Program: BE Biotechnology Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester VI

Course Code: BTC605 and Course Name: Process Control and Instrumentation

Time: 1 hour   Max. Marks: 50

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

Q1.	Phase lag of the frequency response of a second order system to a sinusoidal forcing function_____
Option A:	Is 30°
Option B:	Is 90° at the most
Option C:	Approaches 180° asymptotically
Option D:	Is 120°
Q2.	_____ temperature scale assigns 0° to the 'ice point' and 80° to the 'steam point'.
Option A:	Celsius
Option B:	Rankine
Option C:	Reumur
Option D:	Farenhite
Q3.	Operating range of a temperature measuring instrument is 800 to 1600°C. It could be a/an _____ pyrometer.
Option A:	Radiation
Option B:	Optical
Option C:	Photoelectric
Option D:	Piezoelectric
Q4.	Normal mercury thermometer can be used to measure a temperature of about 300°C. However, its maximum temperature measurement range can be increased up to about 500°C by _____.
Option A:	Filling nitrogen under pressure in the stem
Option B:	Increasing the diameter of the tube
Option C:	Using steel tube in place of glass tube
Option D:	Accounting for the tube expansion
Q5.	An emf of the order of mV is generated when two solutions of different hydrogen ion concentration are separated by a thin glass wall. This is the working principle of a _____
Option A:	pH Meter
Option B:	Polarimeter
Option C:	Chromatograph

Option D:	Polarograph
Q6.	The open loop transfer function of a control system is KR/(1 + TS) . This represents _____
Option A:	A first order system
Option B:	Dead time system
Option C:	A first order time lag
Option D:	A second order system
Q7.	A negative gain margin expressed in decibels means a/an _____ system.
Option A:	Stable
Option B:	Unstable
Option C:	Critically damped
Option D:	Undamped
Q8.	Pressure of 0.0001 absolute psi can be measured by _____ gauge.
Option A:	Mcleod
Option B:	Pirani
Option C:	Thermocouple
Option D:	Thermometer
Q9.	Humidity of air can be determined by a _____.
Option A:	Chromatograph
Option B:	Sling psychrometer
Option C:	Mass spectrometer
Option D:	Polarimeter
Q10.	A control system is unstable, if the open loop frequency response exhibits an amplitude ratio exceeding unity at the crossover frequency. This is _____ criterion.
Option A:	Root
Option B:	Nyquist
Option C:	Routh stability
Option D:	Bode stability
Q11.	Thermal conductivity measurement is used for the determination of_____
Option A:	O_2 percentage in the flue gas
Option B:	Specific gravity of Petro fuels
Option C:	Composition of an alloy
Option D:	CO_2 percentage in the flue gas
Q12.	A proportional controller with a gain of Kc is used to control a first order process. The offset will increase, if _____.
Option A:	Kc is reduced
Option B:	Kc is increased

Option C:	Integral control action is introduced
Option D:	Derivative control action is introduced
Q13.	Flow rate through an orifice is _____ the pressure differential.
Option A:	Proportional to
Option B:	Inversely proportional to the square root of
Option C:	Proportional to the square root of
Option D:	Inversely proportional to the square of
Q14.	Which of the following is the dynamic characteristics of an instrument?
Option A:	Reproducibility
Option B:	Sensitivity
Option C:	Dead zone
Option D:	Fidelity
Q15.	0n-off control which is a special case of proportional control, has a band width of about _____ percent.
Option A:	100
Option B:	75
Option C:	25
Option D:	0
Q16.	Phase margin is equal to _____.
Option A:	180° − phase lag
Option B:	phase lag + 90°
Option C:	phase lag + 180°
Option D:	phase lag − 180°
Q17.	The Offset _____.
Option A:	varies with time.
Option B:	varies exponentially with time.
Option C:	does not vary with time.
Option D:	varies as square of the time
Q18.	A non-linear system will have _____ steady state values.
Option A:	One
Option B:	More than one
Option C:	Two
Option D:	Three
Q19.	Characteristic equation is the denominator of _____ loop transfer function.
Option A:	Open
Option B:	Closed
Option C:	Partially Open
Option D:	Unknown

Q20.	In a single tank system, the transfer function of _____ to inlet flow rate is 1/TS+1.
Option A:	Outlet flow rate
Option B:	Level
Option C:	Inlet Flow Rate
Option D:	Storage Capacity of tank
Q21.	Which of the following controllers has the least maximum deviation?
Option A:	P-controller
Option B:	P-I controller
Option C:	P-I-D controller
Option D:	P-D controller
Q22.	Helium gas constant volume thermometer is suitable for the measurement of a temperature of _____ °C.
Option A:	< 100
Option B:	< 0
Option C:	> 0
Option D:	> 800
Q23.	Thermal well made of _____ gives the fastest speed of response, while measuring temperature by thermocouples.
Option A:	Steel
Option B:	Vycor (a glass)
Option C:	Nichrome
Option D:	Inconel
Q24.	Select the correct statement from the following.
Option A:	The frequency response of a pure capacity process is unbounded
Option B:	The phase lag of a pure time delay system decreases with increasing frequency
Option C:	The amplitude ratio of a pure capacity process is inversely proportional to frequency
Option D:	The amplitude ratio of a pure time delay system increases with frequency
Q25.	Pressure of 0.01 psi (absolute) can be measured by _____ gauge.
Option A:	Ionisation
Option B:	Pirani
Option C:	Mcleod
Option D:	Manometer