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SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (S), AUGUST 2023

ELECTRONICS AND COMMUNICATION ENGINEERING

(2020 SCHEME)

Course Code : 20ECT308

Course Name : Comprehensive Course Work

Max. Marks : 50 **Duration : 75 Minutes**

PART A

(Answer all questions. Each question carries 1 mark)

1 The voltage gain of an amplifier is 100. A negative feedback is applied with β=0.03. The overall gain of the amplifier is

A. 70 **B.** 25

C. 99.97 **D.** 3

2 CE configuration is the most preferred transistor configuration when used as a switch because

A. It requires only one power supply **B.** It requires low voltage or current for operating the switch

C. It is easily understood by everyone **D.** It has small I_{CEO}

3 A Wien bridge oscillator uses ..... Feedback

A. Only positive **B.** Only negative

C. Both positive and negative **D.** None of the above

4 The point of intersection of d.c. and a.c. load lines represents .....

A. Operating point **B.** Current gain

C. Voltage gain **D.** None of the above

5 An RC amplifier stage has a bandwidth of 500KHz. What will be the rise time of this amplifier stage?

A. 0.35μs **B.** 0.7μs

C. 1μs **D.** 2μs

6 The voltage gain of an amplifier without feedback and with negative feedback respectively is 100 and 20. The percentage of negative (β) would be

A. 4% **B.** 5%

C. 20% **D.** 80%

7 The product of which of the following gives the figure of merit of a logic family?

A. Gain and bandwidth **B.** Propagation delay time and power dissipation

C. Fan-out and propagation delay time **D.** Noise margin and power dissipation

8 For Emitter Coupled Logic (ECL), the switching speed is very high because

A. Negative logic is used **B.** The transistors are not saturated when they are conducting

C. Multi emitter transistors are used **D.** Low fan out

9 The 2's complement representation of -17 is

A. 100001 **B.** 101111

C. 110011 **D.** 101110

10 11001, 1001, and 111001 correspond to the 2's complement representation of which one of the following sets of numbers?

A. 25,9 and 57 respectively **B.** -6,-6,and -6 respectively

C. -7,-7 and -7 respectively **D.** -25,-9 and -57 respectively

11 The hexadecimal conversion of decimal number 227

A. A3 **B.** E3

C. CC **D.** C3

12 In 2's complement representation the number 11100101 represents the decimal number ……

A. +37 B. -31

C. +27 D. -27

13 Which one of the following circuits is used for converting a sine wave into a square wave?

A. Astable multi vibrators **B.** Mono stable multi vibrators

C. Bistable multi vibrators **D.** Schmitt trigger

14 The output frequency of the VCO can be changed by changing

A. External tuning resistor **B.** External tuning capacitor

C. Modulating input voltage **D.** All of the mentioned

15 A 1 μs pulse can be stretched into a 1 ms pulse by using

A. A mono stable multi vibrator **B.** An astable multi vibrator

C. A bistable multi vibrator **D.** A JK flip flop

16 Which one of the following causes phase shift through an op-amp?

A. Internal RC circuits **B.** External RC circuits

C. Gain roll off of the internal transistor **D.** Negative feedback

17 How many bits will a D/A converter use so that its full scale output voltage is 5V and its resolution is at the most 10mV

A. 5 **B.** 7

C. 9 **D.** 11

18 In a 741 op-amp, there is 20dB/decade fall-off starting at a relatively low frequency. This is due to the

A. Applied load **B.** Internal compensation

C. Impedance of the source **D.** Power dissipation in the chip

19 Decimation is the process of

A. Retaining sequence values of $X_P[n]$ other than zeros **B.** Retaining all sequence values of $X_P[n]$

C. Dividing all sequence values by 10 **D.** Multiplying the sequence value by 10

20 For an N point FFT algorithm with N=2^m , which one of the following statement is true?

A. It is not possible to construct a signal flow graph with both input and output in normal order **B.** The number of butterflies in the m^{th} stage is N/m

C. In-place computation requires storage of only 2N node data **D.** Computation of a butterfly requires only one complex multiplication

21 Which of the following properties is correct for FIR (Finite Impulse Response) filters?

A. FIR filters are generally canonical **B.** FIR filters are not always stable

C. FIR filters require less memory than IIR filters **D.** FIR filter's linear phase realisation structure cannot be designed easily

