	Mod	el Q	uesti	ion	Par	oer	<b>-1</b> '	wit	h e	ffe	ct from 2020-21(CBCS Schen	ne)
US	SN											
				Fif	th S	Sem	est	er l	B.E	. D	egree Examination	
						P	roc	ess	Co	onti	col System	
TIM	E: 03 H	Iours									Max. M	arks: 100
1	Note:	Ι	Answer	any l	FIVE	E full	que	stion	is, ch	oosi	ng at least <b>ONE</b> question from each <b>MOD</b>	ULE.
							N	Aod	ule –	1		
Q.1	<b>(a)</b>	Witł	n a neat	bloc	k, De	scrib	e the	e wo	rking	g of A	Automatic Control System.	10 Marks
	<b>(b)</b>	Desc	cribe the	e wor	king	of N	ozzl	e Fla	apper	: syst	tem with necessy graph and sketches.	10 Marks
								0	R			
Q.2	(a)	Define the following terms i) Stability ii) Transient state regulation iii) Steady state regulation iv)Minimum area Criteria v) Quarter amplitude criteria										
	(b)		w the ne e operat		ary g	raph	to ill	lustra	ate th	ne op	peration of different types of control	10 Marks
							N	Iodı	ıle –	2		
Q.3	(a)		•					-			motor speed varies from 800 to 750rpm. gnal, calculate	
		· ·	Speed p Speed ca			•	-					10 Marks
	<b>(b)</b>	Writ	e and e	xplai	n the	anal	ytica	l exp	press	ion f	for PI controller mode.	10 Marks
~ .		*11				c			R			
Q.4	(a)	Illus conc		le wo	orkin	g of	two	pos	sitior	1 CO1	ntroller using opamp with level change	10 Marks
	( <b>b</b> )	A P 5%/	D contr % and 1	$k_{\rm D} =$	0.089	%/(%	/mir	n). T	he p	erioc	measurement range 0 - 5V output, $k_P = 1$ of the fastest expected signal change is np circuit.	10 Marks
							N	Iodı	ıle –	3		
Q.5	<b>(a)</b>	Desc	cribe the	e wor	king	of sı	iperv	visor	y coi	nput	er control system with a neat diagram.	10 Marks
	<b>(b)</b>	Expl	ain the c	ligital	desig	gn ste	ps of	Inte	gral 1	node	and PID control mode software.	10 Marks
								C	R			
Q.6	(a)		n necess e in pne	•	0		nd eo	quati	ion, (	expla	ain the working of proportional controller	10 Marks
	<b>(b)</b>	Expl	lain the	supe	rviso	ry co	ntro	l/Sar	nple	data	system with an example.	10 Marks
o -	<i></i>	***							ıle –			
Q.7	(a) (b)					-					two variable process control loop. p tuning for PID controller.	10 Marks
	(0)	Dest		gier-l	10110	15 1110	uiuu	•	DCes	5 100	p tuning for 1 h2 controller.	10 Marks
Q.8	(a)	Disc	uss abo	out sin	ngle v	varia	ble c	-		stem	configuration with its types.	10 Marks
•	(b)				-				-		loop tuning for PID controller.	10 Marks
							T	/od-	مار	5		

18EI53

#### Module - 5

## 18EI53

Q.9	(a)	Draw the flow chart that represents general approach followed in system modeling and explain it with respect to model evaluation and improvement.	10 Marks
	<b>(b)</b>	With the neat diagram, illustrate the operation of optimal control system.	10 Marks
		OR	
Q.10	(a)	Define artificial intelligence (AI) and illustrate the difference in working of conventional systems and AI systems.	10 Marks
	<b>(b</b> )	With a neat diagram, explain the optimal design of tubular reactor for ammonium synthesis using system simulation.	10 Marks

Та	Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome								
Que	stion	Bloom's Taxonomy Level attached	Course Outcome	Programme Outcome					
1	(a)	Understanding (L <sub>2</sub> )	CO1	PO1, PO6, PO12					
	(b)	Understanding (L <sub>2</sub> )	CO1	PO1, PO6, PO12					
2	(a)	Remembering (L <sub>1</sub> )	CO1	PO1, PO6, PO12					
	(b)	Understanding (L <sub>2</sub> )	CO1	PO1, PO6, PO12					
3	(a)	Analysis (L <sub>4</sub> )	CO2	PO1, PO2, PO3, PO6, PO12					
	(b)	Understanding (L <sub>2</sub> )	CO2	PO1, PO6, PO12					
4	(a)	Understanding (L <sub>2</sub> )	CO2	PO1, PO6, PO12					
	(b)	Analysis (L <sub>4</sub> )	CO2	PO1, PO2, PO3, PO6, PO12					

