K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SESSION: 2022-2023 (ODD SEMESTER)
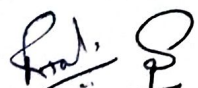### III SESSIONAL TEST QUESTION PAPER
SET-A

USN

Degree : B.E	Semester : III A & B
Branch : Electronics and Communication Engineering	Course Code : 21EC32
Course Title : Digital System Design Using Verilog	Date : 27/03/2023
Duration : 60 Minutes	Max Marks : 20

Note: Answer ONE full question from each part.

Q No.	Question	Marks	K-Level	CO mapping
PART-A				
1(a)	Illustrate with examples Verilog Arithmetic operators giving operator symbol, description and result type.	5	Understanding (K2)	CO4
(b)	Construct a Verilog code in structural modeling style to realize full subtractor using gates.	5	Applying (K3)	CO5
OR				
2(a)	Elaborate with examples Verilog data-types: nets and registers.	5	Understanding (K2)	CO4
(b)	Construct a Verilog code in structural modeling style to realize Boolean expression f(a,b,c)=a'bc+ab'c' using gates.	5	Applying (K3)	CO5
PART-B				
3(a)	Develop a Verilog code to realize 2X1 mux with active low enable in dataflow modeling style.	5	Applying (K3)	CO4
(b)	Explain the structure of Verilog HDL behavioral description with example.	5	Understanding (K2)	CO5
OR				
4(a)	Model a Verilog code to realize full adder in dataflow modeling style.	5	Applying (K3)	CO4
(b)	Explain Verilog IF and ELSE-IF statements with suitable example for each.	5	Understanding (K2)	CO5

Course Incharge   HOD   IQAC- Coordinator   Principal

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SESSION: 2022-2023 (ODD SEMESTER)
III SESSIONAL TEST QUESTION PAPER
SET-B

USN

Degree : B.E	Semester : III A & B
Branch : Electronics and Communication Engineering	Course Code : 21EC32
Course Title : Digital System Design Using Verilog	Date : 27/03/2023
Duration : 60 Minutes	Max Marks : 20

Note: Answer ONE full question from each part.

Q No.	Question	Marks	K-Level	CO mapping
PART-A				
1(a)	**Explain** with examples Verilog logical bitwise operators giving operator symbol, gate, operand type and result type.	5	Understanding (K2)	CO4
(b)	**Construct** a Verilog code in structural modeling style to realize Boolean expression f(a,b,c)=a'bc+ab'c' using gates.	5	Applying (K3)	CO5
OR				
2(a)	**Elaborate** with examples Verilog data-types: vectors and arrays.	5	Understanding (K2)	CO4
(b)	**Construct** a Verilog code in structural modeling style to realize full subtractor using gates.	5	Applying (K3)	CO5
PART-B				
3(a)	**Model** a Verilog code to realize 2X4 decoder in dataflow modeling style.	5	Applying (K3)	CO4
(b)	**Construct** a behavioral description Verilog code for a positive edge triggered JK flip-flop using the case statement.	5	Applying (K3)	CO5
OR				
4(a)	**Develop** a Verilog code to realize full subtractor in dataflow modeling style.	5	Applying (K3)	CO4
(b)	**Construct** a behavioral description Verilog code for a 3 bit binary counter using the case statement.	5	Applying (K3)	CO5

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Degree	:	B.E	Semester :	III A & B
Branch	:	Electronics & Communication Engineering	Course Code :	21EC33
Course Title	:	Basic Signal Processing	Date :	28/03/2023
Duration	:	60 Minutes	Max Marks :	20

Note: Answer ONE full question from each part.

Q No.	Question	Marks	K-Level	CO mapping
PART-A				
1(a)	**Explain** the different properties of convolution sum with appropriate equations and examples.	5	Understanding (K2)	CO4
(b)	**Determine** the Z-Transform of $x(n) = \left(\frac{1}{2}\right)^n u(n)$ and Find the ROC.	5	Applying (K3)	CO5
OR				
2(a)	**Explain** the following properties of LTI System in terms of Impulse response, with appropriate equations: Causality ii) Stability iii) Memory	5	Understanding (K2)	CO4
(b)	**Determine** the inverse Z transform using partial fraction method : $X(z) = \dfrac{z^2}{(z-1)\left(z-\frac{1}{2}\right)}$	5	Applying (K3)	CO5
PART-B				
3(a)	**Determine** the convolution of 2 sequences $x_1(n)$ and $x_2(n)$ by Graphical method: $x_1(n) = \{1,2,3\}$ $x_2(n) = \{2,1,4\}$	5	Applying (K3)	CO4
(b)	Using the properties of Z transform, **Determine** the Z transform of : a) $x(n) = u(-n+1)$ b) $x(n) = na^n u(n)$	5	Applying (K3)	CO5
OR				
4(a)	**Determine** the discrete time convolution sum of $y(n) = u(n) * u(n-3)$	5	Applying (K3)	CO4
(b)	**Determine** the Z transform of the signal and sketch ROC for: $x(n) = \left(\frac{1}{3}\right)^n sin\left(\frac{\pi}{4}n\right)$	5	Applying (K3)	CO5

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Degree	: B.E
Branch	: Electronics & Communication Engineering
Course Title	: Basic Signal Processing
Duration	: 60 Minutes

USN

Semester :	III A & B
Course Code :	21EC33
Date :	28/03/2023
Max Marks :	20

Note: Answer ONE full question from each part.

