BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI (RAJASTHAN)
First Semester 2008-2009

AAOC C321 Control Systems
Quiz (Closed Book)

B

Date 20.11.2008 **Total Time: 50 min** **Max Marks: 40**

NOTE: Questions 1 to 8 of are 1 mark each and Questions 9 to 24 are of 2 marks each.

Name: **ID No:** **Sec. No.**

Q.1 "Pointing finger towards an object" is an example of a _____loop control system.

Q.2 System described by equation $\frac{d^2y(t)}{dt^2} + a_1^2 t\frac{dy(t)}{dt} + a_2 y(t) = u(t)$, where y is input and u is output is a _____system (Non linear/linear and Time variant/invariant).

Q.3 The _____system become sluggish at low temperatures (electrical/hydraulic).

Q.4 The_____system essentially requires the return lines (hydraulic/pneumatic).

Q.5 For a second order under damped system, the radial distance between a pole and the origin gives _____frequency of oscillation.

Q.6 Open loop transfer function of unity feedback control system is given by $G(S)=\frac{K}{s(s+1)}$ If the gain is increased to infinity, the damping ratio will tend to become_____.

Q.7 As compared to derivative error controller, the Integral error controller is used to meet the _____ accuracy requirements.

Q.8 The corner frequencies of $G(s)=\frac{(s+1)}{s(1+0.5s)}$ are _____.

Q.9 The addition of only a zero in the closed loop transfer function results in _____rise time and _____damping.

Q.10 For a unity negative feedback system, forward path gain is $\frac{30K}{s(s+5)}$. The magnitude of sensitivity S_K^T of the system, in case of open loop and closed loop to changes in K, (K = 0.2) at ω= 0.5 rad/s is _____and _____respectively.

Q.11 A 4-stack stepper motor has 45 numbers of teeth, assuming that stack rotor teeth aligns with its stator, the angular displacement between stacks of stator teeth is_____.

Q.12 The output of a system with transfer function $\frac{5}{(s+2)}$ for an input e^{-t} in time domain is _____.

Q.13 The open loop poles of a unity negative feedback control system are at 0 and -1, when there is an increase of 22.5% in its natural frequency, the steady state error to unit ramp input is decreased effectively by _____.

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Q.14 The two phase servo motor develops a torque in accordance with the equation $T_m = K_1V_c - K_2\omega_m$ and its torque-speed characteristic is shown in Fig Q.14. The values of K_1 and K_2 are _____and _____respectively

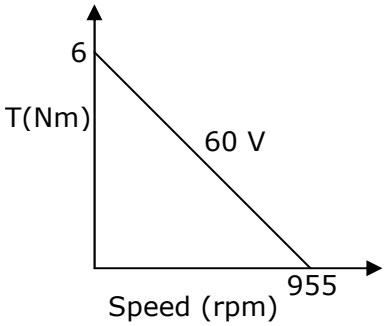


Fig. Q. 14

Q.15 The open loop transfer function of system 1 and system 2 are $K/(s+6)^4$ and $K/(s+6)^5$ respectively. System_____ is stable for more range of K.

Q.16 The signal flow graph of a system is shown in figure Q.16, transfer function C(s)/R(s) of the system is _____.

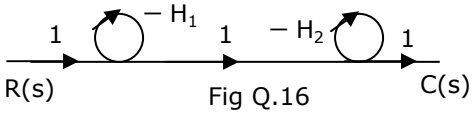


Fig Q.16

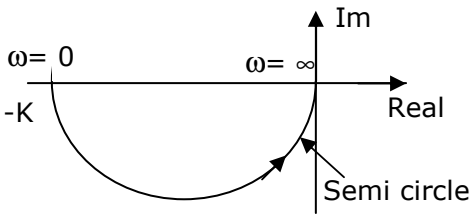
Q.17 The open loop transfer function of a unity negative feedback system is K/s^2. Root locus of the system will lie on _____.

Q.18 Open loop transfer function of a system is K/(s+4). Time constant of the system in case of open loop and closed loop is _____sec. and _____sec. respectively for K =2.

Q.19 Control winding and reference windings of ac servomotor are displaced by _____in phase and by _____ in space.

Q.20 The open loop transfer function of a system is $\frac{(s-3)}{(s+1)(s+3)}$. The gain margin and phase margin of the system is_____db and _____degree respectively.

Q.21 Polar plot of G(jω) is shown in Fig Q.21. The Transfer function G(s) is_____.



∠G (jω) at ω= 4 is 225°

Fig Q.21

Q.22 The polar plot of $1/[s^2(s+1)(1+2s)]$ will lie in _____ quadrant(s) and crosses imaginary axis at_____.[Name the quadrant(s)]

Q.23 The transfer function of a system is $\frac{K}{(s+3)}$. The error in Bode's asymptotic plot at ω = 6 rad/s is_____and ω = 3 rad/s is_____.

Q.24 Asymptotic Bode plot of a system is shown in Fig Q.24.The transfer function for which it is drawn, is_____.

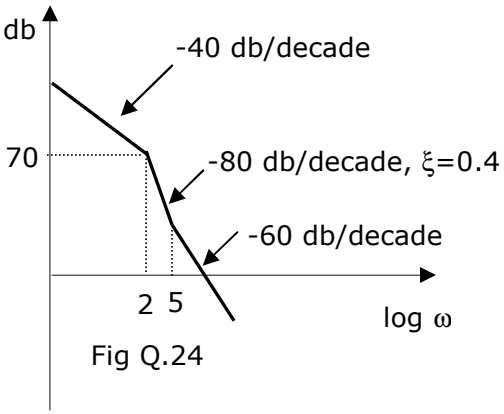


Fig Q.24