R	Coefficient of velocit	V	L	1
C) Coefficient of contraction) None of the above	y		
3 The ratio of actual velocity to theore	tical velocity	v is		Г	1
A) Coefficient of discharge	R	Coefficient of velocit	V	L	1
C) Coefficient of contraction	D) None of the above	y		
4 Orifice as well as mouth pieces are i	used for mea	suring		г	1
A) Rate of flow B) Velocity of flow	$\log (C) Co$	efficient of velocity	D) Coefficient	L of disc) haroe
5 For a pipe flow at constant canacity	head is pro	nortional to	D) Coefficient	[1
A) $1/d$ B) $1/d^2$	C) 1/d	4	D) $1/d^5$	L	1
6 The upper surface of the weir over w	which water f	Tows is known as	D) 1/4	г	1
A) Nappe B) Crest	C) Sil	10 w 3 13 known as	D) Vein	L	1
7 Fire hose nozzle is generally made of	c) bli	1	D) Vein	г	1
A) Divergent shape B) Convergent s	(hane C) C v	lindrical shape	D) Parabolic s	L hane	1
8 The rise of liquid along the walls of	a revolving	cylinder as compared t	D) I alabolic s	the cen	tro
With respect to initial level is	arevolving	cymuci as compared t	o depression at		1
A) Same B) More	C) Let	26	D) Unpredicta	L ble]
9 Mouth nieces are used to measure	C) Le	55	D) Onpredicta	ſ	1
A) Velocity B) Pressure	\mathbf{C}) $\mathbf{P}_{\mathbf{a}}$	te of flow	D) Viscosity	L]
10 In submerged orifice flow the disc	harge is pror	ortional to which one	of following pa	rameter	•c
A) Square root of the downstream head	and ge is prop		or following pa	ranneter r	.s 1
B) Square root of the upstream head	u			L]
C) Square of the upstream head					
D) Square root of the difference betwee	en unstream	and downstream head	e e		
11 If the velocity of flow does not cha	on upstream	nect to length of direct	ion of flow is	г	1
A) Steady flow B) Uniform flow	C Inc	compressible flow	D) Rotational	L flow	1
12 The density of flow is constant from	m point to po	yint in a flow region it	is called	по w	1
A) Steady flow B) Incompressib	ni point to pe de flow	C) Uniform flow	D) Irrotational	t flow	1
13 The rate of flow through a venturin	neter varies	c) childrin now	D) motational	[1
A) H B) \sqrt{H}	lieter varies	C) $H^{3/2}$	D) $H^{5/2}$	L	1
14 The mate of floor through M motols		C) II	D) II	г	1
14. The rate of flow through v-notch v	aries as	$a = 11^{3/2}$	D) 115/2	L]
A) H B) \sqrt{H}		C) H ^{3/2}	$D) H^{3/2}$		
15. Notch is a device used for measuring	ng			[]
A) Rate of flow through pipe	B) Rat	te of flow through sma	ll channel		
C) Velocity through a pipe	D) Ve	locity through a small	channel		
16. The discharge through rectangular	notch is	2/2		[]
A) $Q=2/3 \times C_d \times L \times H^{3/2}$	B) Q=	$\frac{2}{3} \times C_d \times L \times H_{\frac{3}{2}}^{\frac{3}{2}}$			
C) $Q=8/15 \times C_d \times L \times H^{3/2}$	D) Q=	$= 2/3 \times C_d \times L \times H^{3/2}$			
17. The discharge through triangular network $\frac{1}{2}$	otch is		2/2	[]
A) $Q=2/3* C_d * \tan \theta / 2 * H^{3/2}$	B) Q=	$2/3 * C_d * \tan(2 * H)$	<i>2</i> IC		
C) Q=2/15 * C _d * tane/2 * $\sqrt{2g}$ H ^{3/2}	D) Q=	$= 2/3 * C_d * L * H^{3/2}$			

18. The velocity with which the water appr A) Velocity of flow B) Velocity of appro	oaches a	notch is called C) Velocity of wh	irl D) None of th	[e abov] ⁄e
