MUTHAYAMMAL ENGINEERING COLLEGE
(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu

MECH

Must Know Concepts (MKC)

MKC

2021-22

Subject	**Fluid Mechanics and Machinery**

UNIT-I FLUID PROPERTIES AND FLOW CHARACTERISTICS

S No	**Term**	**Notation (Symbol)**	**Concept/Definition/Meaning/Units/Equation/ Expression**	**Units**
1.	Density	ρ	ρ = Mass/Volume	Kg/m^3
2.	Specific weight	γ	γ = Weight/Volume	N/m^3
3.	specific volume	v	v = Volume/ Weight	m^3/ Kg
4.	Kinematic viscosity	ν	ν = Dynamic viscosity /Density of fluid	Stokes
5.	Compressibility	β	β = Volumetric Strain / Compressive stress	m^2/N
6.	Surface tension	σ	σ = Tensile force acting on the surface of the liquid	N/m
7.	Capillarity	h	Capillarity is defined as a phenomenon of rise or fall of a liquid surface in a small tube relative to the adjacent general level of liquid when the tube is held vertically in the liquid	m
8.	Continuity equation	-	$Q = A_1V_1 = A_2V_2$	-
9.	Relative density of mercury is		13.6	
10.	A Newtonian fluid is defined as the fluid which		Obeys Newton's law of viscosity	
11.	The unit of pressure one bar is		100 kPascal	
12.	The location of the centre of pressure over a surface immersed in a liquid is		will be below the centroid	
13.	The continuity equation is the result of application of the following law to the flow field		Conservation of mass	---
14.	Property of fluid that describes its internal resistance is known as:		Viscosity	---

15.	Which fluid does not experience shearing stress during flow?		Inviscid	---
16.	Stress strain relationship for Newtonian fluid is		Linear	---
17.	Bulk modulus is the ratio of		Compressive stress to volumetric strain	---
18.	The sum of components of shear forces in the direction of flow of fluid is called as		Shear drag, friction drag, skin drag	---
19.	When the angle between surface tension with the liquid (θ) is greater than 90^o, the liquid becomes		Convex upward	---
20.	The fluid will rise in capillary when the capillary is placed in fluid, if		The adhesion force between molecules of fluid and tube is more than the cohesion between liquid molecules	---
21.	Ideal fluid		A fluid which has no viscosity, incompressible, no surface tension	---
22.	Newton's law of viscosity states that		The shear stress applied to the fluid is directly proportional to the velocity gradient	---
23.	The specific weight of the fluid depends upon		Gravitational acceleration, mass density of the fluid	---
24.	Shear stress in static fluid is		Always zero	---
25.	The study of force which produces motion in a fluid is called as		Fluid dynamics	---
UNIT-II FLOW THROUGH CIRCULAR CONDUITS				
26.	If the Reynolds number is less than 2000, the flow in a pipe is		Laminar	---
27.	In pipe flow the critical Reynolds number is about		2000	---
28.	Boundary layer thickness is the distance from the boundary to the point where velocity of the fluid is		Equal to 99% of free stream velocity	---
29.	The friction factor in fluid flowing through pipe depends upon		Reynold's number, Relative roughness of pipe surface	---
30.	Laminar flow	-	Reynolds number is less than 2000- Defined path	---
31.	Turbulent flow	-	Reynolds number is greater than 4000 - zig – zag	---
32.	Compressible flow	-	$\rho \neq$ constant	---
33.	Incompressible flow	-	ρ = constant	---

34.	Major Losses	-	Loss of energy due to friction	---
35.	Minor Losses	-	Loss of energy or head due to change of velocity	---
36.	Darcy-Weisbach equation	-	$h_f = 4flv^2 / 2gd$	---
37.	Friction factor for laminar flow is given by		64 / Re	---
38.	Formula for Euler's equation of motion		$(\partial p / \rho) + (g\, dz) + (v\, dv) = 0$	---
39.	Viscous forces are not present in		Irrotational flow	---
40.	If viscosity of fluid is more, the thickness of boundary layer is		More	---
41.	The effect of free stream velocity on thickness of boundary layer		Increase in free stream velocity decreases the boundary layer thickness	---
42.	The velocity gradients over the boundary layer are		Large	---
43.	The intensity of shear stresses over the boundary layer		Large	---
44.	Formula for loss at the exit of a pipe		$V^2 / 2g$	---
45.	Minor losses do not make any serious effect in		Long pipes	---
46.	Minor losses occur due to		Sudden enlargement, sudden contraction and bends in pipe	---
47.	The head loss through fluid flowing pipe due to friction is		The major loss	---
48.	Coefficient of friction for laminar flow is given as		16 / Re	---
49.	The viscosity of the flowing fluid for laminar flow		Should be as high as possible	---
50.	The flow of fluid will be laminar when		Reynold's number is less than 2000, the density of the fluid is low	---
UNIT-III DIMENSIONAL ANALYSIS				
51.	Reynolds number signifies the ratio of		Inertial forces to viscous forces	---
52.	Square root of the ratio of inertia force to elastic force is called as		Mach's Number	
53.	Dimensionless equation		Reynold's equation, Euler's equation, Weber's equation	---

