Program: SE Electronics and Telecommunication

Engineering Curriculum Scheme: Revised 2016

(Choice Based) Examination: Second Year Semester

III

Course Code: **ECC305** and Course Name: **Electronic Instrumentation and Controls**

Time: **1 hour** Max. Marks: **50**

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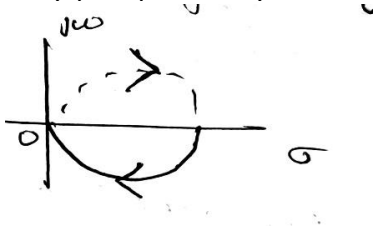
Note to the students:- All Questions are compulsory and carry equal marks .

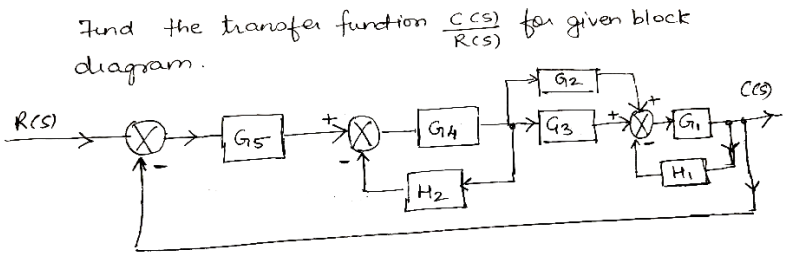
Q1.	Comment on the stability of the system with characteristic Equation Given as : $S^5 + 2S^4 + 3S^3 + 6S^2 + 2S + 1 = 0$
Option A:	Unstable
Option B:	Stable
Option C:	Marginally Stable
Option D:	Conditionally Stable
Q2.	For Unity feedback System G(S) = 20 / S(S+2)(S^2 + 2S +20) find steady state error constants K_p, K_v and K_a
Option A:	K_p = 0, K_v = 1 and K_a = infinity
Option B:	K_p = infinity, K_v = 0.5 and K_a = 0
Option C:	K_p = 0, K_v = 0 and K_a = infinity
Option D:	K_p = 0, K_v = 1 and K_a = 1
Q3.	Transducer preferred for high temperature measurement is
Option A:	Thermistor
Option B:	RTD
Option C:	Thermocouple
Option D:	LVDT
Q4.	Which Bridge is preferred for coils with high Quality factor Q
Option A:	Maxwell's
Option B:	Hay's
Option C:	Schering's
Option D:	Kelvin's

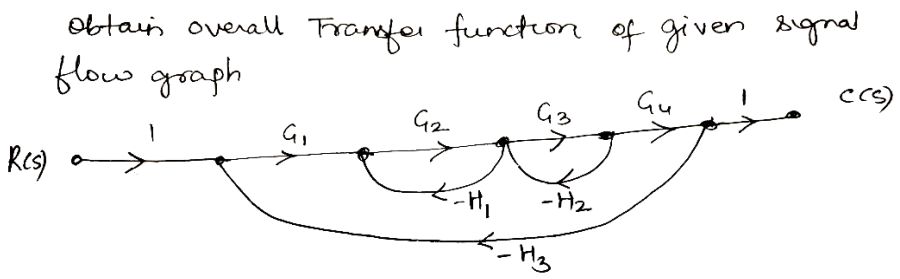
Q5.	Maxwell's bridge is used to measure inductive impedance. The Bridge constants at balance are: C_1 = 0.01 microfarads, R_1 = 470 Kohms, R_2 = 5.1 Kohms, R_3 = 100 Kohms. Find R_x and L_x
Option A:	$R_x = 1.09$ Kohms and $L_x = 5.1$ H
Option B:	$R_x = 2.09$ Kohms and $L_x = 5.1$ H
Option C:	$R_x = 1.09$ Kohms and $L_x = 6.1$ H
Option D:	$R_x = 1.09$ Kohms and $L_x = 2.1$ H
Q6.	Which of these Transducers can be used as a secondary transducer
Option A:	RTD
Option B:	Thermocouple
Option C:	LVDT
Option D:	Thermistor
Q7.	A strain gauges which has high gauge factor is
Option A:	Foil type
Option B:	Wire Type
Option C:	Semiconductor
Option D:	Bonded Strain Gauge
Q8.	A second order System is given by C(S) / R(S) = 25 / S^2 + 6S + 25. Find Rise time and peak time.
Option A:	T_r = 0.22 Sec, T_p = 0.45 Sec
Option B:	T_r = 0.5535Sec, T_p = 0.785 Sec
Option C:	T_r = 0.32 Sec, T_p = 0.45 Sec
Option D:	T_r = 0.42 Sec, T_p = 0.85 Sec
Q9.	Find centroid and breakaway point for root locus of system with G(S) H(S) = K / S(S+4)(S^2 + 4S + 20)
Option A:	Centroid = -2 and Breakaway -2 ± j 2.45
Option B:	Centroid = -2.5 and Breakaway -3 ± j 2.45
Option C:	Centroid = -2.5 and Breakaway -2 ± j 3.45
Option D:	Centroid = -1.5 and Breakaway -1 ± j 2.45

