	IVI.50	:. (3	ELECTRO	zxa NIC	S	11-2023
			Numerical Method	s (N	ISC21101)	
Day Time	& Date : 03:0	e: We 0 PM	ednesday, 19-07-2023 1 To 06:00 PM		Ν	lax. Marks: 80
Instr	uctior	1 s: 1 2 3) Question 1 and 2 are compulsor 2) Attempt any Three from Q.3 to 0 3) Figures to the right indicate full r	y. Q.7. nark	s.	
Q.1	A) 1)	Ch o Fro a) c)	oose Correct Alternative. m Laplace transform, the value of 1/p 1/p-a	e ^{ax} i b) d)	s 1/p ² None of the mentioned	10
	2)	Abs a) b) c) d)	solute error (e _a) = Actual value - Approximate value True value - Approximate value / Absolute error / True value None of the mentioned	e 10 ′ Tru	0 e value	
	3)	Th∉ a) c)	e final corrector of the fourth-order Midpoint rule Simpson's rule	Rur b) d)	ge-Kutta method uses _ Backward Euler methoo Trapezoidal rule	 I
	4)	The a) c)	e modified procedure of complete Additional Reduced	bivot b) d)	ing is called as Partial Modified	
	5)	The a) c)	e inverse of a symmetric matrix (if diagonal matrix symmetric matrix	it exi b) d)	sts) is a skew symmetric matrix triangular matrix	
	6)	The a) c)	e value of f at x _{i+1} is same as its va zero-order approximation second-order approximation	lue a b) d)	at x _i is called first-order approximation all of the mentioned	ſ
	7)	Th∉ a) c)	e LU method of factorization was ir Alan Tango G. W. Leibniz	ntroc b) d)	luced by the mathematic David Hilbert Alex Grothendieck	ian
	8)	Δ ² y a) b) c) d)	$y_0 = \Delta(\Delta y_0)$ is first order forward difference second order forward difference first order backward differences second order backward difference	e		
	9)	a) c)	is the direct method. Gauss elimination Backward substitution	b) d)	Gauss Jordan all of the mentioned	
	10)	∇ <i>f</i> (a) c)	f(X) = f(x+h) - f(x) is for Forward differences Divided differences	b) d)	Backward differences Central differences	

Set P

Seat No.

MS otor I) (Now) (CBCS) Examination: March/April-2023 1

State true/false.

- Gauss Elimination Method is well adopted for computer application. 1)
- 2) Rounding errors are generated when only required significant digits are considered and remaining are discarded.
- Simpson's Rule used for solution of system of linear equations. 3)
- The Laplace transform of impulse function is s. 4)
- If $f(t) = t^n$ where, 'n' is an integer greater than zero, then its Laplace 5) Transform is n!
- 6) In triangularization method LZ = B equation is solved for Z.

Q.2 Answer the following.

B)

- Prove that $L^{-1}{p/(p^2 2p + 2)(p^2 + 2p + 2)} = 1/2$ (sint)(sinht). 1)
- Write a note on curve fitting. 2)
- What is Matrix? Explain different types of the matrix. 3)
- Explain Taylor's series method. 4)
- Prove that initial value theorem and find out Laplace transform of the LT. 80 Q.3 a) Find out the emf observed at the temperature 25°c by fitting the 80 b)

-					
f	ollo	wina	data t	o straight	t line.

t(°c)	0	10	20	30
emf(mv)	53.5	59.5	65.2	70.6

- Q.4 Write a note on curve fitting? Derive the equation for second order least 10 a) square fitting. 06
 - Write a note on LT. Find $L\{e^{-t}(3 \sin h2t 5 \cos h2t)\}$ b)
- Q.5 a) Dividing interval into 5 points find the integration of a function $I = \int_{0}^{2} x^{2} dx$ 08 by using both Trapezoidal rule and Simpson's rule.
 - Find the equation of the cubic curve that passes through the points (-1, -8), 80 b) (0,3), (2,1) and (3,2) using Lagrange's interpolation formula.
- Q.6 Find the value of sin(0) and sin(18) by using following set of points. **08** a)

	θ	0	10	20	30	40	
a note	on inter	nolation	Find out	tan (17°)	by using	n Newton	's forwar

b) Write a note on interpolation. Find out tan (17°) by using Newton's forward 80 method.

|--|

Explain forward and backward substitution method. Solve the system of 10 Q.7 a) equation using forward substitution method

5x - y + z = 102x + 4y = 12

x + y + 5z = -1

Prove that the existence of the Laplace transform $\int_{t_0}^{\infty} e^{-st} f(t) dt$ exists 06 b) where s > a.

SLR-SJ-1

Seat No.					Set	Ρ
M	.Sc. (Se	emester -	I) (New) (CBCS) Ex ELECTRON	amina ICS	ation: March/April-2023	
		Inst	rumentation Desig	n (MS	C21102)	
Day & D Time: 03	ate: Thu 3:00 PM	ursday, 20-0 To 06:00 P	7-2023 M	-	Max. Marks	3: 80
Instruct	t ions: 1) 2) 3)	Q. Nos. 1 a Attempt an Figure to ri	and. 2 are compulsory. y three questions from ght indicate full marks.	Q. No.	3 to Q. No. 7	
Q.1 A) Fill i 1)	n the blank Mercury us a) Wide b) High c) Wide d) Wide	s by choosing correct ed in liquid-filled system e temperature range sensitivity e temperature range an e temperature range an	: altern ns as it d high s d appro	atives given below. gives sensitivity oximately linear scale	10
	2)	Strain gau a) Pres c) Disp	ge is used to monitor ch sure lacement	ange ir b) d)	n Torque All of these	
	3)	lsolation ar a) High c) Low	mplifier is also called as gain gain	b) d)	amplifier. Unity gain All of these	
	4)	The popula data a) Sing c) Mult	ar Digital Panel Meter (E a accusation system. le i	DPM) is b) d)	well known example of Dual None of these	
	5)	The tempe effect. a) RTD c) LM3	rature measurement wi 0 5	th b) d)	_ is based on the see back AD590 Thermocouple	
	6)	A variable a) Roto c) Both	plate area transducer is or a and b	made b) d)	up of fixed plate Stator None of mentioned	
	7)	V to I conv connected a) Inve c) Diffe	erted with grounded loa in mode. rting erential	d the o b) d)	perational amplifier Non inverting All of these	
	8)	In Piezoele used respe a) Jasp c) Bario	ectric transducer Quartz ectively. oer um titanate	, Roche b) d)	elle salt and crystal Citrine None of these	
	9)	Which prox a) Opti c) Cap	kimity sensor detects po cal acitive	bsitionin b) d)	g of an object? Inductive All of these	

