

## INTERNATIONAL CENTRE FOR APPLIED SCIENCES MAHE, MANIPAL B.Sc. (Applied Sciences) in Engg. End – Semester Theory Examinations – Nov./ Dec. 2020 III SEMESTER - FLUID MECHANICS (ICE 232) (Branch: Civil)

Time:	: 3 Hours Date: 23 November 2020	Max. N	/Iarks:50
$\checkmark$	Answer ALL the questions. Missing data, if any, may be suitably assumed		
1A.	An oil of viscosity 5poise is used for lubrication between a shaft and sleeve. The diameter of shaft is 0.5m and it rotates at 200rpm. Calculate the power lost in the oil for a sleeve length of 100mm. The thickness of the oil film is 1.0mm		
1 <b>B</b> .	The velocity distribution for flow over a flat pla $u = \frac{3}{2}y - y^{\frac{3}{2}}$ , where u is the point velocity in metre per second metre above the plate. Determine the shear stress at y = 9cm. viscosity as	te is given by ond at a distance y Assume dynamic 8poise	<b>3marks</b>
1C.	Define specific weight and surface tension. Determine the bulk modulus of elasticity of a fluid which is compressed in a cylinder from a volume of 0.009m <sup>3</sup> at 70 N/cm <sup>2</sup> pressure to a volume of 0.0085m <sup>3</sup> at 270N/cm <sup>2</sup> pressure.		
2A.	The rate of flow of water pumped into a pipe ABC, which is 200m long is 20litres/s. The pipe is laid on an upward slope of 1 in 40. The length of the portion AB is 100m and its diameter is 100mm, while the length of the portion BC is also 100m but its diameter is 200mm. The change of diameter at B is sudden. The flow is taking place from A to C, where the pressure at A is 19.62N/cm2 and end C is connected to a tank. Find the pressure at C and draw the hydraulic gradient and total energy line. Take f= 0.008.		
2 <b>B</b> .	A syphon of diameter 200mm connects two reservoirs having a difference in elevation of 20m. The length of the syphon is 500m and the summit is 3m above the water level in the upper reservoir. The length of the pipe from upper reservoir to the summit is 100m. Determine the discharge through the syphon and also pressure at the summit. Neglect minor losses. The coefficient of friction is 0.005		5marks
3A.	What is the significance of velocity of approach in open c specific energy for a 5m wide rectangular channel is to be 4 of flow of water through the channel is 20m <sup>3</sup> /s, determine the	hannel flow? The 4Nm/N. If the rate he alternate depths	e 5marks
3B.	For a trapezoidal channel with bottom width 40m and si Manning's N is 0.015 and bottom slope is 0.0002. If	de slopes 2H:1V it carries 60m <sup>3</sup> /s	, <b>5marks</b>

discharge, determine the normal depth.

4A.	What is the speciality of Cipolletti notch? A Cipolletti weir of crest length 50cm discharges water. The head of water over the weir is 350mm. Find the discharge over the weir if the channel is 80cm wide and 50cm deep. Take $C_d = 0.65$	5marks
<b>4B.</b>	Derive a relation between Reynold's number and friction factor.	5marks
5A.	Explain the losses happening in pipe flow also draw the velocity and shear stress distribution.	5marks
5R	The head of water over an orifice of diameter 100mm is 5m. The water	5marks

5B. The head of water over an orifice of diameter 100mm is 5m. The water 5marks coming out from orifice is collected in a circular tank of diameter 2m. the rise of water level in circular tank is 0.45m in 30seconds. Also the co-ordinates of a certain point on the jet, measured from vena- contracta are 100cm horizontal and 5.2cm vertical. Find out the different hydraulic co-efficient.

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