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.	Which of the following is not classified as a thermo electric pyrometer?
Option A:	Resistance thermometer
Option B:	Thermocouple
Option C:	Optical pyrometer (disappearing filament type)
Option D:	Radiation pyrometer
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.	Response of a linear control system for a change in set point is called
Option A:	Frequency response
Option B:	Transient response
Option C:	Servo problem
Option D:	Regulator problem
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.	Resistance of a gas in a vessel is given by (where, P = pressure, V = volume of the vessel, n = no. of moles of the gas, R = gas constant) is _____.
Option A:	V/nRT
Option B:	nRT/V
Option C:	nRT/P
Option D:	p/nRT
Q6.	Which of the following judges the accuracy of an instrument?

Option A:	Dead zone
Option B:	Drift
Option C:	Dynamic Error
Option D:	Static error
Q7.	The term analogous to voltage in a single tank system is the
Option A:	Flow rate
Option B:	Level of liquid
Option C:	Heat content of the system
Option D:	Liquid volume in the tank
Q8.	Mercury manometer (U-tube type) exemplifies a _____ order system.
Option A:	Zero
Option B:	First
Option C:	Second
Option D:	Third
Q9.	Which of the following flow-metering instruments is an area meter?
Option A:	Venturimeter
Option B:	Rotameter
Option C:	Pitot tube
Option D:	Hot wire anemometer
Q10.	The transfer function of a first order system is _____.
Option A:	1/(Ts + 1)
Option B:	1/Ts
Option C:	S/(Ts + 1)
Option D:	2S/(Ts + 1)
Q11.	The time constant of a first order process with resistance R and capacitance C is _____
Option A:	R + C
Option B:	R - C
Option C:	1/RC
Option D:	RC
Q12.	A first order system with unity gain and time constant τ is subjected to a sinusoidal input of frequency w = 1/τ. The amplitude ratio for this system is _____.
Option A:	1
Option B:	1/√2
Option C:	0.25
Option D:	0.5
Q13.	The Laplace transform of exp(at), where a > 0, is defined only for the Laplace parameter, s > a since _____.

Option A:	The function is exponential
Option B:	The Laplace transform of integral of exp(at) has finite values only for s > a
Option C:	The Laplace transform integral of exp(at) has initial values only for s > a
Option D:	The function exp(at) is piece-wise continuous only for s > a
Q14.	A stable system is the one _____.
Option A:	for which the output response is bounded for all bounded input
Option B:	which exhibits an unbounded response to a bounded input
Option C:	which satisfies the conditions for a servo problem
Option D:	which does not satisfy the conditions for a servo problem
Q15.	Typical specifications for design stipulate the gain margin and phase margin to be respectively
Option A:	> 1.7 and > 30°
Option B:	< 1.7 and > 30°
Option C:	< 1.7 and < 30°
Option D:	> 1.7 and < 30°
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