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SLR-SJ-2

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		10)	The _ abser a) c)	sw nces of an Active Limit	tch is a ty n object.	pe of senso	r that b) d)	detects the presence and Passive All of these	
	B)	State 1) 2) 3) 4) 5) 6)	e true The S Data The L AD52 A pro Disc t	or false SY-HS220 logger wh M35 tem 4 has an ximity se hermisto) is the pro- nich are us perature s output off nsor is a r r having re	ecision temp sed to meas sensor linear fset voltage non-contact s esistance va	oeratu ure a r scale drift o sensc lue of	ire sensor. nd record the data. e factor + 10.0 mV/°C. of less than 25 μV/ °C or. f 100 ohm to 1 M ohms.	06
Q.2	Ansv a) b) c) d)	wer the following16Sketch block diagram of electronics instrument design for measurement.Short note on single channel DAS.What is need of 4 to 20mA current transformation?Write a short note on selection criteria for transducers.						16	
Q.3	Ansv a) b)	wer th Expla Expla	ver the followingExplain pre-amplifier. And Write a note on AD620.08Explain the techniques of measuring level of liquid.08						08 08
Q.4	Ansv a) b)	wer the followingExplain the concept of grounding and write a note on AD524.10What is signal conditioning? Explain IC 2B30.06						10 06	
Q.5	Ansv a) b)	 swer the following Explain in detail I to V and V to I converter. What is sensor? Explain static and dynamic characteristics of sensor. 						08 08	
Q.6	Ansv a) b)	wer th Expla What	ne follo ain sigr : is isol	owing hal transr ation am	nission in plifier? Ex	detail. plain in deta	il moo	del 289 isolation amplifier.	08 08
Q.7	 Answer the following a) Explain with suitable circuit diagram the designing of AC bridges. And note on electrostatic shielding. b) Write a note on programme bla instrumentation equalities 						10 06		
	~,			, sii piog					

Seat No.		Set P						
	M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023 ELECTRONICS Bower Electronics (MSC21102)							
Day & Time:	& Date 03:00	e: Friday, 21-07-2023 Max. Marks: 80 D PM To 06:00 PM						
Instru	uction	 ns: 1) Q. Nos.1and 2 are compulsory. 2) Attempt any Three questions from Q.3 to Q.7 3) Figures to the right indicate full marks. 						
Q.1	A) 1)	Select correct alternative for the following.10Three phase full converter gives value of Vdc for $\alpha > \pi/2$.a)a) zerob)positivec)negatived)constantb)						
	2)	of the following is used for PF improvement in controlled rectifiers.a) SCRb) GTOc) TRIACd) DIAC						
	3)	Fixed frequency DC can be converted to variable DC by usinga) inverterb) cycloconverterc) ac controllersd) chopper						
	4)	cannot be used as a switching device in AC voltage controllers.a) BJTb) GTOc) TRIACd) SCR						
	5)	Input power factor for on- off controller isa) Vs. kb) \sqrt{k} c) Vs. \sqrt{k} d) k						
	6)	semi converter has quadrant operation. a) two b) one c) one d) four						
	7)	With $\alpha < 60^{\circ}$ three phase semi converter provides pulse/s at the output. a) 1 b) 2 c) 4 d) 6						
	8)	The duty cycle of single phase full wave controller is a) $\sqrt{\binom{m}{n+m}}$ b) $\sqrt{\binom{n}{n+m}}$ c) $(\frac{n}{n+m})$ d) $(\frac{n}{m-n})$						
	9)	Dual convertor allows the firing angle to be to operate in rectification mode. a) $< \pi$ b) $< \pi/2$ c) $> \pi$ d) $> \pi/2$						
	10)	AC chopper uses technique of power factor improvement. a) EAC b) SPWM c) CSI d) PWM						

	_,	 Three phase full converter exhibits four quadrant operation. Inverters can be used in standby power supply. Class A chopper is also known as step up chopper. Cycloconverters can be used to drive high power loads. DC Choppers can be designed using SCRs. The output current of current source inverter depends upon the nature of the load. 	
Q.2	Ans a) b) c) d)	wer the following. Draw a neat labeled circuit diagram of three phase Dual converter. Define rectifiers. Give its classification. Draw a neat labeled circuit diagram of Mc Murray full bridge inverter. Explain EAC technique for power factor improvement.	16
Q.3	Ans a) b)	wer the following. Describe the working of three phase half controlled rectifier. Describe the operation of single phase bidirectional controller.	08 08
Q.4	Ans a) b)	wer the following. Explain the working of single phase full controlled bridge rectifier with R-L load. Discuss the operation of class B chopper.	10 06
Q.5	Ans a) b)	wer the following. Describe the operation of single phase full bridge inverter in detail. Draw a neat labeled diagram of three phase full wave controller for R-L load.	10 06
Q.6	Ans a) b)	wer the following. Discuss single phase fully controlled bridge rectifier with R load for $\alpha < \pi/2$. Discuss step up cycloconverter.	10 06
Q.7	Ans a) b)	wer the following. Explain the working of single phase bridge type cycloconverter. Explain operating principle of inverter. Discuss its types.	10 06

B) Write True or False.

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M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023 ELECTRONICS

Advanced Microcontrollers (MSC21108)

Day & Date: Saturday, 22-07-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.

2) Attempt any three questions from Q. No. 3 to Q. No. 73) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

- 1) What is the file extension that is loaded in a microcontroller for executing any instruction?
 - a) .doc b) .c
 - c) .txt d) .hex
- 2) Where does the comparison level occur for 16-bit contents in the compare mode operation?
 - a) Between CCPR1 register & TMR1
 - b) Between CCPR1 & CCPR2 registers
 - c) Between CCPR2 register & TMR1
 - d) Between CCPR2 register & TMR0
- 3) Which bits play a crucial role in specifying the details or reasons associated with the system wake-up in WDT?
 - a) $\overline{PD} \& \overline{TO}$ b) C & Z
 - c) DC & RPO d) All of the above
- 4) When do the special address 004H get automatically loaded into the program counter?
 - a) After the execution of RESET action in program counter.
 - b) After the execution of 'goto Mainline' instruction in the program memory.
 - c) At the occurrence of interrupt into the program counter.
 - d) At the clearance of program counter with no value.
- 5) The _____ bit of Status Register of AVR used as source or destination for the operated bit.
 - a) T b) S c) D d) None of these
- 6) Which operational feature of PIC allows it to reset especially when the power supply drops the voltage below 4V?
 - a) Built-in Power-on-reset
 - c) Both a & b
- b) Brown-out resetd) None of the above
- 7) SWAP instruction is _____.
 - a) Data transfer instruction
 - c) Logical instruction
- b) Program control instruction
- d) Bit and Bit test instruction

Max. Marks: 80

10

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16

- In AVR microcontrollers, ADD instruction affects the status of which of 8) the following bits of a status register?
 - b)
 - a) Z c) C d) All of the mentioned
- 9) The MCU is _____ when the Watchdog Timer period expires and the Watchdog is enabled.
 - a) in sleep mode b) c) in ideal mode
 - reset d) Both a and c

Ν

- 10) The USART Transmitter is enabled by setting the Transmit Enable (TXEN) bit in the Register.
 - a) UBRRL b) UBRRH
 - c) UCSRB d) UCSR

B) State true or false.

- In AVR, the LCD operates in two main modes, it can be in 8 bit or 4 bit 1) data.
- In PIC Microcontroller 0004H is address of reset vector. 2)
- The PIR1 register contains the individual flag bits for the peripheral 3) interrupts.
- AVR Microcontroller have Two 8-bit Timer/Counters with Separate 4) Pre-scaler, one Compare Mode.
- The R26 and R27 used as single 16 bit Y register. 5)
- The Status register contains the arithmetic status of the ALU. 6)

Q.2 Answer the following.

