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BE SEMESTER 7th EXAMINATION NOVEMBER 2016

SUBJECT CODE: ME - 705   SUBJECT NAME: CONTROL ENGINEERING

DATE: 18/11/2016   TIME: 10.30 TO 01.30   TOTAL MARKS: 70

Instructions:
1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate **clearly**, the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.
6. Assume suitable data if required.

Section 1

Q.1 (A) What is open loop control system and closed loop control System? Compare open loop control system with closed loop control system.   05

(B) What do you mean by mathematical modeling of a control system? Explain its importance.   05

(C) Describe force-voltage analogy and force- current analogy as applied to electrical analogies for mechanical systems.   05

OR

(C) Write down the major steps to derive the transfer function of a given physical system. Derive expression for closed loop transfer function.   05

Q.2 (A) Define delay time, rise time, peak time, maximum overshoot and settling time as transient response specifications of a second order system.   05

(B) What does a block diagram represent? Explain it in brief. List its salient characteristics.   05

OR

(A) What are signal flow graphs? Write down important properties of signal flow graphs. Write down the rules for signal flow graphs reduction?   05

(B) Write down advantages and disadvantages of hydraulic systems. How control action is obtained in a hydraulic system?   05

Q.3 (A) Draw a root locus for G(s) H(s)= K/[s(s+1)(s+3)]   05

(B) Write down the comparison between a pneumatic control system and hydraulic control system. Sketch a schematic diagram of a pneumatic nozzle flapper amplifier system and explain its working.   05

OR

(A) By means of the Routh criterion, determine the stability of the systems represented by the following equations. For systems found to be unstable, determine the number of roots of characteristic equation in the right half of the s-plane.   05
    (a) $S^4 + 2S^3 + 10S^2 + 8S + 3 = 0$
    (b) $S^5 + S^4 + 24S^3 + 48S^2 - 25S - 5 = 0$

	(B)	Draw Proportional-Derivative (PD) hydraulic controller, explain its working and determine its transfer function.	05

Section 2

Q.4	(A)	What are servo systems? Explain construction and working of a mechanical servo control valve.	05
	(B)	Compare modern control theory versus conventional control theory.	05
	(C)	Classify DC motors. Discuss their characteristics. Explain the construction and components of a DC motor.	05

OR

	(C)	Explain and derive the transfer function for an armature controlled D.C. motor.	05
Q.5	(A)	What is Fuzzy logic? Explain the concept of Fuzzy logic with suitable example.	05
	(B)	Write a short note on : control systems for thermal power plant	05

OR

	(A)	Define degree of membership, fuzzyfication and difuzzyfication and rule based system. Describe crisp relations and fuzzy relations.	05
	(B)	Explain boiler feed control system using neat sketch	05
Q.6	(A)	Write note on "Programmable Logic controller (PLC) with its advantages.	05
	(B)	What do you mean by maintenance of hydraulic system? Explain in brief.	05

OR

	(A)	Draw a neat sketch of microprocessor based digital control system and explain the functions of each element. State its advantages also.	05
	(B)	Explain in brief pneumatic relays.	05

******All the Best******