Q10.	Find angle of departure for root locus with open loop transfer function $G(S)H(S) = K / S (S+3) (S^2 + 2S + 2)$
Option A:	$\Phi_d = \pm 62.5^o$
Option B:	$\Phi_d = \pm 71.56^o$
Option C:	$\Phi_d = \pm 22.5^o$
Option D:	$\Phi_d = \pm 82.3^o$
Q11.	For open loop transfer function $G(S) H(S) = K / S (S^2 + 2S + 4)$. Find the range of value of K for which system is stable
Option A:	$0 < K < 10$
Option B:	$0 < K < 14$
Option C:	$0 < K < 8$
Option D:	$0 < K < 5$
Q12.	The transfer function of lead network is
Option A:	$TF = \frac{S\,R1\,R2\,C + R2}{R1 + R2 + S\,R1\,R2\,C}$
Option B:	$TF = \frac{S\,R1\,R2\,C}{R1 + R2 + S\,R1\,R2\,C}$
Option C:	$TF = \frac{S\,R1\,R2\,C + R2}{R1 + S\,R1\,R2\,C}$
Option D:	$TF = \frac{R2}{R1 + R2 + S\,R1\,R2\,C}$
Q13.	Find steady state error e_{ss} for step input, for given system $G(S) H(S) = 20 / (S+2)(S+3)$
Option A:	$e_{ss} = 0.34$
Option B:	$e_{ss} = 0.2307$
Option C:	$e_{ss} = 0.673$
Option D:	$e_{ss} = 0.42069$
Q14.	The minimum value of input parameter that has to be reached for instrument to respond is known as
Option A:	Resolution
Option B:	Threshold
Option C:	Sensitivity
Option D:	Reliability

Q15.	For given System G(S) H(S) = 20 / s (1+0.1S) (1+0.25S), The corner frequencies for the bode plot are
Option A:	$\omega_1 = 0.1, \omega_2 = 0.25$
Option B:	$\omega_1 = 10, \omega_2 = 4$
Option C:	$\omega_1 = 20, \omega_2 = 4$
Option D:	$\omega_1 = 0, \omega_2 = 0.25$
Q16.	In Nyquist stability criterion a system is stable when
Option A:	P = 0
Option B:	P = Z
Option C:	Z = 0
Option D:	N = P - Z
Q17.	The phase lag that can be introduced in the system till it reaches on the verge of instability is called
Option A:	Phase margin
Option B:	Phase Crossover Frequency
Option C:	Gain margin
Option D:	Phase error
Q18.	If Nyquist plot for system with open loop transfer function is  Then the open loop transfer function G(S) H(S) is
Option A:	K / (S+a)
Option B:	K / S(S+a)
Option C:	K / S^2 (S+a)
OptionD:	K / S^3 (S+a)

Q19.	According to principle of Argument in Nyquist Plot
Option A:	N = P – 2Z
Option B:	N = P – Z
Option C:	N = P + 2Z
Option D:	N = 2P

Q20.	In Q Meter the Inductance of the coil can be calculated from known values of coil frequency and resonating capacitor C using formula
Option A:	f = $\frac{1}{2\,\pi\,LC}$
Option B:	f = $\frac{1}{2\,\pi\,\sqrt{LC}}$
Option C:	f = $\frac{1}{\sqrt{LC}}$
Option D:	f = $\frac{1}{2\,\pi\,(LC)^2}$
Q21.	The degree of closeness of a measurement compared to expected (desired) value is defined as
Option A:	Precision
Option B:	Resolution
Option C:	Accuracy
Option D:	Sensitivity
Q22.	
Option A:	$\frac{G1\;G4\;G5\;(G2+G3)}{(1+G1\;H1)(1+G4\;H2)+G1\;G4\;G5(G2+G3)}$
Option B:	$\frac{G4\;G5\;(G2+G3)}{(1+G1\;H1)(1+G4\;H2)+G1\;G4\;G5(G2+G3)}$
Option C:	$\frac{G1\;G4\;G5\;(G2+G3)}{(1+G1\;H1)(1+G4\;H2)+G1\;G5(G2+G3)}$
Option D:	$\frac{G1\;G4\;G5}{(1+G1\;H1)(1+G4\;H2)+G1\;G4\;G5(G2+G3)}$

Q23.	
Option A:	$\frac{G1\ G2\ G3}{1 + G2\ H1 + G3\ H1 + G1\ G2\ G3\ G4\ H3}$
Option B:	$\frac{G1\ G2\ G3\ G4}{1 + G3\ H1 + G1\ G2\ G3\ G4\ H3}$
Option C:	$\frac{G1\ G2\ G3\ G4}{1 + G2\ H1 + G3\ H1 + G1\ G2\ G3\ H3}$
Option D:	$\frac{G1\ G2\ G3\ G4}{1 + G2\ H1 + G3\ H1 + G1\ G2\ G3\ G4\ H3}$
Q24.	If peak overshoot M_p is 12 % and peak time T_p = 0.2 seconds. Find resonant peak M_r and resonant frequency ω_r
Option A:	M_r = 1.0783 and $\omega_r = 11.36$ rads/sec
Option B:	M_r = 1.0783 and $\omega_r = 11.5912$ rads/sec
Option C:	M_r = 3.066 and $\omega_r = 12.36$ rads/sec
Option D:	M_r = 2.566 and $\omega_r = 13.36$ rads/sec
Q25.	Transducer which require external energy source for their working are known as
Option A:	Active Transducer
Option B:	Passive Transducer
Option C:	Piezoelectric Transducer
Option D:	Thermoelectric Transducer