- Write a note on Status register of PIC Microcontroller. a)
- Explain the concept Developing, compiling, and programming the Microcontroller b) in short.
- C) Write any 8 features of AVR Microcontroller.
- Draw the Reset circuit and clock circuit of AVR Microcontroller. d)

03	a)	Explain universal asynchronous receiver and transmitter of AVR	08
	" ,	Microcontroller.	•••
	b)	Explain addressing modes of PIC Microcontroller.	80
Q.4	a) b)	Draw the architecture of AVR microcontroller and explain in details. Write note on Compare capture mode.	10 06
Q.5	a) b)	Draw the Diagram for LCD interfacing to PIC and Write its program. Explain Logical instructions set of AVR Microcontroller.	08 08
Q.6	a) b)	Explain Timer 2 of PIC Microcontroller. Write note on Register banks of AVR Microcontroller.	10 06
Q.7	a)	Explain interfacing of Opto-coupler to Microcontroller with suitable diagram and program.	10
	b)	Write a note on Interrupts in PIC microcontrollers.	06

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ľ	M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023								
	ELECTRONICS								
Day 8	Dat	e. We	dnesd:	av 19-07-2023	y (1010)	Max Marks: 80			
Time:	Time: 11:00 AM To 02:00 PM								
Instructions: 1) Q. No. 1 and 2 are compulsory.									
		2)	Attem	pt any three questions	from Q.	No. 3 to 7.			
		5)	riguit			3.			
Q.1	A)	Choc	se the	e correct alternative fr	om the	options. 10			
		1)	a) (Controller	b)	Input			
			c) F	Processor	d)	Plant			
		2)	If a co	ontrol system has one ir	nput and	l one output, it is termed as			
			a) /	_ system. A single feedback	b)	SIMO			
			c) I	МІМО	d)	SISO			
		3)	A par	abolic function has a va	alue of _	for $t > 0$.			
			a) A	At ² /2 At ²	b) d)	0 t ²			
		4)	In firs	" t step of reduction of bl	ock diad	Iram blocks are reduced			
		.,	a) I	Vultiple	b)	parallel			
			c) S	Single	d)	series			
		5)	Positi	ve feedback signal imp	roves	of automatic control system.			
			c) I	nput	d)	error			
		6)		_ Signal will become ze	ro when	the feedback signal and reference			
			signs	are equal.	b)	Foodbook			
			a) [c) [Reference	d)	Input			
		7)	, 	_ is used to obtain trans	sfer func	tion.			
		-	a)	Mason's gain formula	b)	Nyquist Criterion			
		0)	C) E	Bode plot	(D U the fell	Functional analysis			
		8)	a) a	a control system has a good accuracy	II the foi	lowing reatures except			
			b) s	slow response					
			c) (d) s	good stability sufficient power handlin	a capac	ity			
		9)	A blog	ck diagram cannot have	a a				
		-,	a) F	Forward path	b)	 Input signal			
			c) S	Signal flow graph	d)	Feedback path			

10) The number of forward paths of the below signal flow graph is



B) Write true or false.

- An automatic toaster system is an example of closed loop system. 1)
- Feedback increases the stability of the system. 2)
- Chain node of SFG has branches in both directions. 3)
- Type 2 system has zero poles at the origin. 4)
- Root locus technique gives quick transient and stability response. 5)
- SFG uses division rule. 6)

Answer the following. Q.2

16

06

- a) State any two properties of Signal flow graph. Justify each with an example.
- **b)** Write a note on regenerative feedback.
- c) Write a note on Poles and Zeros of the Transfer function of the system.
- d) Define the terms plant, input, output and disturbance in a Control system.

Answer the following. Q.3

a) From the following block diagram draw the corresponding signal flow graph 10 and evaluate closed loop transfer function using mason's gain formula.



b) Define the transient time response specifications Delay time, Rise time, 06 Peak time.

Q.4 Answer the following.

- a) Describe in detail the Nyquist's criteria for the stability of the system. 10
- b) With suitable example describe the closed loop control system. 06

Answer the following. Q.5

- a) Define the term root locus. With suitable example discuss the angle 10 condition and magnitude condition. 06
- **b)** Write a note polar plot.

Q.6 Answer the following.

- a) Compare the Block Diagram representation and Signal flow graph.
- **b)** Examine the stability of control system having characteristic equation 06 $S^{3}+4S^{2}+S+6 = 0$ by Routh's Criterion.

Q.7 Answer the following.

- a) Derive expression for transfer function of the system consisting R and C 10 connected in series and output is taken across Capacitor.
- b) Give the advantages and features of Transfer function. 06

М	Sc. (Semester -	II) (New) ((CBCS)	Fxamii
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(CBCS) Examination: March/April-2023 in (ine ELECTRONICS

Real Time Operating System (MSC21202)

Day & Date: Sunday, 23-07-2023 Time: 11:00 AM To 02:00 PM

Instructions: 1) Question 1 and 2 are compulsory.

- 2) Attempt any Three from Q.3 to Q.7.
- 3) Figure to right indicate full marks.

Q.1 Choose correct alternatives. A)

C)

- The _____ are useful for the enforcement of mutual exclusion and also 1) provide an effective means of inter-process communication.
 - Semaphores a) Monitors
 - Messages b) d) Addressing
- The strategy of making processes that are logically runnable to be 2) temporarily suspended is called _
 - a) Non preemptive scheduling
 - b) Preemptive scheduling
 - c) Shortest job first
 - d) First come First served
- Which can be considered as the lower level in the multitasking operating 3) system?
 - a) process

c) threads

- b) task d) multi threads
- 4) Which term is used to encompass more than a simple context switch?
 - a) process
- single thread system b) multithreads
- c) threads d)
- Choose one of the disadvantages of the priority scheduling algorithm? 5)
 - a) it schedules in a very complex manner
 - b) its scheduling takes up a lot of time
 - c) it can lead to some low priority process waiting indefinitely for the CPU
 - d) none of the mentioned
- If the semaphore value is negative 6)
 - a) its magnitude is the number of processes waiting on that semaphore
 - b) it is invalid
 - c) no operation can be further performed on it until the signal operation is performed on it
 - d) none of the mentioned
- On Linux which of the following is not a valid file type _____. 7)
 - a) Socket Inode b)
 - c) Softlinked FIFO d)

Set

Max. Marks: 80

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		8)	AVR ATmega8L microcontroller has of In-System Self- programmable Flash program memory. a) 1Kbytes b) 4Kbytes c) 8Kbytes d) 16Kbytes	
		9)	 Priority inversion is solved by use of a) priority inheritance protocol b) two phase lock protocol c) time protocol d) all of the mentioned 	
		10)	The amount of time required for the scheduling dispatcher to stop oneprocess and start another is known asa) event latencyb) interrupt latencyc) dispatch latencyd) context switch	
	В)	State 1) 2) 3) 4) 5) 6)	e true or false AVR ATmega8L microcontroller has one 8-bit Timer. The advantages of real-time operating systems is Maximum utilization of devices and systems. Hard real time operating system has Less jitter than a soft real time operating system. In a real time operating system a task must be serviced by its deadline period. For real time operating systems, interrupt latency should be Zero. In Real Time OS, the response time is very critical.	06
Q.2	Ans a) b) c) d)	wer tl Write Write What Expla	he following. e note on Binary semaphore. e note on Mailboxes it is mean by Priority Inversion? ain the structure of embedded system.	16
Q.3	a) b)	Expla Write	ain concept Inter task Communication. e difference between Hard and Soft Real Time Systems.	08 08
Q.4	a) b)	Expla Write	ain in detail Scheduling Algorithm. e concept of Sharing of resources.	10 06
Q.5	a) b)	Expla Write	ain in detail Round Robin scheduling. e note on Kernel Objects.	08 08
Q.6	a) b)	Desig Write	gn embedded systems for Measurement of pH. e note on POSIX Pthreads.	10 06
Q.7	a) b)	Expla Write	ain in detail Messages, Queues. e note on context switching.	10 06