54.	Dimensional analysis	-	Mathematical technique which makes use of the study of dimensions as an aid to solution of several engineering problems	---
55.	Dimensional homogeneity	-	Dimensions of the terms on its LHS are same as the dimensions of the terms on its RHS.	---
56.	Methods of dimensional analysis	-	Rayleigh method, Buckinghum π method	---
57.	Model	-	Small scale replica of an actual structure	---
58.	Prototype	-	Actual structure or machine is called as its Prototype	---
59.	Dimensions of force		$M L T^{-2}$	---
60.	Quantities has the dimensions [M0 L0 T 0]		Strain	---
61.	The unit of physical quantity which does not depend on the unit of any other physical quantity is called as		Fundamental dimension	---
62.	Euler's dimensionless number relates the following		Pressure force and inertial force	---
63.	When a body floating in a liquid, is displaced slightly, it oscillates about		Metacentre	---
64.	When the Mach number is between _____ the flow is called super-sonic flow.		1 and 6	
65.	A one dimensional flow is one which		Involves zero transverse component of flow	---
66.	Dimensions of surface tension		$ML°T^{-2}$	---
67.	The loss of pressure head in case of laminar flow is proportional to		Velocity	---
68.	Reynolds number is significant in		Full immersion or completely enclosed flow, as with pipes, aircraft wings, nozzles etc.	---
69.	Practical fluids		Possess viscous, surface tension, compressible	---
70.	The flow in a pipe is neither laminar nor turbulent when Reynold number is		Between 2000 and 2800	---
71.	Principle of similitude forms the basis of		Designing models so that the result can be converted to prototypes	---
72.	A fluid is said to be ideal, if it is		Inviscous and incompressible	---
73.	In one dimensional flow, the flow		Takes place in straight line	---
74.	Cavitation is caused by		Low pressure	---

75.	Froude number is significant in		Simultaneous motion through two fluids where there is a surface of discontinuity, gravity forces, and wave making effect, as with ship's hulls	---
UNIT-IV PUMPS				
76.	Centrifugal pump	-	The mechanical energy is converted into pressure energy means of centrifugal force acting on the fluid, the hydraulic machine is called Centrifugal Pump	---
77.	Mechanical Efficiency	η mech	Power at the impeller / Shaft Power	
78.	Priming	-	The operation in which the suction pipe, casing of the pump and a portion of the delivery pipe up to the delivery valve is completely filled up from outside source with the liquid to be raised by the pump before starting the pump	---
79.	Slip	-	Difference between the theoretical discharge (QT) and actual discharge (Qact)	---
80.	Coefficient of discharge	-	Ratio of actual discharge to theoretical discharge	---
81.	The main function of centrifugal pumps are to		Transfer energy	---
82.	Centrifugal pumps are used to transport		Fluid	---
83.	Centrifugal pumps transport fluids by converting		Kinetic energy to hydrodynamic energy	---
84.	The fluid coming into the centrifugal pump is accelerated by		Impeller	---
85.	Pump transfers the mechanical energy of a motor or of an engine into _____ of a fluid.		Pressure energy, kinetic energy or both	---
86.	Rotary displacement pumps are suitable for handling		oils	---
87.	Which of the following is/are example/s of rotary displacement pumps?		Rotary piston pump	---
88.	Pump is also called as velocity pump.		Centrifugal	---
89.	Capacity of the reciprocating pump is _____Discharge that of the centrifugal pump.		lower than	---
90.	For small discharge and high head, which pump is preferred?		Reciprocating type	---
91.	Centrifugal pumps are used to		Fluid	---

