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SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023

ROBOTICS AND AUTOMATION

(2020 SCHEME)

Course Code : 20RBTT308

Name	: Comprehensive Course Work		
rks :	50		Duration: 75 Minutes
	PART	A	
	(Answer all questions. Each o	_l uesti	on carries 1 mark)
A cir	cular bar moving in a round hole i	s an e	xample of
A.	Incompletely constrained motion	B.	Partially constrained motion
C.	Completely constrained motion	D.	Successfully constrained motion
Low	ver pairs are those which have		
A.	Point or line contact between the two elements when in motion	B.	Surface contact between the two elements when in motion
	Elements of pairs not -held together mechanically	D.	Two elements that permit relative motion
A.	uniform acceleration and retardation	В.	cycloidal motion
C.	simple harmonic motion	D.	any one of the above
4 A slider crank chain consists of following numbers of turning and			mbers of turning and sliding pairs
A.	1, 3	B.	2,2
C.	3,1	D.	4,0
The length of belt used in a cross-belt drive is than that used in op			is than that used in open belt
A.	double	B.	equal
C.	less	D.	greater
In a four-bar linkage, if the lengths of shortest, longest and the of are denoted by s, l, p and q, then it would result in Grashof's link that			. •
A.	l+p = s+q	B.	1 + p < s + q
C.	1-p = s+q	D.	1+s < p+q
The interrupt service routine for the RESET interrupt is vectored in			
A.	0000Н	B.	0003H
C.	000BH	D.	0013H
Wh	ich register is used to make the int	errupt	t level or an edge triggered pulse?
A.	TCON	B.	IE
C.	IPR	D.	SCON
	A cir A. C. Low A. C. The drive A. C. In a are o that A. C. The A. C. Whi	A circular bar moving in a round hole i A. Incompletely constrained motion C. Completely constrained motion Lower pairs are those which have A. Point or line contact between the two elements when in motion C. Elements of pairs not -held together mechanically The follower of a cam has A. uniform acceleration and retardation C. simple harmonic motion A slider crank chain consists of followin A. 1, 3 C. 3,1 The length of belt used in a cross-belt drive A. double C. less In a four-bar linkage, if the lengths of are denoted by s, l, p and q, then it wouthat A. l+p = s+q C. l-p = s+q The interrupt service routine for the R A. 0000H C. 000BH Which register is used to make the interval	A circular bar moving in a round hole is an eta. A. Incompletely constrained motion B. C. Completely constrained motion D. Lower pairs are those which have A. Point or line contact between the B. two elements when in motion C. Elements of pairs not -held together mechanically The follower of a cam has A. uniform acceleration and retardation C. simple harmonic motion D. A slider crank chain consists of following numbers of the length of belt used in a cross-belt drive drive A. double B. C. less D. In a four-bar linkage, if the lengths of shorter are denoted by s, l, p and q, then it would resthat A. l+p = s+q B. C. l-p = s+q D. The interrupt service routine for the RESET A. 0000H B. C. 000BH D. Which register is used to make the interrupt of the property of the pair of the pa

9	The program which combines small subprograms to execute the main program					
	A. linker	В.	loader			
	C. assembler	D.	compiler			
10	Which pin of the external hardware is said to exhibit INTO interrupt?					
	A. pin no 10	В.	pin no 11			
	C. pin no 12	D.	pin no 13			
11	Which instructions have no effect on the flags of PSW?					
	A. ANL	В.	XRL			
	C. ORL	D.	All of the mentioned			
12	Which addressing mode execute its in	struc	tions within CPU without the			
	necessity of reference memory for oper					
	A. Implied Mode	В.	Immediate Mode			
	C. Direct Mode	D.	Register Mode			
13	First order system is defined as:					
	A. Number of poles at origin	A.	Order of the differential equation			
	C. Total number of poles of	C.	Total number of poles and order of			
14	equation A system is marginally stable. The pol	les of	equation the system are located			
11	A. On the imaginary axis	В.	On right hand plane			
	C. On the real axis	D.	On left hand plane			
15		The impulse response of a LTI system is a unit step function, then the				
10	corresponding transfer function is	is a u	int step function, then the			
	A. 1/s	В.	$1/s^2$			
	C. 1	D.	S			
16	The given characteristic equation S4+	S ³ +	$2S^2 + 2S + 3 = 0$ has:			
	A. Zero root in the s-plane	В.	One root in the RHS of s-plane			
	C. Two root in the RHS of s-plane	D.	Three root in the RHS of s-plane			
17	Steady state accuracy specified in terr	Steady state accuracy specified in terms of:				
	A. Steady state error	В.	Damping ratio			
	C. Natural frequency	D.	All of the mentioned			
1.0	7 1 5 1					
18	Zeroes are defined as:	_	5.1			
	A. Roots of the denominator of the closed loop transfer function	В.	Roots of the numerator of the			
	C. Parts of the numerator	D.	closed loop transfer function Parts of the denominator			
19	Which one of the following robots with					
	A. Cartesian	В.	Articulated			
	C. Cylindrical	D.	None of the above			
20	Which one of the following robots also					
20						
	A. SCARA	В.	Delta			
	C. Polar	D.	None of the above			
21	In trajectory planning					
	A. Cartesian scheme is preferred to joint space scheme due to less computational complexity.	В.	Joint space scheme is preferred to Cartesian scheme due to less computational complexity.			