Seat No.						Set	Ρ
M	.Sc. (S	emester -	II) (New) (CBCS) I FL FCTRO	Exami	nation: March/Ap	oril-2023	
			Opto Electronics	(MSC	21206)		
Day & [Time: 1	Date: Tu 1:00 AN	esday, 25-0 ⁻ 1 To 02:00 P	7-2023 M			Max. Marks	: 80
Instruc	tions: 1 2 3) Q. No. 1 ai 2) Attempt an 3) Figure to ri	nd. 2 are compulsory. ny three questions fror ight indicate full marks	n Q. No s.	. 3 to Q. No. 7		
Q.1 A	a) Cho 1)	o se correct Transmissi a) sound c) light	t answer. ion through optical fibe	er is of t b) d)	he form electricity speed		10
	2)	Function of a) resha b) only a c) both a d) none	f receiver in optical fib the degraded sign amplify a degraded sig amplify and reshape the of these	er is to al only gnal he degra	 aded signal		
	3)	A graded ir a) Less b) Less c) Less d) Less	ndex profile in optical waveguide dispersion material dispersion in attenuation in SI profi modal dispersion thar	fiber cal than S than SI le n SI prof	ble provides: I profile profile file		
	4)	Light propa a) total i c) both a	agates along optical fil nternal reflection a & b	ber by _ b) d)	 total internal refract either a or b	ion	
	5)	Attenuatior a) dB/kn c) kdB/n	n in optical fiber can b n n	e meas b) d)	ured in dB/m dBm/m		
	6)	Total interr a) Diam c) air to	nal reflection can take ond to glass water	place w b) d)	hen light travel from water to glass air to glass	·	
	7)	At critical a a) light r b) light r c) There d) None	angle of incidence ay in air is perpendicu ay in air is parallel to a is no such relation of the above	 ular to g glass su	lass surface ırface		
	8)	Scattering a) $1/\lambda^2$ c) $1/\lambda^4$	loss in optical fiber va	ries with b) d)	h wavelength as $1/\lambda^3$ $1/\lambda$	·	
	9)	is th a) 10 ⁹ Hz c) 10 ¹⁴ H	ie transmission freque z Iz	ency in c b) d)	optical fiber. 10 ¹¹ Hz 10 ⁻⁹ Hz		

		 10) RI of core is higher than that of cladding because a) better confinement of light b) maximum distance operation c) easy to handle d) higher life time of material 					
	В)	 State True of False. To be used as photo detector, PIN diode should be connected forward bias. Glass having the highest refractive index Higher emission efficiency is applicable for LASER. Photo detector is square low device. The relation between bandwidth of an optical fiber and NA is BW α 1/NA. In the first window of optical fiber, light source are generally GaAIAs. 	06				
Q.2	Ans [•] a) b) c) d)	wer the following. Compare step index fiber and graded index fiber. What are the different advantages of optical fiber communication? A step-index fiber has a numerical aperture of 0.26, a core refractive index of 1.5 and a core diameter of 100 micrometer. Calculate the acceptance angle. Write a note on splicing and connectors.	16				
Q.3	Ans a) b)	wer the following. Explain the techniques of glass fiber fabrication. Describe briefly PIN photodiode.	16				
Q.4	Ans a) b)	wer the following. Explain the working of pocket cell as modulator and Kerr modulator. Explain the construction and principle of operation of He-Ne laser.	16				
Q.5	Ans ⁻ a) b)	 wer the following. Explain working principle and characteristics of photo transistors. Explain terms: i) NA ii) Acceptance angle iii) acceptance cone 	16				
Q.6	Ans a) b)	wer the following. With neat diagram describe the elements of optical fiber communication System. Describe briefly the action of LED with its types.	16				
Q.7	Ans a) b)	16 Discuss the operation of APD with neat sketch. What is modulation? Discuss intensity modulation with special reference to fiber optic instrumentation.					

Cascade

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M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023 **ELECTRONICS Digital Signal Processing (MSC21301)**

Day & Date: Monday, 10-07-2023 Time: 11:00 AM To 02:00 PM

Instructions: 1) Question 1 and 2 are compulsory.

2) Attempt any Three from Q.3 to Q.7.

3) Figure to right indicate full marks.

Choose the correct alternatives from the given options. Q.1 A)

- 1) Sampling rate conversion by the rational factor I/D is accomplished by connection of interpolator and decimator.
 - Parallel a) b)
 - Convolution d) None of the mentioned c)
- The Fourier transform of real valued time signal has 2)
 - a) odd symmetry b) even symmetry
 - c) conjugate symmetry no symmetry d)
- An IIR system with system function H(z) = B(z)/A(z) is called a 3) minimum phase if _____.
 - a) All poles and zeros are inside the unit circle
 - b) All zeros are outside the unit circle
 - c) All poles are outside the unit circle
 - d) All poles and zeros are outside the unit circle
- The *z*-transform of a sequence x(n) which is given as 4)
 - $X(z) = \sum_{n=-\infty}^{\infty} x(n) z^{-n}$ is known as _____.
 - a) Uni-lateral Z-transform **Bi-lateral Z-transform** b)
 - c) Tri-lateral Z-transform d) None of the mentioned
- In bilinear transformation, the left-half s-plane is mapped to _____ 5) statement in the z-domain.
 - a) Entirely outside the unit circle |z| = 1
 - b) Partially outside the unit circle |z| = 1
 - c) Partially inside the unit circle |z| = 1
 - d) Entirely inside the unit circle |z| = 1
- Final value theorem is used for 6)
 - a) All type of systems Stable systems b)
 - marginally stable systems c) Unstable systems d)
- 7) If we reverse the directions of all branch transmittances and interchange the input and output in the flow graph, then the resulting structure is called as
 - a) Direct form I
- Direct form II b)
- c) Transposed form None of the mentioned d)
- _ is the odd component of the signal $x(t) = e^{(jt)}$ 8)
 - i*sint a) cost b)
 - j*cost d) sint c)

Max. Marks: 80

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- The anti-symmetric condition with M even is not used in the design of 9) linear-phase FIR filter.
 - High pass b)
 - Band pass Bans stop c) d)
- 10) is the linearity property of z-transform. $[x(n) \leftrightarrow X(z)]$
 - $x(n) + y(n) \leftrightarrow X(z)Y(z)$ $x(n) + y(n) \leftrightarrow X(z) + Y(z)$ b) a)
 - $x(n)y(n) \leftrightarrow X(z) + Y(z)$ d) $x(n)y(n) \leftrightarrow X(z)Y(z)$ C)

B) State true or false.

a)

- If the discrete time LTI system is BIBO stable Entire z-plane, except at 1) $z = \infty$ is the ROC of the system function H(z).
- Interpolation has to be performed in sampling rate conversion by 2) rational factor.
- 3) x(t) or x(n) is defined to be an energy signal, if and only if the total energy content of the signal is a finite quantity.
- 4) The function given by the equation x(n) = 1, for n = 0; x(n) = 0, for $n \neq 0$ is a unit step function.
- The direct evaluation DFT requires N² complex multiplications. 5)
- FIR filters are non-recursive and do not adopt any feedback. 6)

Q.2 Answer the following.