	transport			
92.	Centrifugal pumps transport fluids by converting		Kinetic energy to hydrodynamic energy	---
93.	_____ pump is also called as velocity pump		Centrifugal pump	---
94.	In a centrifugal pump, the liquid enters the pump		At the centre	---
95.	In general, the vanes of a centrifugal pump are		Backward-curved	---
96.	Head developed by a centrifugal pump depends on		Speed ,impeller diameter	---
97.	The ratio of the of the actual measured head to the head imparted to the fluid by the impeller is known as		Manometric efficiency	---
98.	If pump NPSH requirements are not satisfied,		It will be cavitated	---
99.	To avoid cavitation in the centrifugal pump		Suction pressure should be high	
100.	Multistage centrifugal pumps are used to obtain		High head	---
UNIT-V TURBINES				
101.	Turbine	-	The machines which use the energy of water and convert it into mechanical energy	---
102.	Jet Ratio	-	Ratio of the pitch diameter (D) of the Pelton wheel to the diameter of the jet (d).	
103.	Radial flow reaction turbine	-	Water flows in the radial direction in the turbine	---
104.	Draft tube	-	Discharges water to tail race safely	---
105.	Efficiencies of a turbine	-	Hydraulic efficiency Mechanical efficiency Volumetric efficiency Overall efficiency	---
106.	Impulse turbine requires		High head and low discharge	---
107.	Which of the following is an impulse turbine?		Pelton turbine	---
108.	Pelton turbine is		Tangential flow	---
109.	Kaplan turbine is		Radial flow	---
110.	Francis turbine is		Mixed flow	---
111.	If the blades of the axial flow turbine are fixed, these are called		Propeller turbine	---

112.	The specific speed of a turbine is		N√P / H^5/4	---
113.	Hydraulic gradient line represents the sum of		pressure head and datum head	
114.	Hydraulic ram is a pump which works		principle of water hammer	---
115.	The Pelton turbine is		Tangential flow impulse turbine	---
116.	Which of the following is an example of impulse turbine		Pelton wheel	---
117.	Gross head is the difference between		head race and tail race	---
118.	The energy of water entering the reaction turbine is		partly the pressure energy and partly the kinetic energy	---
119.	What is the formula for the velocity of water jet at the inlet of turbine		$V = C_v \sqrt{2gH}$	---
120.	Impulse turbine is used for		High head	---
121.	Hydraulic gradient line (H.G.L.) represents the sum of		Pressure head,kinetic head and datum head	---
122.	High specific speed of a pump implies it is		Axial flow pump	---
123.	Low specific speed of a pump implies it is		Centrifugal pump	---
124.	For small discharge at high-pressure following pump is preferred		Reciprocating	---
125.	Indicator diagram of a reciprocating pump is a graph between		Pressure in cylinder vs swept volume	---
PLACEMENT & TRAINING				
126.	Anemometer is used to measure		Velocity	---
127.	The highest point of syphon is called as		Summit	
128.	Kinematic eddy viscosity (ε) is the ratio of		Eddy viscosity (η) to mass density (ρ)	---
129.	Magnitude of eddy viscosity for laminar flow is		Zero	---
130.	Venturimeter consists of short converging conical tube which has a total inclination angle of		21 ± 1o	---

131.	Blood circulation through arteries is		A laminar flow	---
132.	The component of acceleration due to change in the direction of velocity vector is called as		Normal acceleration	---
133.	Which acceleration has a nonzero value in uniform flow?		Local acceleration	---
134.	Inter molecular cohesive force in the fluids is		Less than that of the solids	---
135.	One litre of water occupies a volume of		1000 cm^3	---
136.	In one dimensional flow, the flow		Takes place in straight line	---
137.	Coefficient of contraction is the ratio of		Area of jet at vena contracta to the area of orifice	---
138.	The Reynold's number of a ship is _____ to its velocity and length.		Directly proportional	---
139.	Coefficient of resistance is the ratio of		Loss of head in the orifice to the head of water available at the exit of the orifice	---
140.	In order to measure the flow with a venturimeter, it is installed in		Any direction and in any location	---
141.	In a venturimeter, the velocity of liquid at throat is _____ than at inlet.		Higher	
142.	Example of laminar flow		Under ground flow, Flow past tiny bodies, Flow of oil in measuring instruments	---
143.	The pressure less than atmospheric pressure is known as		Suction pressure, vacuum pressure, negative gauge pressure	---
144.	The maximum efficiency of transmission through a pipe is		66.67%	---
145.	The coefficient of viscosity may be determined by		Capillary tube method, orifice type viscometer, rotating cylinder method	---
146.	The stability of a dam is checked for		Tension at the base, overturning of the wall or dam, sliding of the wall or dam	---
147.	An ideal fluid is		Frictionless and incompressible	---
148.	A manometer is used to measure		High pressure	---
149.	The centre of gravity of the volume of the liquid displaced is called		Centre of buoyancy	---
150.	The pressure measured with the help of a piezometer tube is in		Head of liquid	---