	C.	Computational complexity of Cartesian scheme and joint space scheme is not comparable.	D.	Joint space scheme is never used.	
22	Th	The robots with the designation TRR is known as robots?			
	A.	Spherical	В.	Articulated	
	C.	Both a and b	D.	None of the above	
23		According to Denavit – Hartenberg notations, link and joint parameters represent			
	A.	The relative positions of neighboring links and structure of a link respectively.	B.	The structure of a link and relative positions of neighboring links respectively	
	C.	The structure of a link only	D.	The relative positions of neighboring links only	
24	Th	e joints of the robots are categorized	into	types?	
	A.	one	B.	two	
	C.	three	D.	None of the above	
25		Check valve may also be known as			
	A.	pressure reducing valve	B.	pressure escape	
	C.	directional management valve	D.	Directional valve	
26	In	ship manufacturing, the type of layo	out pr	eferred is	
	A.	Product layout	B.	Process layout	
	C.	Fixed-position layout	D.	GT layout	
27	Wh	nich one is the PLC programming lar	ıguag	e?	
	A.	HMI	B.	MMI	
	C.	FBD	D.	None of the above	
28		Which of the following is an advantage of using a strain gauge over other types			
	01 10 A.	orce measurement sensors? High sensitivity	В.	Non-contact measurement	
	л. С.	Low cost	D.	Immunity to environmental factors	
29		om the following which is not the ap		·	
47	A.	Truck loading and unloading	рпсат В.	To change the tool	
	л. С.	Material transfer	D.	Paper roll transfer	
30		which layout manufacturing is done		-	
30	A.	GT layout	B.	Product layout	
	C.	Process layout	D.	Hybrid layout	
	C.	•		Tryblid layout	
		PART 1			
31	Тът	(Answer all questions. Each questions have their axis parallel and		·	
31	oth max	ximum velocity of sliding in cm per 1	speed	of the shaft is 100 rpm, what is the	
		he side discs? 1750 cm/min	B.	1570cm/min	

	C.	1075 cm/min	D.	751 cm/min	
32	1. 3	Which of the following statements is/are true? 1. Static force analysis does not consider inertia forces along with static forces			
	3.	The SI unit of mass moment of inert Mass moment of inertia of a thin dis lation (mr²) / 2			
	A.	Only 1	В.	Only 2	
	C.	Only 3	D.	All the above statements are true	
33	W	hat is the meaning of the instruction	MOV	/ A,05H?	
	A.	data 05H is stored in the accumulator	В.	fifth bit of accumulator is set to one	
	C.	none of the mentioned	D.	address 05H is stored in the accumulator	
34	Th	ne instruction to start the counting o	f Tim		
	A.	SETB TRO	В.	START TIMERO	
	C.	CLR TR0	D.	SETB TMOD.0	
35		onsider a system with transfer functi 1 be 0.5 when the values of k is:	on G	(s) = $s+6/Ks2+s+6$. Its damping ratio	
	A.	2/6	В.	3	
	C.	1/6	D.	6	
36	$th\epsilon$	onsider the system represented by the total phase value at $\omega = 0$? $0/[S^3 (S + 3) (S + 6) (S + 10)]$.		-	
	A.	-90°	В.	-180	
	C.	-270°	D.	-360°	
37		ssume that the joint mechanisms at e joint torque t required to bear an a		-	
	A.	J^{-1} F	В.	JF	
	C.	$J^{\scriptscriptstyle{\mathrm{T}}}\!\mathrm{F}$	D.	$J^{-1}F^{T}$	
38	Wh	nich one of the following statement is	True	9?	
	A.	ROT (X,θ_1) ROT (X,θ_2) = ROT (X,θ_2) ROT (X,θ_1)	В.	ROT (X, θ_1) ROT (X, θ_2) = -ROT (X, θ_2) ROT (X, θ_1)	
	C.	ROT (X, θ_1) ROT (X, θ_2) = ROT $(X, \theta_{1+} \theta_2)$	D.	ROT (X, θ_1) ROT (X, θ_2) = ROT $(X, \theta_1 - \theta_2)$	
39		ladder logic programming, an alternated to the last and alternated to the last alternated t	ative :	in place of using same internal relay	
	A.	battery-backed relay	В.	dummy relay	
	C.	one-shot operation	D.	master control relay	
40	W	hich of the following is not the meth-	od of	part family formation	
	A.	Visual inspection method	B.	Automatic product sorting	
	C.	Parts classification & coding	D.	Production flow analysis	