

Program: BE Civil Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester V

Course Code: CEC503 and Course Name: Applied Hydraulics

Time: 1 hour

Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	The ratio of section factor and hydraulic depth in a trapezoidal section is $324/25$ , calculate the top width if the total wetted area of the channel is $24\text{m}^2$ .
Option A:	4m
Option B:	5m
Option C:	6m
Option D:	7m
Q2.	When $S_o > 0$ and $Y_n < Y_c$ , it is called as:
Option A:	Adverse
Option B:	Horizontal
Option C:	Critical
Option D:	Steep
Q3.	The angle made by resultant force with horizontal direction is given by,
Option A:	$\text{Sin}\theta = F_x/F_y$
Option B:	$\text{Cos}\theta = F_x/F_y$
Option C:	$\text{tan}\theta = F_x/F_y$
Option D:	$\text{tan}\theta = F_y/F_x$
Q4.	Guide blade angle is :

Option A:	Angle made by absolute velocity at inlet with tangential direction of motion of vane
Option B:	Angle made by relative velocity at inlet with tangential direction of motion of vane
Option C:	Angle made by absolute velocity at outlet with tangential direction of motion of vane
Option D:	Angle made by relative velocity at outlet with tangential direction of motion of vane
Q5.	A 300 mm diameter pipe carries water under head of 10 m with velocity of 3.5m/s if axis of pipe turns through 45°, find magnitude of force in horizontal direction
Option A:	1040.44 N
Option B:	2056.25 N
Option C:	1279 N
Option D:	1463.25 N
Q6.	Let the top width of a rectangular channel be B and the depth be y, determine the hydraulic radius of the channel.
Option A:	$\frac{By}{B+2y}$
Option B:	$\frac{By}{B+y}$
Option C:	y
Option D:	By
Q7.	If a centrifugal pump has manometric head of 50m, rotational speed of 1000r.p.m, and discharge of 0.20m <sup>3</sup> /s then specific speed of the pump is given by
Option A:	22
Option B:	24
Option C:	23.787

Option D:	25
Q8.	The component of a Centrifugal pump Which convert mechanical energy into hydraulic energy
Option A:	Impeller
Option B:	Casing
Option C:	Runner
Option D:	pipes
Q9.	A pipe of 300 mm diameter conveying $0.5 \text{ m}^3/\text{s}$ of water has a right angled bend in a horizontal plane. Find the vertical force exerted on bend if the pressure at inlet and outlet bend are $24.525 \text{ N/cm}^2$ and $23.544 \text{ N/cm}^2$
Option A:	3538.66 N
Option B:	6593.37 N
Option C:	4659.37 N
Option D:	2365.37 N
Q10.	What is the depth of buckets of Pelton wheel ?
Option A:	1.2 times diameter of jet
Option B:	1.3 times diameter of jet
Option C:	1.4 times diameter of jet
Option D:	1.5 times diameter of jet
Q11.	Consider steady laminar incompressible viscous flow through a straight circular pipe of constant cross – sectional area at a Reynolds number of 5. The ratio of inertia force to viscous force on a fluid particle is
Option A:	5

Option B:	1/5
Option C:	0
Option D:	$\infty$
Q12.	The volumetric efficiency of a Francis turbine is given to be 90%. If the volume flow rate through the turbine is 25 m <sup>3</sup> /s. What is the flow rate of water over the runner blades (in m <sup>3</sup> /s)?
Option A:	20
Option B:	25
Option C:	22.5
Option D:	21.5
Q13.	Dimension of Torque is given by:
Option A:	$[M L^2 T^{-3}]$
Option B:	$[M L T^{-1}]$
Option C:	$[M L^{-2} T^{-2}]$
Option D:	$[M L^2 T^{-2}]$
Q14.	Among the following which turbine has least efficiency?
Option A:	Pelton turbine
Option B:	Kaplan turbine
Option C:	Francis turbine
Option D:	Propeller turbine
Q15.	The pipe of large diameter which carries water from reservoir to the turbines is called as:
Option A:	Head stock
Option B:	Tail race
Option C:	Tail stock

Option D:	Pen stock
Q16.	The discharge Q, through a small orifice of diameter D under a head H depends upon the density $\rho$ of the liquid and its viscosity $\mu$ and the acceleration due to gravity g. In this phenomenon as per dimensional analysis one of the $\Pi(\pi)$ term is:
Option A:	$\frac{H}{D}$
Option B:	$\frac{HQ}{D\rho}$
Option C:	$HD$
Option D:	$HDQ$
Q17.	What is the purpose of a Draft tube?
Option A:	To prevent flow separation
Option B:	To avoid Pressure drag
Option C:	To prevent rejection of heat
Option D:	To increase efficiency
Q18.	The phenomenon involving free surface flows such as flow over spillways, weirs, sluices, channels etc are analyzed using which model law
Option A:	Froude's Model Law
Option B:	Euler's Model Law
Option C:	Reynold's Model Law
Option D:	Mach's Model Law
Q19.	Which among the following velocities cannot be found using the velocity triangle?
Option A:	Tangential
Option B:	Whirl

Option C:	Relative
Option D:	Parabolic
Q20.	Tangential flow, axial flow, radial flow turbines are classified based on?
Option A:	Type of energy at inlet
Option B:	Direction of flow through runner
Option C:	Head at inlet of turbine
Option D:	Specific speed of turbine
Q21.	Dimension of Dynamic Viscosity is given by:
Option A:	$[M L^{-1} T^{-1}]$
Option B:	$[M L T^{-1}]$
Option C:	$[M L^{-1} T^{-2}]$
Option D:	$[M L^2 T^{-2}]$
Q22.	The force exerted by the jet on the plate in the direction normal to the plate can be expressed as
Option A:	$F_n = \rho a V^2 \sin\theta$
Option B:	$F_n = \rho a V^2 \sin\theta \cos\theta$
Option C:	$F_n = \rho a V^2 \cos\theta$
Option D:	$F_n = \rho a V \sin\theta$
Q23.	The condition for maximum efficiency when a jet of water strikes series of vanes would be
Option A:	$V = u/2$
Option B:	$u = V/2$
Option C:	$V = 1/3 U$
Option D:	$u = 2.5 V$

Q24.	A jet of water of diameter 50 mm, having a velocity of 20 m/s strikes a curved vane which is moving with a velocity of 10 m/s in the direction of the jet. The jet leaves the vane at an angle of 50° to the direction of motion of vane at outlet. The velocity of whirl at the out $V_{w2}$ is
Option A:	4.57 m/s
Option B:	3.57 m/s
Option C:	3 m/s
Option D:	2.5 m/s
Q25.	The relative velocity is achieved by the equation
Option A:	$u - V_1$
Option B:	$V_1 - u$
Option C:	$u * V_1$
Option D:	$u / V_1$

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Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	D
Q2.	D
Q3.	D
Q4	A
Q5	B
Q6	A
Q7	C
Q8.	C
Q9.	A
Q10.	A
Q11.	A
Q12.	C
Q13.	D
Q14.	A
Q15.	D
Q16.	A
Q17.	A



Q18.	A
Q19.	D
Q20.	B
Q21.	A
Q22.	A
Q23.	B
Q24.	B
Q25.	B