Write a note on Bilinear transform filter. a)

Low pass

- Find the Fourier transform of $x(t) = e^{-3t}[u(t+2) u(t-3)]$ b)
- Write a note on quantization with A/D conversion. c)
- What are the advantages and disadvantages of window method? d)

Q.3 State and prove final value theorem of ZT. a) **08** Obtain the Fourier transform of triangular pulse. 80 b) Prove that multiplication of two DFTs is equivalent to the circular convolution Q.4 a) 10 of their sequences in time domain. Obtain IZT using residue method from $X(Z) = Z(Z+1)/(Z-1)^2$ 06 b) Q.5 An analog filter has the transfer function H(s) = 1/s + 1 using BLT technique **08** a) determine the transfer function of digital filter H(Z) and also write he difference equation of digital filter. Find the FT of **08** b) 1) sgn(t) 2) u(t) State unilateral Z-transform. Prove shifting property of unilateral ZT using Q.6 80 a) time advance function. Determine 2-point and 4-point DFT of a sequence. 80 b) x(n) = u(n) - u(n-2) sketch the magnitude of DFT in both cases.

Q.7 a) A LTI is described by equation 10 2y(n) + 3y(n-1) + y(n-2) = u(n) + u(n-1) - u(n-2) find the response of system when initial conditions are given by y(-1) = 2 and y(-2) = -1 and when unit step is applied at the input. 06

Write a note on PFE method. b)

16

]	M.So	c. (Se	emest	ter - III) (New) (CBCS) ELECTRO	Examir NICS	nation: March/April-2023
			Adva	inced Digital Design w	vith VH	DL (MSC21302)
Day o Time	& Dat : 11:0	e: Tue 00 AM	esday, To 02	11-07-2023 2:00 PM		Max. Marks: 80
Instr	uctio	o ns: 1) 2) 3)	Q. No Atten Figur	os. 1 and. 2 are compulsory npt any three questions from re to right indicate full marks	y. m Q. No. s.	3 to Q. No. 7
0.4	• >	<u>Oh a</u>				40
Q.1	A)	1)	The \ a) c)	/HDL is utilized for c Analog both a & b	design. b) d)	Digital none of these
		2)	The r a) c)	meaning of 'L' is in D Low weak 0)ata Type b) d)	es STD_LOGIC_1164. 0 all of these
		3)	The p a) c)	blace and route is included Back both a & b	in b) d)	end level design. Front Mixed
		4)	The e a) c)	exit and next statements are Outside both a & b	e used or b) d)	nly loop statement. Inside none of these
		5)	The p a) c)	backage std_logic_1164 is a Library Type	accessed b) d)	l by clause. Use Both a & b
		6)	The (a) c)	Generate statement is Sequential Process	_ statem b) d)	ent. Concurrent All of these
		7)	The _ a) c)	value is assigned by Signal Constant	<= assig b) d)	nment operator. Variable All of these
		8)	The _ a) c)	are the programming SRAM Flash	g technolo b) d)	ogies used for PLD. EPROM all of these
		9)	The L state a) c)	-OOP statement is used to ment. Sequential both a & b	iterate th b) d)	rough the set of Concurrent Mixed
		10)	The V a) c)	VHDL is description Software both a & b	language b) d)	e. Hardware Logic

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Page **2** of **2**

	B) State True of False.				
		1)	The data attributes return data information regarding a data vector.		
		2)	The '&' operator is addition operator used in VHDL code.		
		3)	The WAIT statement is a concurrent statement.		
		4)	The PLD devices are utilized for analog logic circuit design.		
		5)	The operator NAND and NOR are not associative.		
		6)	The PROCESS statement is itself concurrent statement.		
Q.2	Ans	wer th	ne following.	16	
	a)	Expla	in basic terminology of VHDL.		
	b)	Discu	ss advantages of VHDL.		
	C)	Expla	in the syntax of Process statement.		
	d)	Expla	in the architecture of FPGA.		
Q.3	a)	State	and Explain the role of various types of architecture bodies in VHDL	10	
		using	suitable example.		
	b)	Write	VHDL code for 8:1 demux using behavioral modelling.	06	
Q.4	a)	Expla	in the various language element of VHDL and Explain operators in	10	
		detail.			
	b)	Write	VHDL code for serial in serial out shift register.	06	
Q.5	a)	What	do you mean Attributes and Generic. Explain it with suitable example.	10	
	b)	Write	VHDL code for 8-bit input comparator.	06	
Q.6	a)	Expla	in the LOOP statement in detail with suitable example.	10	
	b)	Write	VHDL code for 3:8 decoder.	06	
Q.7	a)	Expla	in the EDA tools. Write a note on Macrocell	10	
	b)	Write	VHDL code for one digit counter.	06	

0)	OIX	α)	Eight	
When are	the processor is executing in j	azelle	e state, then all instructions	\$
a)	16 bit	b)	8 bit	
c)	32 bit	d)	64 bit	
Single	e 10-bit DAC provides variable		_output.	
a)	Digital	b)	Analog	
c)	Analog and digital	d)	Neither analog nor digital	
The A instrue	RM and thumb instruction set a ction set.	and ja	wa byte codes are	
a)	Java	b)	Jazelle	
c)	ARM	d)	None of these	
				Page 1 of 2

Day Time	& Dat : 11:0	e: Wedne 00 AM To	sday, 12-0 02:00 PM	07-2023				
Instr	uctio	n s: 1) Q. 2) Att 3) Fig	Nos. 1 an empt any jure to righ	d 2 are co three que nt indicate	ompulsory stions fro full mark	′. m Q. No. s.	3 to Q. No	o. 7
Q.1	A)	Fill in th 1) a)	e blanks is the Intel	by choos founder c	s ing corre of LPC214	e ct altern 8 board. b)	atives gi v Atmel	/en

Q.1 A) n below.

M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023 **ELECTRONICS** ARM Microcontroller and system design (MSC21306)

- a) Intel b)
- Motorola d) C)
- 2) The main importance of ARM micro-processors is providing operation with
 - a) Low cost and low power consumption
 - b) Higher degree of multi-tasking
 - Lower error or glitches c)

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Efficient memory management d)

ARM7TDM1 controller is present in 3)

- a) 128 bit b) 8 bit
- 64 bit d) 32 bit c)
- 4) The USB controller provides high speed interface to laptop or PC with a speed of
 - On-chip USB with 12Mb/s a) c)
- On-chip USB with 15Mb/s b) Peripheral USB with 12Mb/s d) Peripheral USB with 15Mb/s

Philips

5) The address space in ARM is _____

9)

- 2⁶⁴ 2²⁴ a) b) 2¹⁶ 2³²
 - C) d)
- The ARM instruction set architecture divided into _____ classes of 6) instructions.
 - a) Two b) Four d) Fight Six c)
- 7) When the pro are w
 - a) 16 bit
 - C) 32 bit
- Single 10-bit 8)
 - a) Digital
 - C) Analog

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Max. Marks: 80

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- 10) AMBA bus stands for
 - **ARM Microcontroller Bus Architecture** a)
 - Advanced Microcontroller Bus Architecture b)
 - **ARM Microprocessor Bus Architecture** c)
 - None of the mentioned d)

State true or false B)

- 1) LPC2148 provides real time debugging with the on chip real monitor software.
- USB 2.0 full speed compliant device controller with 8KB of end point 2) RAM.
- 3) The ARM processors don't support Byte addressability.
- LPC2148 have in system programming or in application programming 4)
- All instructions in ARM are conditionally executed. 5)
- ARM processors where basically designed for mobile system. 6)

Q.2 Answer the following

- What are the features of LPC2148? a)
- Write a note on SPSR. b)
- Explain the Multiply instruction. C)
- d) What are the types of CORTEX-M series?