22 If x(n) and X(k) are an N-point DFT pair, then X(k+N)=?

A. X(-k) **B.** -X(k)

C. X(k) **D.** None of the mentioned

23 The Chebyshev filters have

A. Flat pass band Equiripple pass band **B.** Flat stop band & Equiripple pass band

C. Tapering stop band **D.** Flat pass band & Tapering stop band

24 Which of the following methods are used to convert analog filter into digital filter?

A. Approximation of Derivatives **B.** Bilinear transformation

C. Impulse invariance **D.** All of the mentioned

25 A communication channel disturbed by Gaussian noise has a bandwidth of 6kHz and S/N ratio of 15. The maximum transmission rate that such a channel can support is

A. 2.4 kbits/sec **B.** 24 kbits/sec

C. 32 kbits/sec **D.** 48 kbits/sec

26 An audio signal, $15\sin(2\pi * 1500t)$ amplitude modulates $60\sin(2\pi * 1000t)$. The modulation index will be

A. 20% **B.** 50%

C. 25% **D.** 100%

27 In delta modulation, the slope overload distortion can be reduced by

A. Decreasing the step size **B.** Decreasing the granular noise

C. Decreasing the sampling rate **D.** Increasing the step size

28 When noise is passed through a narrow band filter, the output of filter should be?

A. triangular **B.** square

C. parabolic **D.** sinusoidal

29 The Nyquist sampling rate for the signal $s(t) = \frac{sin(500\pi t)}{\pi t} * \frac{sin(700\pi t)}{\pi t}$ is given by

A. 400Hz **B.** 600Hz

C. 1200Hz **D.** 1400Hz

30 A PLL can be used to demodulate

A. PAM signal **B.** PCM signal

C. FM signal **D.** DSB-SC signal

PART B

(Answer all questions. Each question carries 2 marks)

31 A certain regulator has a no-load voltage of 6 V and a full-load output of 5.82 V. What is the load regulation?

A. 3.09% **B.** 2.87 %

C. 2.72 % **D.** None of the above

32 The drain gate capacitance of a junction FET is 2pF. Assuming a common source voltage gain of 20, what is the input capacitance due to Miller effect?

A. 21pF **B.** 40pF

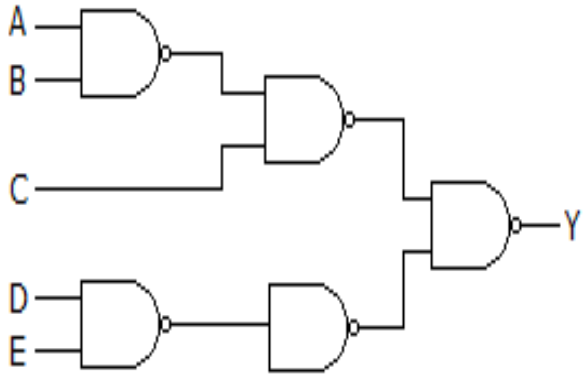
C. 42pF **D.** 10pF

33 Decimal 43 in hexadecimal and BCD number system is respectively……. and

A. B2 and 01000011 **B.** 2B and 01000011

C. 2B and 00110100 **D.** B2 and 01000100

34 The circuit of the given figure realizes the function .....



A. $Y = (\overline{A} + \overline{B})C + \overline{DE}$

B. $Y = \overline{A} + \overline{B} + \overline{C} + \overline{D} + \overline{E}$

C. $AB + C + DE$

D. AB+C(D+E)

35 How would a binary number 0010 be represented by a 4 bit binary word, if the range of voltage is 0 to 10v?

A. 0.666v **B.** 1.333v

C. 0.333v **D.** 2000v

36 A differential amplifier has inputs $V_1 = 1050\mu V$ and $V_2 = 950\mu V$ with CMRR=1000. What is the error in the differential output?

A. 10% **B.** 1%

C. 0.1% **D.** 0.01%

37 The circular convolution of both of these sequences x1(n)={2,1,2,1} and x2(n)={1,2,3,4} would be:

A. {14,16,14,16} B. {2,3,6,4}

C. {16,16,14,14} D. {14,14,16,16}

38 The 4 point DFT of a discrete time sequence {1,0,2,3} is

A. [0,-2+2j,2,-2-2j] **B.** [2,2+2j,6,2-2j]

C. [6,-1+3j,0,-1-3j] **D.** [6,-1+3j,0,-1-3j]

39 In Delta modulation_____

A. all the coded bits used for sampling are transmitted **B.** one bit per sample is transmitted

C. the step size is fixed **D.** Both A & B

40 In Differential Pulse Code Modulation techniques, the decoding is performed by_____

A. PLL **B.** Sampler

C. Accumulator **D.** Quantizer