(b)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       Q.4     (a)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12					0 40000		
Q.2     (a)     Remembering (L <sub>1</sub> )     CO1     PO1, PO6, PO12       (b)     Understanding (L <sub>2</sub> )     CO1     PO1, PO6, PO12       Q.3     (a)     Analysis (L <sub>4</sub> )     CO2     PO1, PO2, PO3, PO6, PO12       Q.4     (a)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       Q.4     (a)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       Q.4     (a)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       Q.4     (a)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       Q.5     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       Q.5     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       Q.6     (a)     Understanding (L <sub>2</sub> )     CO4     PO1, PO6, PO12       Q.6     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       Q.6     (a)     Understanding (L <sub>2</sub> )     CO4     PO1, PO6, PO12       Q.6     (b)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       Q.7     (a)     Understanding (L <sub>2</sub> ) </th <th>Q.1</th> <th>(a)</th> <th>Understanding (</th> <th>L<sub>2</sub>)</th> <th>CO1</th> <th>PO1, PO6, PO12</th>	Q.1	(a)	Understanding (	L <sub>2</sub> )	CO1	PO1, PO6, PO12	
(b)     Understanding (L <sub>2</sub> )     CO1     PO1, PO6, PO12       Q.3     (a)     Analysis (L <sub>4</sub> )     CO2     PO1, PO2, PO3, PO6, PO12       (b)     Understanding (L <sub>2</sub> )     CO2     PO1, PO2, PO3, PO6, PO12       Q.4     (a)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       Q.4     (a)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       Q.4     (a)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       Q.4     (a)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       Q.5     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       Q.5     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       Q.6     (a)     Understanding (L <sub>2</sub> )     CO4     PO1, PO6, PO12       Q.6     (a)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       Q.7     (a)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       Q.7     (a)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       (b)     Understanding (L <sub>2</sub> )     CO6		(b)	Understanding (	L <sub>2</sub> )	CO1	PO1, PO6, PO12	
(b)     Understanding (L_2)     CO1     PO1, PO6, PO12       Q.3     (a)     Analysis (L_4)     CO2     PO1, PO2, PO3, PO6, PO12       (b)     Understanding (L_2)     CO2     PO1, PO2, PO3, PO6, PO12       (b)     Understanding (L_2)     CO2     PO1, PO6, PO12       (a)     Understanding (L_2)     CO2     PO1, PO6, PO12       (b)     Analysis (L_4)     CO2     PO1, PO6, PO12       (c)     Understanding (L_2)     CO3     PO1, PO6, PO12       (c)     Understanding (L_2)     CO3     PO1, PO6, PO12       (c)     Understanding (L_2)     CO4     PO1, PO6, PO12       (d)     Understanding (L_2)     CO5     PO1, PO6, PO12       (d)     Understanding (L_2)     CO5     PO1, PO6, PO12       (d)     Understanding (L_2)     CO5     PO1, PO6, PO12       (d)     Understanding (L_2) <t< th=""><th>Q.2</th><th>(a)</th><th>Remembering (I</th><th>L<sub>1</sub>)</th><th>CO1</th><th>PO1, PO6, PO12</th></t<>	Q.2	(a)	Remembering (I	L <sub>1</sub> )	CO1	PO1, PO6, PO12	