19. Francis's formula for a rectangular wei A) $Q=1.84.L.H^{5/2}$ B) $Q=2/3.L.H^{3/2}$	r for two	end contraction su C) Q=1.84.L.H $^{3/2}$	ppressed is given l D) Q=2/3.L.H	5/2 [^{5/2}	
20. A triangular notch is more accurate me	asuring	device than the recta	angular notch for r	neasur	ring
Which one of the following				l	J
A) Low flow rates B) Medium flow rate	e	C) High flow rates	D All flow rate	ites	T 1
21.A standard 90° V-notch weir is used to	measure	discharge. The disc	charge is Q_1 for he	ights F	1_1 above
the sill and Q_2 is the discharge for a heigh	t H2– If	H_1 / H_2 is 4, then Q	$1/Q_2$ 1S	L]
A) 32 B) $16\sqrt{2}$		C) 16	D) 18		
22. A short tube mouthpiece will not run fu	ill at its o	outlet if the head un	der which the orif	ice wo	rks, is
A) Equal of 12.2 m of water	B) Mo	ore than 12.2 m of w	ater []	
C) Less than 12.2 m of water	D) No	ne of the above			_
23. The thickness of a sharp crested weir is	s kept les	s than		[]
A) Two-third of the height of water on the	sill	B) One-fourth of t	he height of water	on the	e sill
C) One-third of the height of water on the s	sill	D) One half of the	height of water of	n the s	ill
24. The side slope of Cipolletti weir is gene	erally ke	pt		[]
A) 1 to 3 B) 1 to 4		C) 1 to 5	D) 1 to 2		
25. The theoretical discharge through orific	ce is			[]
A) Area of orifice $x \sqrt{2gh}$	B) Are	ea of orifice x $\sqrt{2h}$			
C) Area of orifice x \sqrt{gh}	D) Ai	rea of orifice x $\sqrt{2g}$	h		
26. For external mouth pieces, absolute pre	essure he	ad at ena-contracta	is	[1
A) $H_c=H_a-H$ B) $H_c=H_a-0.49$ H	C) I	$H_c = H_a - 0.89$ I	D) H _c =H _a -0.89 H	L	-
27. The discharge through fully submerged	lorifice	is	, c u	[1
A) $O = C_1 * b * (H_2 - H_1) * \sqrt{gh}$	B) O =	$= C_{d*} (H_2 - H_1) * \sqrt{2}$	ah	L	-
		-u (2 1)			
C) Q = C _d * b * (H ₂ -H ₁) * $\sqrt{2gh}$	D) Q =	$= b * (H_2 - H_1) * \sqrt{2g}$	1h		
	1	1 1 / 1		г	1
28. The condition height for maximum disc	charge of	ver a broad-crested	weir is	L]
A) $n=2/3.H$ B) $n=1/3.H$	C)	n=4/3.H	D) n=2.H		•
29. The error in discharge due to the error in $\Delta = 1/2$ which $\Delta = 1/2$	in the me	easurement of nead	over a rectangular	notch	18
A) 1/2 dH/H B) 3/2 dH/H	C) .	5/2 dH = D = 3/4 d	1H/H	l r]
30. The condition for maximum discharge $1.705 \text{ G} \text{ H}^{3/2}$	over a t	proad-crested weir is 1.005 C L $\text{H}^{3/2}$	5	L]
A) $Q_{max} = 1.705 \text{ C}_d \text{ H}$	$(\mathbf{B}) \mathbf{Q}_{\mathrm{m}}$	$_{ax.}$ = 1.905 C _d L H 1.705 C L U ^{3/2}			
C) $Q_{\text{max}} = 1.705 \text{ L H}$	$D) Q_{\rm m}$	$a_{ax} = 1.705 C_d L H$		г	1
31. The fluid property, due to which, merch	ury does	not wet the glass is $(x) = x^{1} + x^{2}$	\mathbf{D} \mathbf{U}	L]
A) Surface tension B) Conesion		C) Adnesion	D) Viscosity	r	1
32. The dimensions for discharge is $A > L^3$		$\sim 1^{3} T^{-1}$	D) $MI^{2}T-1$	L]
A) L B) L I 22. In a famou days stars, the scalar iter of fluid	1 1	C) L I	D) ML I	г	1
33. In a forced vortex, the velocity of fluid	i anywne	$\frac{1}{2}$	\mathbf{D}) $\mathbf{U}_{\mathbf{n}}$ and $\mathbf{I}_{\mathbf{n}}$	[.1.1.]
