ANALOG & DIGITAL ELECTRONICS

CS - 301

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternative –

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i)	The gain required for sustained oscillation in Wien-bridge oscillator is		on in Wien-bridge oscillator is			
	a)	29	c) 3			
	b)	1.5	d) 1			
ii)	Schmitt trigger is also known as					
	a)	squaring circuit	c) sweep circuit			
	b)	blocking oscillator	d) astable multivibrator			
iii)	A differential amplifier has the differential gain of 100. If its CMRR = 240, then the					
	COI	mmon mode gain is				
	a)	0.24	c) 24000			
	b)	0.417	d) 1			
iv)	Th	The maximum theoretical efficiency of class A amplifier can be				
	a)	50%	c) 25%			
	b)	78%	d) 100%			
v)	For a wide range of oscillations in the audio range, the preferred oscillator is					
	a)	Hartley				
	b)	Phase shift				
	c)	Wien-bridge				
	d)	d) Hartley and Colpitt				
vi)	To improve the efficiency of the amplifier we have to					
	a) reduce the power dissipation rating					
	b)	reduce supply voltage				
	c)	reduce the load power				
	d)	reduce unwanted power loss				
vii)	A class B push-pull power amplifier has an a.c. output of 10 watts. The d.c. power from					
	the	the power supply under ideal condition is				
	a)	10 watts	c) 15 watts			
	b)	12.75 watts	d) 20 watts			
viii)	То	avoid false triggering of the NE 555	imer, the RESET pin (Pin 4) is generally			
	connected to					

a)	Pin 8	c) Pin 3

The maximum positive number that can be represented in 1's complement

b) Pin 1 d) No connection (NC)

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representation is

ix)

	a) 2 ⁿ⁻¹ -1	c) – (2 ⁿ⁻¹ – 1)
	b) $1-2^{n-1}$	d) 2 ⁿ⁻¹
x)	The value of F is	
А 0-е)
	a) 0	c) A
	b) 1	d) A'
xi)	A decoder with enable input can be used as	
	a) Encoder	c) NAND
	b) Parity Generator	d) Demultiplexer
xii)	Which of the following is self-complementing	code?
	a) Gray	d) Parity code
	b) Excess-3	e) Hamming code
	c) BCD	
xiii)	How many Flip-flops are required to design M	OD-1024 counter?
	a) 1024	c) 10
	b) 102	d) 1
xiv)	The decimal equivalent of the binary number	(101111.1101) ₂ is
	a) (46.8125) ₁₀	c) (47.8155) ₁₀
	b) (47.8125) ₁₀	d) (47.8145) ₁₀
xv)	Which family has the better noise margin?	
	a) ECL	c) DTL
		1) ==:
	b) MOS	d) IIL
xvii)	b) MOS J-K flip – flop has	d) I I L
xvii)	 b) MOS J-K flip – flop has a) one stable state 	d) TTL

xviii)	Master-slave configuration is used in flip-flops	to
~~	haster slave comparation is used in mp hops	ιu

- a) increase its clicking rate
- b) reduce power dissipation
- c) eliminate race around condition
- d) improve its reliability

xix) The equation $\sqrt{213} = 13$ is valid for which one of the number systems with base?

d) Base 4

c) AB + B + CA

d) ABC + A + B + C

- a) Base 8 c) Base 6
- b) Base 6

xx) Simplified form of Boolean expression

F(A, B, C) = ABC + A'BC + AB'C + ABC' is

- a) AB + BC + CA
- b) A + BC + CA
- xxi) PROMs are used primarily for
 - a) data storage
 - b) temporary program and data storage
 - c) they are inexpensive
 - d) permanent program & data storage Short An

GROUP – B

(Short Answer Type Questions)

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- 2. What is Schmitt trigger? Explain with circuit diagram.
- 3. In what respect Class B Push-Pull amplifier configuration better than a Class A Push-Pull Amplifier? What is major drawback of Class B operation and how is this remedied?
- 4. What is a multivibrator? Explain the operation of a monostable multivibrator and draw the output voltage waveform.

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- 5. Design a combinational circuit using an 8 x 4 ROM that accepts a 3-bit number & generates an output binary number equal to the square of input no.
- 6. Simplify the following expression using K-map

 $Y = \pi (0, 1, 4, 5, 6, 8, 9, 12, 13, 14)$

- 7. Check whether the Even parity Hamming code for 4-bit data, (1001011)₂ is correct or not. If not, correct the code.
- 8. Explain race around condition of J-K flip-flop. Show how this condition can be avoided.
- 9. Perform the arithmetic operation:

(-22)_{decimal} + (13)_{decimal} + (-15)_{decimal}

Using 2's complement binary form.

GROUP – C

(Long Answer Type Questions)

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- 10. a) What do you mean by the conversion efficiency of a power amplifier?b) Draw the circuit of a Class B push-pull power amplifier and show that its maximum power efficiency is 78.5%.
 - c) What is the function of tuned amplifier?
- 11. a) Draw the circuit arrangement and explain the operation of a Schimdt Trigger circuit.b) Draw and explain the operation of a square wave generator and hence prove that the frequency of oscillation depends only on external components used.c) Define CMRR and slew rate of Op-Amp.

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12. a) Design an asynchronous 4-bit up-down counter and it will count up when a signal line M = 0 and count down when a signal line M = 1.

b) Design a sequential circuit that implements the following state diagram. Use all D-type FF for the design.



- 13. a) Write down the excitation table of JK and D flip-flops. Derive the excitation equations for theses two flip-flops.
 - b) Design a clocked R-S flip-flop using NAND gates. Explain its principle of operation.
- 14. a) Simplify the following function using K-map.
 - i) $F = \pi m (0, 1, 3, 8, 10, 15) . \pi d (11, 13, 14)$
 - ii) $F = \Sigma m (0, 4, 7, 9, 13, 15) + \Sigma d (10, 14)$
 - b) What is ROM and RAM? What is the basic difference between EPROM and EEROM?
- 15. a) Draw a neat diagram for a R-2R ladder type DAC. What is linearity error and offset error in a DAC?

b) Find the conversion time of a successive approximation A/D converter which uses a 2 MHz clock and a 5-bit binary ladder containing 8V reference. What is the conversion rate?