(b)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       (a)     Understanding (L <sub>2</sub> )     CO2     PO1, PO6, PO12       (b)     Analysis (L <sub>4</sub> )     CO2     PO1, PO6, PO12       (b)     Analysis (L <sub>4</sub> )     CO2     PO1, PO6, PO12       (c)     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       (c)     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       (b)     Understanding (L <sub>2</sub> )     CO4     PO1, PO6, PO12       (c)     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       (b)     Understanding (L <sub>2</sub> )     CO4     PO1, PO6, PO12       (b)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       (c)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       (c)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       (c)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       (d)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       (d)     Understanding (L <sub>2</sub> )     CO6     PO1, PO6, PO12       (d)<		(b)	Understanding (	L <sub>2</sub> )	CO1	PO1, PO6, PO12	
(b)     Understanding (L2)     CO2     PO1, PO6, PO12       Q.4     (a)     Understanding (L2)     CO2     PO1, PO6, PO12       (b)     Analysis (L4)     CO2     PO1, PO2, PO3, PO6, PO12       Q.5     (a)     Understanding (L2)     CO3     PO1, PO6, PO12       Q.5     (a)     Understanding (L2)     CO3     PO1, PO6, PO12       Q.6     (a)     Understanding (L2)     CO4     PO1, PO6, PO12       Q.6     (a)     Understanding (L2)     CO3     PO1, PO6, PO12       Q.6     (a)     Understanding (L2)     CO4     PO1, PO6, PO12       Q.6     (a)     Understanding (L2)     CO3     PO1, PO6, PO12       Q.7     (a)     Understanding (L2)     CO5     PO1, PO6, PO12       Q.7     (a)     Understanding (L2)     CO5     PO1, PO6, PO12       Q.7     (b)     Understanding (L2)     CO5     PO1, PO6, PO12       Q.8     (a)     Understanding (L2)     CO5     PO1, PO6, PO12       Q.9     (a)     Understanding (L2)     CO6     PO1, PO6,	Q.3	(a)	Analysis (L <sub>4</sub> )		CO2	PO1, PO2, PO3, PO6, PO12	
(b)     Analysis (L <sub>4</sub> )     CO2     PO1, PO2, PO3, PO6, PO12       Q.5     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       (b)     Understanding (L <sub>2</sub> )     CO4     PO1, PO6, PO12       Q.6     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       Q.6     (a)     Understanding (L <sub>2</sub> )     CO4     PO1, PO6, PO12       Q.6     (a)     Understanding (L <sub>2</sub> )     CO3     PO1, PO6, PO12       Q.7     (a)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       Q.7     (a)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       Q.7     (a)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       Q.7     (a)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       Q.8     (a)     Understanding (L <sub>2</sub> )     CO5     PO1, PO6, PO12       Q.9     (a)     Understanding (L <sub>2</sub> )     CO6     PO1, PO6, PO12       Q.9     (b)     Understanding (L <sub>2</sub> )     CO6     PO1, PO6, PO12       (b)     Understanding (L <sub>2</sub> )     CO6     PO1		(b)	Understanding (I	-2)	CO2	PO1, PO6, PO12	
Q.5(a)Understanding (L2)CO3PO1, PO6, PO12(b)Understanding (L2)CO4PO1, PO6, PO12Q.6(a)Understanding (L2)CO3PO1, PO6, PO12(b)Understanding (L2)CO3PO1, PO6, PO12(b)Understanding (L2)CO4PO1, PO6, PO12Q.7(a)Understanding (L2)CO5PO1, PO6, PO12(b)Understanding (L2)CO5PO1, PO6, PO12(b)Understanding (L2)CO5PO1, PO6, PO12(c)(a)Understanding (L2)CO5PO1, PO6, PO12(b)Understanding (L2)CO5PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)(a)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)(a)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)(a)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)<	Q.4	(a)	Understanding (L	-2)	CO2		
(b)Understanding (L2)CO4PO1, PO6, PO12(a)Understanding (L2)CO3PO1, PO6, PO12(b)Understanding (L2)CO4PO1, PO6, PO12(b)Understanding (L2)CO4PO1, PO6, PO12(a)Understanding (L2)CO5PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)(a)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)(a)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)(a)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(		(b)	Analysis (L <sub>4</sub> )		CO2	PO1, PO2, PO3, PO6, PO12	
