BT MRE-VIII(R/S)-06-24-3271 Reg. No. | | | | | | | | |

B

B.Tech. Degree VIII Semester Regular/Supplementary Examination in Marine Engineering June 2024

19-208-0810 MARINE CONTROL ENGINEERING AND AUTOMATION (ELECTIVE II)

(2019 Scheme)

Time: 3 Hours

Maximum Marks: 60

Course Outcome

On successful completion of the course, the students will be able to:

CO1: Understand the different measuring devices and signal transmitting devices.
CO2: Gain knowledge regarding control theory and different type of controllers.
CO3: Understand details of correcting units, system analysis and mathematical models.
CO4: Understand about the stability and performance of control system.
CO5: Gain knowledge on applications of control system on ships.

Bloom's Taxonomy Levels (BL): L1 – Remember, L2 – Understand, L3 – Apply, L4 –Analyze, L5 – Evaluate, L6 – Create

PI – Programme Indicators

(Answer *ALL* questions) (5 × 15 = 75)

			Marks	BL	CO	PI
I.	(a)	Describe two flow measuring devices along with neat diagrams and practical applications.	10	L2	1	1.6.12
	(b)	Define Bonded and Unbonded Strain gauges with diagrams.	5	L2	1	1.6.12
		OR				
II.	(a)	What is the need for flapper nozzle arrangement in pneumatic sytems? Explain the working principle with neat diagram.	10	L2	1	1.6.12
	(b)	Compare electric and electronic controllers in tabular form.	5	L2	1	1.6.12
III.	(a)	What type of controller is used in a drone? Explain with reason.	5	L2	2	1.6.12
	(b)	Define the following: (i) Droop (ii) Two step control (iii) Split range control (iv) Transfer lag (v) Set value.	10	L2	2	1.6.12
		OR				
IV.	(a)	Which control is better, open loop control or closed loop control? Why?	5	L2	2	1.6.12
	(b)	Differentiate between proportional, derivative and integral controllers with examples.	10	L2	2	1.6.12

(P.T.O.)

			Marks	BL	CO	PI
V.		Explain any three actuators with neat diagrams and examples.	15	L2	3	1.6.12
		OR				
VI.	(a)	Which is the device used to understand the percentage of opening of valves in a system? Explain its working with neat diagram.	5	L2	3	1.6.12
	(b)	Derive the transfer function of a liquid level system.	10	L2	3	1.6.12
VII.	(a)	Define different levels of stability using possible real and imaginary values.	5	L4	4	1.2, 4.12
	(b)	Find the range of stability of K if $H(s) = 1$ and $G(s) = K/s\,(s+1)\,(s+2)$ using RH criteria.	10	L4	4	1.2,4.12
		OR				
VIII.	(a)	If Nyquist plot cuts the negative real axis at a distance of 0.8, then find the gain margin.	3	L4	4	1.2, 4.12
	(b)	Sketch the Nyquist plot and find the stability of the open loop transfer function $G(s)\,H(s) = K/s^2\,(s+1)\,(s+10)$ with $H(s) = 1$.	12	L4	4	1.2, 4.12
IX.		Describe the following: (i) Air / Fuel ratio control. (ii) Feed water control. (iii) Steam pressure control.	15	L2	5	1.6.12
		OR				
X.		Short notes on the following: (i) Manoeuvring of direct reversing diesel engine bridge control. (ii) Fuel oil viscousity control. (iii) Jacket cooling of water.	15	L2	5	1.6.12

Blooms's Taxonomy Level
L2 – 80%, L4 – 20%.

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