A) Maximum B) Minimum	1	C) Zero	D) Unpredicta		1
54. reputition of the second comparison		orviter of anti-1-		L]
A) specific gravity of inquids B) Sp C) Specific gravity of second	ecilic gi	avity of solids			
C) specific gravity of gasses D) No	one of th	e above		г	1
55. The head due to velocity approach 18 gi $A = \frac{1}{2} 1$	C h =	$V/2\alpha$ D)	$h - V^2/\alpha$	L]
$\frac{\mathbf{A} \mathbf{H}_{a} - \mathbf{v}_{a}/2g}{} = \mathbf{D} \mathbf{H}_{a} - \mathbf{v}_{a}/2g$	C Π_a	$-\mathbf{v}_{a'} \angle g \qquad \mathbf{D}$	$m_a - v_a / g$		
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			QUESTION BANK	2019
36. The coefficient of	f discharge for extern	al mouth piece is	[1
A) 0.375	B) 0.5	C) 0.707	D) 0.855	
37. The velocity corr	esponding to Reynold	d number of 2800, is called	, Į]
A) sub-sonic velocity	B) si	uper-sonic velocity		
C) lower critical velo	city	D) higher critical velocity	7	
38. The atmospheric	pressure at sea level	is	[]
A) 103 kN/m ²	B) 10.3 m of water	C) 760 mm of mercury	D) all of these	
39. The error in disch	harge (dQ/Q) to the end	rror in measurement of head	(dH/H) over a rectan	ngular notch
is given by			[]
$\frac{dQ}{dQ} = \frac{1}{\sqrt{2}} \frac{dH}{\sqrt{2}}$	$\frac{dQ}{=}$	$3 \sqrt{dH}$ $dQ = dH$	dQ	$=\frac{3}{\sqrt{dH}}$
A) ^Q 2 [^] H	B) Q	4 ^{<i>H</i>} C) ^{<i>Q</i>} ^{<i>H</i>}	D) Q	2 [^] H
40. The discharge ov	er a triangular notch	is	, Į	1
A) inversely proporti	onal to $H^{3/2}$	B) directly proportional to	$H^{3/2}$	
C) inversely proportion	onal to $H^{5/2}$	D) directly proportional to	o $H^{5/2}$	

<u>UNIT –V</u>

LAMINAR FLOWAND TURBULENT FLOW

1. A flow is said to be laminar		[]
A) The fluid particles are move in zig-zag way	B) The Reynolds num	ber is high	
C) The fluid particles are move parallel to the lay	yer D) None of the above		
2. For a laminar flow through a circular pipes		[]
A) The maximum velocity $= 1.5$ times of average	e velocity		
B) The maximum velocity $= 2.0$ time the average	e velocity		
C) The maximum velocity $= 2.0$ time the average	e velocity D) None of the above		
3. The loss of pressure head for the laminar flow	through pipes varies	[]
A) As the square of velocity B) Directly	as the velocity		
C) As the inverse of velocity D) None of	f the above		
4. For the laminar flow through a pipe, the shear	stress over the cross-section	[]
A) Varies inversely as the distance from the cent	re of pipe		
B) Varies directly as the distance from the surface	e of pipe		
C) Varies directly as the distance from the centre	e of the pipe		
D) Remains constant over the cross-section			
5. The velocity distribution in laminar flow throu	igh a circular pipe follow the	[]
A) Parabolic law B) Linear law	C) Logarithmic law D) Nor	ne of the above	ve
6. Steel and Cast Iron pipes carrying a fluid under	er pressure are regarded as hydrau	lically []
smooth when			
A) The boundary surface is relatively smooth	B) The roughness projections	are of flow h	neight
C) The roughness elements are completely cover	ed by the laminar sub-layer		
D) The laminar is thin as compared to the average	e height of roughness elements		
7. In laminar flow		[]
A) Experiment is required for the simplest flow of	case B) Newton's law of vi	scosity is app	plied
C) Flow particles move in irregular path	D) Viscosity of unimp	ortant	
8. If x is the distance from leading edge, then the	e boundary layer thickness in lam	inar flow var	ies as
A) x B) x	C) x D) x/7	[]

1	e surface at which the	point velocity is equa	l to the average	velocity of	
flow for a uniform laminar flo	w with a free surface,	will be		[]	
A) 0.423 D	B) 0.577 D	C) 0.223 D	D) 0.707 D		
10. The boundary layer thickn	ess in turbulent flow	varies as		[]	
A) x"7	B) x,/2	C) x4/5	D) x3/5		
where x is the distance from le	eading edge				
11. The distance y from pipe boundary, at which the point velocity is equal to average velocity for					
turbulent flow, is				[]	
A) 0.223 R	B) 0.423 R	C) 0.577 R	D) 0.707 R		