Q.6(a)Understanding (L2)CO3PO1, PO6, PO12(b)Understanding (L2)CO4PO1, PO6, PO12Q.7(a)Understanding (L2)CO5PO1, PO6, PO12(b)Understanding (L2)CO5PO1, PO6, PO12Q.8(a)Understanding (L2)CO5PO1, PO6, PO12(b)Understanding (L2)CO5PO1, PO6, PO12Q.8(a)Understanding (L2)CO5PO1, PO6, PO12(b)Understanding (L2)CO5PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12Q.9(a)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)(b)Understanding (L2)CO6PO1, PO6, PO12Q.10(a)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)	Q.5	(a)	Understanding (	L <sub>2</sub> )	CO3	PO1, PO6, PO12	
$ \begin{array}{ c c c c } \hline \begin{tabular}{ c c c c } \hline \begin{tabular}{ c c c c } \hline \begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c } \hline \begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		(b)	Understanding (	L <sub>2</sub> )	CO4	PO1, PO6, PO12	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Q.6	(a)	Understanding (	L <sub>2</sub> )	CO3	PO1, PO6, PO12	
(b)Understanding (L2)CO5PO1, PO6, PO12Q.8(a)Understanding (L2)CO5PO1, PO6, PO12(b)Understanding (L2)CO5PO1, PO6, PO12Q.9(a)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)CO6PO1, PO6, PO12(b)Understanding (L2)CO6PO1, PO6, PO12(c)Understanding (L2)Lower order thinking skillsBloom's Taxonomy LevelsRemembering( Knowledge): L1Understanding Comprehension): L2L3(c)Higher order thinking skillsHigher order thinking skillsLa		(b)	Understanding (	L <sub>2</sub> )	CO4	PO1, PO6, PO12	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Q.7	(a)	Understanding (	L <sub>2</sub> )	CO5	PO1, PO6, PO12	
$\begin{array}{c c c c c c c } \hline (b) & Understanding (L_2) & CO5 & PO1, PO6, PO12 \\ \hline (b) & Understanding (L_2) & CO6 & PO1, PO6, PO12 \\ \hline (b) & Understanding (L_2) & CO6 & PO1, PO6, PO12 \\ \hline (b) & Understanding (L_2) & CO6 & PO1, PO6, PO12 \\ \hline (b) & Understanding (L_2) & CO6 & PO1, PO6, PO12 \\ \hline (b) & Understanding (L_2) & CO6 & PO1, PO6, PO12 \\ \hline (b) & Understanding (L_2) & CO6 & PO1, PO6, PO12 \\ \hline \\ \hline Bloom's & Remembering( & Understanding \\ raxonomy \\ Levels & Higher order thinking skills \\ \hline \end{array}$		(b)	Understanding (	L <sub>2</sub> )	CO5	PO1, PO6, PO12	
$ \begin{array}{c c c c c c c } \hline \textbf{Q}, \textbf$	Q.8	(a)	Understanding (	L <sub>2</sub> )	CO5	PO1, PO6, PO12	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		(b)	Understanding (	L <sub>2</sub> )	CO5	PO1, PO6, PO12	
Q.10 (a) Understanding (L <sub>2</sub> ) CO6 PO1, PO6, PO12   (b) Understanding (L <sub>2</sub> ) CO6 PO1, PO6, PO12   Lower order thinking skills   Bloom's Remembering( knowledge):L <sub>1</sub> Understanding Comprehension): L <sub>2</sub> Applying (Application): L <sub>3</sub> Levels Higher order thinking skills	Q.9	(a)	Understanding (	L <sub>2</sub> )	CO6	PO1, PO6, PO12	
$\begin{tabular}{ c c c c c c c c } \hline \hline $(b)$ Understanding (L_2)$ CO6 PO1, PO6, PO12 \\ \hline $(b)$ Understanding (L_2)$ CO6 PO1, PO6, PO12 \\ \hline $PO1, PO6, PO12$ \\ \hline $PO1, PO6, PO6,$		(b)	Understanding (	L <sub>2</sub> )	CO6	PO1, PO6, PO12	
Bloom's   Lower order thinking skills     Remembering( knowledge):L1   Understanding Comprehension): L2   Applying (Application): L3     Levels   Higher order thinking skills	Q.10	(a)	Understanding (	L <sub>2</sub> )	CO6	PO1, PO6, PO12	
Bloom's TaxonomyRemembering( knowledge): $L_1$ Understanding Comprehension): $L_2$ Applying (Application): $L_3$ LevelsHigher order thinking skills		(b)	Understanding (	L <sub>2</sub> )	CO6	PO1, PO6, PO12	
Bloom's TaxonomyRemembering( knowledge): $L_1$ Understanding Comprehension): $L_2$ Applying (Application): $L_3$ LevelsHigher order thinking skills							
Taxonomyknowledge): $L_1$ Comprehension): $L_2$ $L_3$ LevelsHigher order thinking skills							
Levels Higher order thinking skills			Ũ,			Applying (Application):	
	-		knowledge): $L_1$				
Analyzing (Analysis): $L_4$ Valuating (Evaluation): $L_5$ Creating (Synthesis): $L_6$	Levels						
			Analyzing (Analysis): $L_4$	Creating (Synthesis): $L_6$			

