Program: Instrumentation Engineering
Curriculum Scheme: Rev2019-C
Examination: SE Semester IV
Course Code: ISC402 and Course Name: Transducers-II

Time: 2 hour Max. Marks: 80

==========

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Any change in the resistance of strain gauge due to temperature variation is compensated by _____which are connected in limbs adjacent to those containing _____.
Option A:	Active gauges, dummy gauges
Option B:	Active gauges, Active gauges only
Option C:	Dummy gauges, Active gauge
Option D:	Dummy gauges, Dummy gauges only
2.	The ratio of fractional change in resistance to mechanical strain is called _____
Option A:	Bulk modulus
Option B:	Strain Rosette
Option C:	Gauge factor
Option D:	Temperature Gradient
3.	A pressure reading below the atmospheric pressure is known as _____ pressure
Option A:	Vacuum
Option B:	Rarefaction
Option C:	Negative
Option D:	Gauge pressure
4.	In McLeod gauge, the gas should obey
Option A:	Newton's law
Option B:	Boyle's law
Option C:	Charles' law
Option D:	Gay-Lussac's law
5.	Which of the following type of bourdon tube shape has a small tip travel & necessitates amplification?
Option A:	C-type
Option B:	Spiral
Option C:	Helical shaped
Option D:	Straight
6.	Which of the following characteristics is not desired in manometric liquid
Option A:	High viscosity
Option B:	Low viscosity
Option C:	Low vapour pressure

Option D:	Negligible surface tension
7.	Pirani gauge produces small changes in_____, which is sensed by means of Wheatstone bridge circuit.
Option A:	Resistance
Option B:	Ionization current
Option C:	Thermal conductivity
Option D:	E. M. F
8.	Which flow meter is used for measuring the flow rate in an open channel?
Option A:	Orifice meter
Option B:	Ultrasonic flow meter
Option C:	Weir
Option D:	Rotameter
9.	The discharge over a V-notch is proportional to
Option A:	$H^{3/2}$
Option B:	$H^{5/2}$
Option C:	$H^{1/2}$
Option D:	$H^{-3/2}$
10.	Bernoulli's equation is applicable only for _____
Option A:	Irrotational flow
Option B:	Viscous flow
Option C:	Inviscid, incompressible flow
Option D:	Compressible flow
11.	Electromagnetic flow meters can be used for measuring the flow of
Option A:	Non-conducting fluids
Option B:	Fluids having some minimum electrical conductivity
Option C:	Gases
Option D:	Fluids which contain no solid matter
12.	Which of the following are used for clean fluids only
Option A:	Turbine flow meter
Option B:	Hot wire anemometer
Option C:	Ultrasonic flow meter
Option D:	Laser Doppler Anemometer
13.	Conveyor-based methods is used for the measurement of the flow of
Option A:	Solids
Option B:	Liquid
Option C:	Gas
Option D:	Semi solid
14.	The head loss of an orifice meter is
Option A:	Less than that of the venturi meter
Option B:	Less than that of the nozzle flow meter
Option C:	Greater than that of the venturi meter
Option D:	Equal to that of the nozzle flow meter

15.	Rotameter is a
Option A:	Drag force flow meter
Option B:	Variable area flow meter
Option C:	Variable head flow meter
Option D:	Rotating propeller type flow meter
16.	The reference electrode in pH measurements is
Option A:	Glass electrode
Option B:	Hydrogen electrode
Option C:	Antimony electrode
Option D:	Hg-calomel electrode
17.	Conductivity is defined as
Option A:	The ability of a substance to repel electric current.
Option B:	The ability of a substance to conduct electric current, which is the same as resistivity.
Option C:	The ability of a substance to conduct electric current, which is the reciprocal of resistivity.
Option D:	The ability of a substance to conduct variable resistance.
18.	_____ is used for measuring torque in rotating parts in machines.
Option A:	Accelerometer
Option B:	Dynamometer
Option C:	Tachometer
Option D:	Interferometer
19.	The instrument which is unsuitable for continuous viscosity measurements is
Option A:	Variable area viscometer
Option B:	Rotating cylinder viscometer
Option C:	Efflux type viscometer
Option D:	Capillary tube viscometer
20.	What is the density of a substance that has a mass of 55.4 g and a volume of 10 cm^3?
Option A:	554 g/cm^3
Option B:	0.554 g/cm^3
Option C:	5 kg/l
Option D:	5.54 g/cm^3

Q2 **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i.	Derive expression for gauge factor of strain gauge.
ii.	Define gauge pressure, vacuum and absolute pressure.
iii.	State and derive Bernoulli's equation.
B	**Solve any One** **10 marks each**
i.	Explain with diagram Variable Area type flowmeter.

ii.	List various techniques of viscosity measurement and explain any two in detail.

Q3 **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i.	Explain calibration procedure of pressure gauges using dead Weight Tester.
ii.	Explain the types of fluid flow.
iii.	Explain the principle of hydrometer.
B	**Solve any One** **10 marks each**
i.	Explain Turbine type flow meter with neat sketch.
ii.	Explain conductivity measurement scheme using suitable diagram. Also explain details about electrodes.