Q No.	Question	Marks	K-Level	CO mapping
PART-A				
1(a)	**Explain** the following properties of LTI System in terms of Impulse response, with appropriate equations: i) Causality ii) Stability iii) Memory	5	Understanding (K2)	CO4
(b)	**Determine** the Z transform of the signal and sketch ROC for $$x(n) = \left(\frac{1}{3}\right)^n \sin\left(\frac{\pi}{4}n\right)$$	5	Applying (K3)	CO5
OR				
2(a)	**Explain** the different properties of convolution sum with appropriate equations and examples.	5	Understanding (K2)	CO4
(b)	**Determine** the inverse Z transform and Sketch ROC for the given conditions: $$X(z) = \frac{z(z^2 - 4z + 5)}{(z-3)(z-2)(z-1)}$$ i) $2 < |z| < 3$ ii) $|z| > 3$ iii) $|z| < 1$	5	Applying (K3)	CO5
PART-B				
3(a)	**Determine** the discrete time convolution sum of $$y(n) = u(n) * u(n-3)$$	5	Applying (K3)	CO4
(b)	**Determine** the Z-Transform of $x(n) = \left(\frac{1}{2}\right)^n u(n)$ and Find the ROC.	5	Applying (K3)	CO5
OR				
4(a)	**Determine** the convolution of 2 sequences $x_1(n)$ and $x_2(n)$ by Graphical method $x_1(n) = \{1,2,0.5,1\}$ $x_2(n) = \{1,2,1,-1\}$	5	Applying (K3)	CO4
(b)	Using the properties of Z transform, **Determine** the Z transform of a) $x(n) = u(-n-2)$ b) $x(n) = 2^n u(n-2)$	5	Applying (K3)	CO5

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Degree	:	B.E
Branch	:	Electronics and Communication Engineering
Course Title	:	Analog Electronics Circuits
Duration	:	60 Minutes

Semester : III
Course Code : 21EC34
Date : 28/03/2023
Max Marks : 20

Note: Answer ONE full question from each part.

Q No.	Question	Marks	K-Level	CO mapping
	PART-A			
1(a)	Explain 4-Bit binary weighted D/A converter with the help of a circuit. **Calculate** output voltage for binary values of $b_3b_2b_1b_0=0011$ and $b_3b_2b_1b_0=1111$. Given $R_F=R=10K\Omega$ and $V_{ref}=5$ V.	5	Applying (K3)	CO4
(b)	Define Power Electronics and **explain** with functional block diagram.	5	Understanding (K2)	CO5
	OR			
2(a)	Explain the first order butter worth low pass filter with neat circuit diagram and frequency response. **Derive** the expression for $\frac{V0}{Vin}$.	5	Applying (K3)	CO4
(b)	**Explain** V-I characteristics of SCR.	5	Understanding (K2)	CO5
	PART-B			
3(a)	**Design** a narrow bandpass filter with two feedback paths with $f_c=1.5kHz$, Q=7 and $A_F=15$. Calculate new value of the resistance in the circuit which will change f_c to 2kHz.	5	Applying (K3)	CO4
(b)	**Explain** different Power Electronics converter circuits and mention two applications for each.	5	Understanding (K2)	CO5
	OR			
4(a)	Explain the operation of 555 timer as an Astable multivibrator and **design** the same for 50% duty cycle.	5	Applying (K3)	CO4
(b)	**Explain** Class A commutation circuit with neat circuit diagram and waveforms.	5	Understanding (K2)	CO5

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Degree	:	B.E	Semester	:	III
Branch	:	Electronics and Communication Engineering	Course Code	:	21EC34
Course Title	:	Analog Electronics Circuits	Date	:	28/03/2023
Duration	:	60 Minutes	Max Marks	:	20

Note: Answer ONE full question from each part.

Q No.	Question	Marks	K-Level	CO mapping
	PART-A			
1(a)	Explain 4-Bit R-2R ladder network D/A converter with the help of a circuit. **Calculate** output voltage for binary values of $b_3b_2b_1b_0=1000$ and $b_3b_2b_1b_0=1111$. Given $R_F=20K\ \Omega$, $R=10K\Omega$ and $V_{ref}=5\ V$.	5	Applying (K3)	CO4
(b)	Define Power Electronics and **explain** with functional block diagram.	5	Understanding (K2)	CO5
	OR			
2(a)	**Design** first order High pass filter with cut off frequency of 10 KHz with pass band gain of 1.5. Also plot the frequency response for the designed filter.	5	Applying (K3)	CO4
(b)	**Explain** any two Thyristors turn on methods. .	5	Understanding (K2)	CO5
	PART-B			
3(a)	**Design** a narrow bandpass filter with two feedback paths with $f_c=1.5kHz$, $Q=7$ and $A_F=15$. Calculate new value of the resistance in the circuit which will change f_c to 2kHz.	5	Applying (K3)	CO4
(b)	**Explain** different Power Electronics converter circuits and mention two applications for each.	5	Understanding (K2)	CO5
	OR			
4(a)	Explain the operation of 555 timer as a Monostable multivibrator and **derive** the expression for pulse width T.	5	Applying (K3)	CO4
(b)	**Explain** the operation of RC-triggering circuit with suitable circuit diagram.	5	Understanding (K2)	CO5

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