Question



Max. Marks: 100

10 Marks

#### Model Question Paper -2 with effect from 2020-21(CBCS Scheme)

Fifth Semester B.E. Degree Examination

### PROCESS CONTROL SYSTEM

#### Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**. Module – 1 Draw the block diagram of general purpose control system. Explain the function of 0.1 **(a)** 10 Marks each block. (b) Illustrate the working of Reverse action pneumatic actuator with necessary equation. 10 Marks OR Q.2 (a) With the neat diagram, explain the working of self regulation and human control 10 Marks operation. 10 Marks Use necessary sketches to illustrate the degree of baking of crackers showing final **(b)** control operation. Module – 2 Q.3 (a) Discuss the working of opamp based derivative controller mode with necessary 10 Marks diagram and equation. 10 Marks **(b)** Design an PI controller with a proportional band of 30% and an integration gain of 0.4 - 2V signal and the output is to be 0 - 10V. Calculate values of Gp, G<sub>I</sub>, R<sub>2</sub>, R<sub>1</sub> and C. OR (a) Define the following terms 10 Marks i) Process Load & Control Load ii) Process lag & Control lag iv) Control Parameter range iii) Dead time & Cycling v) Error 10 Marks Q.4 (b) A liquid level control system linearly converts a displacement of 2 to 3m into 4 to 20mA control signal. A relay serves as the two position controller to open or close an inlet valve. The relay closes at 12mA and opens at 10mA. Find the relation between displacement level and current. Module – 3 Illustrate the working of data logging system using computer. 10 Marks **O.5** (a) Explain the digital design steps of Derivative mode and PID control mode software. 10 Marks **(b)** OR Q.6 (a) Describe the working of multi variable alarm system with neat diagram and necessary 10 Marks equation. With necessary diagram, explain the working of PI and PD controller mode in 10 Marks **(b)** pneumatic type. Module – 4

- With an example, explain the working of cascade control system. **Q.7** (a)
  - **(b)** Describe open loop transient response method of process loop tuning for proportional 10 Marks controller with necessary equation.

#### **TIME: 03 Hours**

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OR
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Q.8	(a)	Explain the steps for stability of a control system in terms of transfer function and frequency dependencies. Also explain the stability criteria.	10 Marks
	(b)	Illustrate the process and instrumentation drawings (PI&D) symbols for various instruments and valves.	10 Marks
		Module – 5	
Q.9	<b>(a)</b>	With block diagram, briefly explain the following:	10 Marks
		<ul><li>i) Model reference adaptive control.</li><li>ii) Model identification adaptive control.</li></ul>	
	(b)	Describe the working of predictive control system with necessary diagram.	10 Marks
		OR	
Q.10	(a)	Explain how the number of degree of freedom can be reduced to zero to have a completely specified system with unique behavior.	10 Marks
	(b)	With the flow chart, illustrate the steps to build mathematical model of a plant.	10 Marks

Та	ble sl	nowing the Bloom's Tax	onomy Lo Outco	· ·	tcome and Programme	
Question		Bloom's Taxonomy L attached	evel	Course Outcome	Programme Outcome	
Q.1	(a)	Understanding (L <sub>2</sub> )		CO1	PO1, PO6, PO12	
<b>V</b> .1	(b)	Understanding (I		CO1	PO1, PO6, PO12	
Q.2	(a)	Understanding (I		CO1	PO1, PO6, PO12	
<b>~·</b> -	(b)	Understanding (I	-	CO1	PO1, PO6, PO12	
Q.3	(a)	Understanding (I		CO2	PO1, PO6, PO12	
	(b)	Analysis (L <sub>4</sub> )	27	CO2	PO1, PO2, PO3, PO6, PO12	
Q.4	(a)	Remembering (I	L <sub>1</sub> )	CO2	PO1, PO6, PO12	
	(b)	Analysis (L <sub>4</sub> )		CO2	PO1, PO2, PO3, PO6, PO12	
Q.5	(a)	Understanding (I	L <sub>2</sub> )	CO3	PO1, PO6, PO12	
	(b)	Understanding (	L <sub>2</sub> )	CO4	PO1, PO6, PO12	
Q.6	(a)	Understanding (	L <sub>2</sub> )	CO3	PO1, PO6, PO12	
	(b)	Understanding (	L <sub>2</sub> )	CO4	PO1, PO6, PO12	
Q.7	(a)	Understanding (	L <sub>2</sub> )	CO5	PO1, PO6, PO12	
	(b)	Understanding (	L <sub>2</sub> )	CO5	PO1, PO6, PO12	
Q.8	(a)	Understanding (	L <sub>2</sub> )	CO5	PO1, PO6, PO12	
	(b)	Understanding (	L <sub>2</sub> )	CO5	PO1, PO6, PO12	
Q.9	(a)	Understanding (	L <sub>2</sub> )	CO6	PO1, PO6, PO12	
	(b)	Understanding (	L <sub>2</sub> )	CO6	PO1, PO6, PO12	
Q.10	(a)	Understanding (	L <sub>2</sub> )	CO6	PO1, PO6, PO12	
-	(b)	Understanding (	L <sub>2</sub> )	CO6	PO1, PO6, PO12	
			Lower o	order thinking ski	lls	
Bloom's Taxonomy Levels		Remembering(	Understar	nding	Applying (Application)	
		knowledge): $L_1$	-	hension): $L_2$ $L_3$		
				order thinking ski		
		Analyzing (Analysis): L <sub>4</sub>	Valuating	g (Evaluation): $L_5$	Creating (Synthesis): $L_6$	