Q.3 Answer the following

Explain the architecture of LPC2148 and its features. 10 a) Explain the operation of ARM pipeline for simple instructions. 06 b) Q.4 Answer the following Explain the designing of embedded system for the interfacing of relay using 10 a) LPC2148. Explain the bus technology? Describe the APB bus architecture of ARM 06 b) processor. Q.5 Answer the following What are the features of LPC2148? Explain the timers and counters of a) **08** LPC2148. Explain Arithmetic and Logical instructions in ARM processor with 08 b) examples.

Q.6 Answer the following

Q.7

a)	Explain the PLL0 and PLL1 of LPC2148.	08
b)	Explain the I ² C bus serial I/O controller.	08
Ans a)	swer the following What is interfacing? Explain the development of embedded system for the	10

- interfacing of temperature using LPC2148.
- b) Explain Interrupt latencies of ARM processor.

		2 3	Attempt any three questions from Q. No. 3 to Q. No. 7 Figure to right indicate full marks.	
Q.1	A)	Fill i 1)	n the blanks by choosing correct alternatives given below. In nMOS enhancement transistor the drain current' is not influenced by	10
			 a) channel width b) threshold voltage c) thickness of SiO₂ d) IC packaging 	
		2)	Silicon on insulator process usesto grow gate oxide layer.a) ion implantationb) thermal oxidationc) diffusiond) epitaxy	
		3)	view captures the activity of a circuit over time.a) temporalb) topologicalc) behaviorald) Hierarchical	
		4)	Logical '1' level is normally set to a value between volts. a) 5 to 10 b) 3.5 to 12 c) 1.5 to 15 d) 3.5 to 10	
		5)	The nMOS enhancement device is cut off whena)Vgs = Vtb)Vgs < Vt	
		6)	In the operation of CMOS inverter, the region exists for Vin= VDD/2. a) A b) B c) D d) C	
		7)	a) $\beta \alpha T^{-2}$ b) $\beta \alpha T$ c) $\beta \alpha T^{-1.5}$ d) $\beta \alpha T^{-2}$	
		8)	Op a rMOS device has output impedance.a) finiteb) infinitec) zerod) higher	
		9)	The cut - off region of operation of MOS device is also called asa)Linearb)Subthresholdc)Saturationd)Unsaturation	
		10)	Silicon wafer is maintained at temperature for dry oxidation.a) 1200°Cb) 1000°Cc) 900°Cd) 1500 °C	

Instructions: 1) Q. Nos. 1 and 2 are compulsory.

ÉLECTRÓNICS **CMOS Design Technologies (MSC21316)**

Day & Date: Wednesday, 12-07-2023 Time: 11:00 AM To 02:00 PM

M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023

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Max. Marks: 80

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	B)	 State true or false The carrier mobility μ is given by V/E. PMS is not a design environment. The typical value of process gain factor Kp is given by 10 to 30. Transistor gain factor β is independent of Vds. Ge is the starting material for the fabrication of MOS device. βn/βp ratio of 10 is desirable. 	06
Q.2	Ans a) b) c) d)	Swer the following Write a note $\beta n/\beta p$ ratio. Draw the structure of CMOS inverter. Explain its working. Give the features and advantages of SOI process of fabrication. Write a note on Id-Vds relationship.	16
Q.3	Ans a) b)	swer the following Describe the operation of nMOS enhancement transistor. What is the oxidation process in the CMOS fabrication? Explain its two types.	10 06
Q.4	Ans a) b)	swer the following Explain the switching characteristics of MOS device. Explain the working of transmission gate.	08 08
Q.5	Ans a) b)	swer the following Explain the concept of power dissipation. Discuss its types. Explain the operation of pseudo nMOS transistor.	10 06
Q.6	Ans a) b)	swer the following Discuss the representation issues of digital Electronic Design. Describe the process of placement in CAD.	08 08
Q.7	Ans a) b)	swer the following With neat diagram discuss the latchup. Give the techniques of latchup prevention. With neat diagram discuss the concept of threshold voltage in MOS device.	08 08

Page	1	of	2
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No.	

M.Sc. (Semester - IV) (New) (CBCS) Examination March/April-2023 ELECTRONICS

Microwave Devices, Antennas and Measurements (MSC21401)

Day & Date: Monday, 10-07-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) Question 1 and 2 are compulsory.

- 2) Attempt any Three from Q.3 to Q.7.
- 3) Figure to right indicate full marks.

Q.1 A) Choose the correct alternatives from the given options.

- 1) The power gain of a half wave dipole with respect to an isotropic radiator is _____.
 - a) 1 db b) 2.15 db
 - c) 3 db d) 6 db
- 2) The scattering parameters are used to indicate _____.
 - a) Permittivity and permeability
 - b) Electric and magnetic field intensities
 - c) Reflection and transmission coefficients
 - d) Frequency and wavelength

3) GaAs is used in fabricating Gunn diode. Gunn diode is _____.

a) bulk device

5)

- b) sliced device
- c) made of different type of semiconductor layers
- d) none of the mentioned

The dominant wave should have _____.

- a) no phase shift b) no attenuation
- c) highest cut-off frequency d) lowest cut-off frequency
- _____ microwave tube uses buncher and catcher cavities.
 - a) Magnetron b) Klystron
 - c) Reflex klystron d) Travelling wave tube
- 6) Polarization of EM wave is in _____
 - a) the direction of electric field
 - b) the direction of magnetic field
 - c) the directions of electric and magnetic field
 - d) none of the mentioned
- 7) _____ is not an Omni-directional antenna.
 - a) Half-wave dipole b) Logic periodic
 - c) Discone d) Marconi
- 8) Under ideal conditions, when a PIN diode is used as a switch, the switch must have _____ insertion loss in the ON state.
 - a) Zero
 - b) Maximum
 - c) Average
 - d) Insertion loss cannot be defined for a switch

Set F

Max. Marks: 80

		9)	Max a) c)	well's equation for electromagnetic waves in a waveguide is $\nabla \times E = -j\omega\mu(vector E)$ b) $\nabla \times E = -j\omega\mu(vector H)$ $\nabla \times H = -j\omega\mu(vector H)$ d) $\nabla \times H = j\omega\mu(vector H)$	
		10)	The a) b) c) d)	correct sequence to find H, when D is given is D-E-B-H D-B-E-H It cannot be computed from the data given D-H	
	B)	State	e true	e or false.	06
		1)	The S comp	SWR on a transmission line is infinity; the line is terminated in blex impedance.	
		2) 3)	A hol The f	llow rectangular waveguide does not support TEM mode of propagat first Maxwell law is based on Faraday and Lenz law.	ion
		4)	A ma	ijor disadvantage of klystron amplifier is Low bandwidth.	
		5)	The p	parameters S ₁₁ and S ₁₂ indicate the transmission coefficients.	
		6)	When	n the separation between two lines that carry the TEM wave	
			appro	baches λ the wave tends to be radiated.	
Q.2	Ans	wer tl	he fol	llowing.	16
	a)	What	t is M	icrowave? What are the applications of microwave?	
	b)	Write	a no	te on Multicavity Klystron Amplifiers.	
	c)	What	t is ar	ntenna? Explain Horn Antenna.	
	a)	Disti	iguisi	n between mansmission Line and waveguide	
Q.3	a)	Write	e a no	te on Rat Race Junction. Explain Directional Couplers.	08
	b)	Deriv	e the	e wave equation in good conductor.	08
Q 4	a)	What	t are t	the Maxwell's equations? Explain with its boundary conditions	10
Q ,1	b)	Write	a no	ote on Gunn Effect. Explain InP Diode.	06
0 F	- \				
Q.5	a)	Expla	ain ivi As	odes in waveguides. Derive the wave equation for TE and TM	08
	b)	What	t is S\	WR? Explain SWR of impedance and admittance.	08
0.6	a)	\\/rita		to an transmission line. Derive the transmission line equation	00
Q.0	a) b)	Disci	uss sl	lot and microstrip antennas.	08
	,	2.000			
Q.7	a)	A cei	rtain t	transmission line has a characteristics impedance is $[75 + j0.01\Omega]$	10
		anu i 1)	s tem Refle	ction coefficient (Γ)	
		2)	Trans	smission coefficient (T)	
		3) j	$T^{2} -$	zl [1 Γ^2]	
			1 =	$\frac{1}{20}$	
	b)	Expla	ain Re	eflex Klystrons tube and RWH theory.	06