12. In laminar flow through a	round tube, the discha	rge varies		[]	
A) Linearly as the viscosity		B) Inversely as the pressure drop			
C) Linearly as the cube of the diameter		D) Inversely as the viscosity			
13. The pressure drop in a pipe	e flow is directly prop	ortional to the mean v	elocity. It can b	e deduced	
that the				[]	
A) Flow is laminar	B) Flow is turbulent	C) Pipe is smooth	D) Pipe is roug	gh	
14. In pipe larger than 25 mm,	, carrying water, the la	minar flow is		[]	
A) Very often exist	B) Generally exist	C) Rarely exist	D) Unpredicta	ble	
15. The Boundary layer takes	place			[]	
A) For Ideal Fluid	B) For pipe flows only	y C) For Real fluid	D) For flow ov	ver flat plates	
16. The Existence of Boundary	y layer on account of			[]	
A) Fluid Velocity B) Grav	vitational velocity	C) Fluid viscosity	D) surface Tens	sion	
17. In case of an airfoil, the se	paration of flow occur	rs		[]	
A) At the extreme rear of body	У	B) At the extreme from	ont of body		
C) Midway between rear and t	front of body				
D) Anywhere between rear an	d front of body depen	ding upon Reynolds n	umber		
	6 • • •			r 1	
18. For laminar flow in a pipe	of circular cross-secti	on, the Darcy's friction	on factor f is	[]	
18. For laminar flow in a pipe A) directly proportional to Re	of circular cross-secti ynolds number and in	on, the Darcy's friction dependent of pipe wal	on factor f is l roughness	[]	
18. For laminar flow in a pipeA) directly proportional to ReyB) directly proportional to pipe	of circular cross-secti ynolds number and in e wall roughness and	on, the Darcy's friction dependent of pipe wal independent of Reyno	on factor f is l roughness lds number	[]	
18. For laminar flow in a pipeA) directly proportional to RegB) directly proportional to pipC) inversely proportional to R	of circular cross-secti ynolds number and in e wall roughness and eynolds number and i	on, the Darcy's friction dependent of pipe wal independent of Reyno ndpendent of pipe wal	on factor f is l roughness lds number ll roughness	[]	
 18. For laminar flow in a pipe A) directly proportional to Reg B) directly proportional to pip C) inversely proportional to R D) inversely proportional to R 	of circular cross-section ynolds number and inder wall roughness and eynolds number and i eynolds number and c	on, the Darcy's friction dependent of pipe wal independent of Reyno ndpendent of pipe wal lirectly proportional to	on factor f is l roughness ilds number ll roughness o pipe wall roug	[] hness	
 18. For laminar flow in a pipe A) directly proportional to Rey B) directly proportional to pip C) inversely proportional to R D) inversely proportional to R 19. Separation of flow occurs 	of circular cross-section ynolds number and inter- e wall roughness and eynolds number and i eynolds number and co when	on, the Darcy's friction dependent of pipe wal independent of Reyno ndpendent of pipe wal lirectly proportional to	on factor f is l roughness lds number ll roughness o pipe wall roug	[] hness []	
 18. For laminar flow in a pipe A) directly proportional to Reg B) directly proportional to pip C) inversely proportional to R D) inversely proportional to R 19. Separation of flow occurs A) The pressure intensity reac C) The heart down lower compared 	of circular cross-section ynolds number and inder wall roughness and eynolds number and i eynolds number and construct when hes a minimum	on, the Darcy's friction dependent of pipe wal independent of Reyno ndpendent of pipe wal lirectly proportional to B) The cross-section	on factor f is l roughness olds number ll roughness o pipe wall roug of a channel is 1	[] hness [] reduced	
 18. For laminar flow in a pipe A) directly proportional to Rey B) directly proportional to pip C) inversely proportional to R D) inversely proportional to R 19. Separation of flow occurs A) The pressure intensity reac C) The boundary layer comes 	of circular cross-section ynolds number and inder wall roughness and eynolds number and i eynolds number and control when hes a minimum to rest	on, the Darcy's friction dependent of pipe wal independent of Reyno ndpendent of pipe wal lirectly proportional to B) The cross-section D) All of the above	on factor f is l roughness olds number ll roughness o pipe wall roug of a channel is r	[] hness [] reduced	
 18. For laminar flow in a pipe A) directly proportional to Rey B) directly proportional to pip C) inversely proportional to R D) inversely proportional to R 19. Separation of flow occurs A) The pressure intensity reac C) The boundary layer comes 20. The ratio of average veloce A) 1/2 	of circular cross-section ynolds number and inder wall roughness and eynolds number and i eynolds number and of when hes a minimum to rest ity to maximum veloc	on, the Darcy's friction dependent of pipe wal independent of Reynon ndpendent of pipe wal lirectly proportional to B) The cross-section D) All of the above ity for steady laminar	on factor f is l roughness lds number ll roughness o pipe wall roug of a channel is 1 flow in circular	[] hness [] reduced	
 18. For laminar flow in a pipe A) directly proportional to Rey B) directly proportional to pip C) inversely proportional to R D) inversely proportional to R 19. Separation of flow occurs A) The pressure intensity reac C) The boundary layer comes 20. The ratio of average velocities A) 1/2 B) 2/3 21. The distance from pipe holds 	of circular cross-section ynolds number and inder wall roughness and eynolds number and i eynolds number and of when hes a minimum to rest ity to maximum veloc	on, the Darcy's friction dependent of pipe wal independent of Reyno ndpendent of pipe wal lirectly proportional to B) The cross-section D) All of the above ity for steady laminar C) 3/2	on factor f is l roughness olds number ll roughness o pipe wall roug of a channel is 1 flow in circular D) 2	[] hness [] reduced pipes is []	
 18. For laminar flow in a pipe A) directly proportional to Rey B) directly proportional to pip C) inversely proportional to R D) inversely proportional to R D) inversely proportional to R 19. Separation of flow occurs A) The pressure intensity reac C) The boundary layer comes 20. The ratio of average veloc: A) 1/2 B) 2/3 21. The distance from pipe boundary layer comes in a set of the properties o	of circular cross-section ynolds number and inder wall roughness and eynolds number and i eynolds number and of when hes a minimum to rest ity to maximum veloc undary, at which the t	on, the Darcy's friction dependent of pipe wal independent of Reynon ndpendent of pipe wal directly proportional to B) The cross-section D) All of the above ity for steady laminar C) 3/2 urbulent shear stress i	on factor f is l roughness olds number ll roughness o pipe wall roug of a channel is r flow in circular D) 2 s one-third die v	[] hness [] reduced pipes is [] wall shear	
 18. For laminar flow in a pipe A) directly proportional to Rey B) directly proportional to pip C) inversely proportional to R D) inversely proportional to R D) inversely proportional to R 19. Separation of flow occurs A) The pressure intensity reac C) The boundary layer comes 20. The ratio of average veloc: A) 1/2 B) 2/3 21. The distance from pipe bostress, is A) 1/2 B) 2/3 B) 2/	of circular cross-section ynolds number and inder wall roughness and eynolds number and i eynolds number and control when hes a minimum to rest ity to maximum veloc undary, at which the t	on, the Darcy's friction dependent of pipe wal independent of Reynon ndpendent of pipe wal lirectly proportional to B) The cross-section D) All of the above ity for steady laminar C) 3/2 urbulent shear stress i	on factor f is l roughness olds number ll roughness o pipe wall roug of a channel is 1 flow in circular D) 2 s one-third die v	[] hness [] reduced • pipes is [] vall shear []	