	M.Sc	с. (Se	emester - IV) (New) (CBCS) Examination: Ma	rch/April-2023
		Ν	Networking and data communications (MSC2	21402)
Day Time	& Dat : 03:0	te: We 00 PM	ednesday, 12-07-2023 M To 06:00 PM	, Max. Marks: 80
Instr	ructio	o ns: 1) 2 3	1) Q. Nos. 1 and. 2 are compulsory. 2) Attempt any three questions from Q. No. 3 to Q. No. 7 3) Figure to right indicate full marks.	7
Q.1	A)	Cho 1)	Dose correct alternative. In OSI model Trailer bit is added at a) Physical layer b) Network lay c) Data link layer d) Application	10 er layer
		2)	SONET standard has layers. a) 7 b) 4 c) 3 d) 5	
		3)	In byte stuffing process is added if a flag like s in the. a) ESC b) Flag c) 0 bit d) 1 bit	tructure appears
		4)	The TDD-TDMA is a type of communication. a) full duplex b) duplex c) half duplex d) Simplex	
		5)	NRZ unipolar scheme of coding defines bit 1 by a) Zero b) Negative c) Positive d) both positiv	_ voltage level. e and negative
		6)	In PM of the carrier wave is modulated to follow voltage level of modulating signal. a) Peak amplitude b) Frequency c) Phase d) Delta	w the changing
		7)	 A composite signal is a combination of a) Simple sine waves of different phases b) Simple cosine waves of different amplitudes c) Sine waves of different frequency d) Sine waves of different wavelength 	
		8)	The routing table may be table. a) dynamic b) static c) both a and b d) none of the	se
		9)	The B8ZS replaces 8 consecutive zeros witha) 00V0V00Bb) 000VB0VBc) B00V0B0Vd) 000BV0VB	

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		10)	add a) c)	can be ress throug Dual stac Header tr	used to transf gh IPv6 region king anslation	er an IP ì.	v4 pa b) d)	acket to the device with IPv4 Piggybacking Tunneling	
	B)	State 1) 2) 3) 4) 5) 6)	e tru The The HTT Per Uns A B	e or false ATM is by RG-58 is P function formance of hielded tw luetooth de	te relay Proto used for thin E s are combina of the following isted pair cabl evice has a rai	col. Ethernet. ation of l g is not a les are u nge is 10	JDP cha sed)0m.	and TCP. racteristic of data flow. ini0 Base- T network.	06
Q.2	Ans a) b) c) d)	wer th Expla Write Desc Expla	ne fo ain S a no ribe ain H	llowing MTP. ote on ATM IPv6 Addre DLC protoc	l Technology. esses. col.				16
Q.3	Ans a) b)	 Answer the following a) Describe the Addressing of TCP/IP. b) What is mean by Network? Explain categories of Network. 						08 08	
Q.4	 Answer the following a) Explain Remote Logging and Electronic mail. b) Explain Architecture of IEEE 802.11. 						10 06		
Q.5	Answer the followinga) Discuss Connecting devices.b) Explain IP Security.						08 08		
Q.6	Ans a) b)	wer tł Expla Expla	ne fo ain W ain S	llowing /WW and H ONET Netv	ITTP. work.				08 08
Q.7	Ans a) b)	wer tł Discu Write	ne fo iss th a no	Ilowing ne OSI mod ote on stop	del in detail. and wait ARC	Q protoco	ol.		10 06

b) Write a note on stop and wait ARQ protocol.

-,		- /							
The	parabolic as well as square due to the symmetry of the	well ne po	wave functions solutions are tential well.						
a) b)	symmetric or antisymmetric Sine functions	·							
c) d)	neither asymmetric or antisymmetric Cosine functions								
The	synonym of MODFET is		Madulation acids deviad FFT						
a) c)	modulation doped FET	b) d)	None of these						
The SiGe heterojunctions have lattice constant difference between Si and Ge, which is about 4%.									
a)	Small	b)	Large						
c)	Equal	d)	None of these						
The	OLED's are an electrolumir of different work function	nesce s.	nt organic material between two						
a)	Semiconductors	b)	Nonconductors						
c)	insulator	d)	conductors						

Seat No.

M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2023 **ELECTRONICS** Nanoelectronics (MSC21403)

Day & Date: Friday, 14-07-2023 Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 1 and 2 are compulsory.

- 2) Attempt any three questions from Q. No. 3 to Q. No. 7.
- 3) Figure to right indicate full marks.

Q.1 A) Choose correct answer.

- lithography, a film of water or another dielectric medium is 1) In inserted in between the lens and wafer.
 - a) Optical b) electron beam
 - c) Immersion d) ultraviolet
- If characteristics $\lambda > Lx$ and $Lx \ll Lz$, Ly then it stands for 2) quantum____.
 - a) Dot Wire b)
 - c) Well artificial d)

For a _____ photoresist, the resist material is initially insoluble and 3) through a chemical reaction when exposed to light it become soluble.

- a) positive b) negative
 - c) Lithography d) IC

4) For triangular well, the energy levels (En) are proportional to _____.

- a) n^{2/3} b) n
- n^{1/3} c) n² d)
- The transistor having 100nm dimensions obeys_____ principle. 5)
 - a) Quantum classical physics b)
 - c) both a & b d) none of these
- 6) The
 - a)
 - b)
 - C)
 - d)

9)

- 7) The
 - a)

C) The 8)

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Max. Marks: 80



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		10)	In case of Type I multiple quantum well (MQW) the wells for hole a electron are located in the space location. a) Alternate b) Same c) Different d) triangular	ınd				
	B)	State 1) 2) 3) 4) 5) 6)	e true or false. The zero DEG structure is often called as artificial atoms The organic semiconductor has π and σ bonds The homo-structures are made from the same material with non- uniform doping. The motion of particle in the nanoworld is determined by wave and quantum mechanics. If $\lambda > L_X, L_y$ and $L_X, L_y << L_z$ then it stands for quantum well. The particle moves throughout the structure without scattering is called diffusive regime of particle.	06				
Q.2	Ans a) b) c) d)	swer ti Explai Discu Discu Explai	he following. In the quantum well and dots in brief considering the lengths. Iss advantages of the nanostructures over microelectronics. Iss nanotechnology and nanoelectronics. In the lithography technique for nanostructure fabrication.	16				
Q.3	Ans a) b)	Iswer the following. What do you mean by MOSFET structures? Write a note on quantum wire.						
Q.4	Ans a) b)	Answer the following.						
Q.5	Ans a) b)	swer ti Expla Expla	he following. iin in detail Heterojunctions. iin the triangular quantum well.	10 06				
Q.6	Ans a) b)	swer tl Explai super Write	he following. in the concept of superlattice and discuss the Kronig-Penney model flattice. a note on multiple quantum well.	of 10 06				
Q.7	Ans a) b)	swer tl Explai Write	he following. iin in detail tunneling effect and tunneling elements. a note on OLED.	10 06				

T a c	he PLC was invented by) Bill Gates) Bill Landis	 b) d)	Dick Morley Tod Cunningham
N fc	letwork type used by time divi or DCS is	sion m	nultiplex access (TDMA) protocol
a c) Ring) Bus	b) d)	Tree None of these
T a c	he determines which rac) Rack number) Both a and b	ck the b) d)	module sits in. Terminal number None of these
lr o a	normally contact, whe ut some kind of action.	n this b)	contact open, the function carries
C) Latch	d)	None of these
lr n	PLC ladder diagram, the umber of lines to the OFF star	tu te.	Irns the following specified
a c) SK) MCR	b) d)	MC All of these
S a b c d	 ynonym of DCS is a) Distributed control system) Data control system) Data column system) Distributed column system 		
lr a c	 PLC OG stands for the Operated Group Output Group 	 b) d)	Open Group All of these

Q.1 A)	A)	Choose correct alternative.							
		1) The type of memory which is fast and temporarily stores the							

2) Attempt any three questions from Q. No. 3 to Q. No. 7.

data are

M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2023 **ELECTRONICS Mechatronics and Industrial Automation (MSC21406)**

- immediately required for use is called as_
 - a) HDD b) ROM
 - c) RAM d) SSD
- First Generation SCADA system known as _____SCADA system. 2)
 - a) Monolithic b) Networked
 - Wireless
 - c) Wired d)

3)

- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

SLR-SJ-19

Set Ρ

Seat No.

Day & Date: Sunday, 16-07-2023

Instructions: 1) Question no. 1 and 2 are compulsory.

3) Figure to right indicate full marks.

Time: 03:00 PM To 06:00 PM

10

Max. Marks: 80

		10)	Par a) c)	rallel connection of ladde Coils Networks	ər logic is b) d)	s	typically called Rungs Branches	
	B)	State 1) 2) 3) 4) 5) 6)	tru The The cor The The RT	e or false. e I/O task is a heart of a e programming device is e abbreviations NO and ntact when the switch is e conventional relay ope e memory map of PLC for U stands for Remote Tra	SCADA a brain NC reprend not actuation rated fast or input i ansmitte	o es at st in	ystem. f a PLC system. sent the electrical state of switch ed. er than PLC. hage status area is 8 words. Unit.	06
Q.2	Ans a) b) c) d)	swer th Explai Explai What a List do	n pr n pr n su are wn	ollowing. ofibus for SCADA. ubtraction functions of Pl the types of control syste PLC programming meth	LC. ems in m rods.	ne	chatronics?	16
Q.3	Ans a) b)	swer th Explai Write a	ne fo n in a no	bllowing. detail basic architecture ote master control relay a	e of DCS	i. Je	encer functions in PLC.	08 08
Q.4	Ans a) b)	swer th Explai Write a	ne fo n th a no	ollowing. e design of ladder diagra ote on serial communicat	am for pr tion in Pl	ro L(cess control description. C.	10 06
Q.5	Ans a) b)	swer the following. Explain open and closed loop system in mechatronics. Explain SCADA protocols.					08 08	
Q.6	Ans a) b)	swer th Explai Explai	n e fo n ac n pr	ollowing. dvantages and disadvan rogramming for ON-OFF	tages of inputs a	n an	nechatronics systems. d ON-OFF Outputs in PLC.	08 08
Q.7	Ans a) b)	swer th Explai Write a	n <mark>e fo</mark> n in a no	ollowing. detail architecture of CC ote on IO modules and th	CS syste	m	n. cteristics in PLC.	10 06

Seat No.						Set	Ρ
М.:	Sc. (Se	mester - IV)	(New) (CBCS) ELECTRC	Exa NIC	mination: March/Ap S	ril-2023	
Day & D Time: 0	0ate: Sur 3:00 PM	Mixed Sigr iday, 16-07-202 To 06:00 PM	23	De	sign (MSC21409) M	lax. Marks	: 80
Instruct	t ions: 1) 2) 3)	Question no. 1 Attempt any th Figure to right	and 2 are compu ree questions fro indicate full mark	ulsory m Q. s.	r. No. 3 to Q. No. 7.		
Q.1 A)) Choc 1)	se correct alte In case of PSc a) SRAM c) Flash	ernative. C devices the Bo	ot pro b) d)	ogram is stored in SROM PROM		10
	2)	System that ca a) static reco c) dynamic re	an change its beh nfiguration econfiguration	avior b) d)	during run time is called one-time configuration none of these	as	
	3)	a) CPLDXC9 c) microcontr	ed signal based S 572 oller 8051	oC d b) d)	evices. PSoC1 microprocessor 8086		
	4)	VC1 is derived a) VC2 c) VC3	l from	b) d)	PLL Sysclk		
	5)	PSOC1 device a) Odd c) both odd a	e has global	di b) d)	gital bus inter connect. Even only odd or only even		
	6)	The PSoC1 de configurable d a) 12 c) 24	evice from Cypres igital blocks.	b) d)	nprises an array of 16 4	_	
	7)	Netlist produce a) Synthesis c) post-layou	ed frompr	oces b) d)	s. pre-layout simulation none of these		
	8)	M8C has a) 3 c) 5	internal regist	er. b) d)	4 6		
	9)	In continuous t configured up a) 2 c) 48	time analog block to	of P b) d)	SoC devices the gain car 256 18	n be	
	10)	For programm a) UART c) I2C	able communicat	ion in b) d)	terface is used. SPI All of these		

Set P

06	
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16

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06

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08

80 08

		 SRAM stores only local variable in M8C processor of PSoC1. The delta sigma ADC consist buffer, decimator and modulator blocks. PSoC 5 consists of ARM Cortex as processing core. BiCMOS is the combination of BJT and CMOS transistor.
Q.2	Ans a) b) c) d)	swer the following. Write a note on memory subsystem. Describe continuous time analog block as integrator. Write a note on Quantization. Write a note on programmable gain amplifier.
Q.3	Ans a) b)	swer the following. What is Nyquist theorem for sampling? Describe with suitable block diagram first order delta sigma ADC. Characteristics of Mixed Signal VLSI design.
Q.4	Ans a) b)	swer the following. With suitable block diagram describe the design of mixed signal based system on chip for measurement of temperature. Describe switched capacitor block as comparator.
Q.5	Ans a) b)	swer the following. With suitable diagram describe fundamental architecture of digital PSoC block. Draw a diagram for summing amplifier based on switched Capacitor Principal and explain it.
Q.6	Ans a) b)	swer the following. What are subsystems of PSoC1 device? Describe in detail Clock system of the PSoC devices. Write a note on configuration of global IO ports of PSoC 1.
Q.7	Ans a) b)	swer the following. With block diagram describe architecture of M8C core. Describe in detail SPI block of PSoC device.

Nyquist sampling theorem states that the sampling signal frequency

should be half the input signal's highest frequency. SWAP instruction used to exchange the content.

B)

1)

2)

Write true or false.