 18. For laminar flow in a pipe A) directly proportional to Rey B) directly proportional to pip C) inversely proportional to R D) inversely proportional to R 19. Separation of flow occurs A) The pressure intensity reac C) The boundary layer comes 20. The ratio of average velocities A) 1/2 B) 2/3 21. The distance from pipe bot stress, is A) 1/2 R B) 2/3 F 	of circular cross-secti ynolds number and in- e wall roughness and eynolds number and i eynolds number and c when hes a minimum to rest ity to maximum veloc undary, at which the t	on, the Darcy's friction dependent of pipe wal independent of Reyno ndpendent of pipe wal lirectly proportional to B) The cross-section D) All of the above ity for steady laminar C) 3/2 urbulent shear stress i C) 3/4R	on factor f is l roughness olds number ll roughness o pipe wall roug of a channel is 1 flow in circular D) 2 s one-third die v D) 1/3 R	[] hness [] reduced pipes is [] vall shear []	
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		QUESTION BA	NK 2019			
25. The maximum thickness of bound	ary layer in a pipe of	radius r is	[]			
A) r B) $r/2$	C) 0	D) 2r	LJ			
26. The boundary layer thickness at a	distance of 1 m from t	he leading edge of a flat pla	te, kept at zero			
angle of incidence to the flow direction is Ω 1 cm. The velocity outside the boundary layer is 25 ml						
sec. The boundary layer thickness at a	distance of 4 m is (A	ssume that boundary layer i	s entirely			
laminar.)			[]			
A) 0.40 cm B) 0.20 cm	C) 0.10 cm	D) 0.05 cm	LJ			
27. For laminar flow in circular pipes.	the Darcy's friction f	actor f is equal to	[]			
A) 16/Re B) 32/ Re	C) 64/ Re	D) none of the abov	e			
28. The kinematic energy correction fa	actor ß for a laminar f	low through a circular pipe	is []			
A) 1.5 B) 2.0	C) 1.67	D) 1.33				
29. An oil of kinematic viscosity 0.25	stokes flows through	a pipe of diameter 10 cm. T	he flow is a			
critical at a velocity of	8	1 1	[]			
A) 7.2m/s B) 5. m/s	C) 0.5m/s	D) 0.72m/s				
30. Which of the following assumption	ns is/are correct to ob	tain an analytical solution fo	or the problem			
on laminar boundary layer of fluid on	flat plate?	2	[]			
A) The fluid is incompressible E	B) The fluid is in stea	dy-state C) The is no	t affected by			
fluid flow I	D) All of the above		-			
31. The momentum correction factor β	for a laminar flow th	rough a circular pipe is	[]			
A) 1.5 B) 2.0	C) 1.67	D) 1.33				
32. The equation of motion for a lamin	har flow of a real fluid	d is	[]			
A) Euler's equation B) Bernoulli's e	equation C) Nav	vier stoke equation D) H	agen equation			
33. In a uniform laminar flow through	a two dimensional pa	assage, the ratio of maximum	n velocity to			
average velocity is			[]			
A) 1.5 B) 2.0	C) 1.67	D) 1.33				
34. The creeping motion obeys stokes	law up to a critical R	eynolds number value of	[]			
A) 0.001 B) 1.0	C) 100	D) 2000				
35. In Laminar flow between two fixed	d parallel plate, the sh	near stress is	[]			
A) Constant across the passage	B) Zer	o all through the passage				
C) Maximum at centre and zero at the	boundary D) Max	ximum at boundary and zero	at the centre			
36. The separation of boundary layer t	akes place		[]			
A) Negative B) Positive	C) Zero	D) Constant				
37. At the point of separation			[]			
A) Velocity is negative B) Shear	r stress is zero	C) Shear stress is maximum	1 D) none			
38. The separation of boundary layer of	occurs when		[]			
A) The flow is accelerated fast bounda	ry B) The bounda	ary layer comes to rest				
C) Any adverse pressure is encountere	d D) The fluid is	ideal				
39. The ratio of coefficient of friction	drag in laminar bound	dary layer compared to that	in turbulent			
boundary layer is proportional to		2				
$A > D^2$ $D > D^5$	$() D_{10}^{1}$	$D = \frac{a}{D_{10}}$				
$A) R_L \qquad B) R_L$	$C) \mathbf{R}_{L}$	$D) R_L$				
	1 1 .	$V^{\frac{1}{7}}$ a call 1	1			
40. If the velocity u in a turbulent boundary layer varies as f , the growth of the boundary layer						
-1 -1 -1		-4	LJ			
A) Re^{5} B) Re^{2}	C R P	5 D R	ρ^{-1}			
x = x $y = x$	C) 110,		°x			

BY-T. BABUSARANAM