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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S, FE) / S6 (PT) (S, FE) Examination December 2024 (2019 Scheme)

Course Code: ECT 308

Course name: COMPREHENSIVE COURSE WORK

Max. Marks: 50 Duration: 1Hour

Instructions: ***(1) Each question carries one mark. No negative marks for wrong answers***
(2) Total number of questions: 50
(3) All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.
(4) If more than one option is chosen, it will not be considered for valuation.

1. Transformer utilization factor of half wave rectifier is……..

   a) 0.287 b) 0.693 c) 0.812 d) 0.480

2. FET is a .....device.

   a) Unipolar b) Bipolar c) Tripolar d) None of the mentioned

3. The voltage gain of amplifier stage is lowest in …….

   a) Common Emitter b) Common Base c) Common Collector d) Same in all configuration

4. Transistor is in saturation when……..

   a) $I_B = I_C$ b) $I_B > \frac{I_C}{\beta_{dc}}$ c) $I_B = 0$ d) $I_B < \frac{I_C}{\beta_{dc}}$

5. When voltage gain A_V is greater than one, then the voltage gain in dB is …….

   a) Negative b) Positive c) Zero d) None of the mentioned

6. Crossover distortion is the characteristics of ……output stage

   a) Class A b) Class B c) Class AB d) None of the mentioned

7. A cascaded amplifier has the advantages of ……

   a) Low input capacitance b) Low input impedance c) High trans conductance d) Large voltage gain

8. Negative feedback amplifier is a……..

   a) Degenerative Feedback b) Regenerative Feedback c) Both d) None of the mentioned

9. If the gain of positive feedback amplifier is **18** and feedback factor is **0.5**, the gain of the amplifier without feedback will be

   a) 18 b) 1.8 c) 180 d) 3.6

10. A Hartley oscillator is used for generating…….. frequency oscillation

a) Very low b) Radio c) Microwave d) Audio

11 The $2's$ complement representation of the decimal number (- 4) is

a) 1011 b) 1010 c) 1001 d) 0100

12 If $(0.100)_2 = (X)_{10}$,then **X** is

a) 0.5 b) 0.1 c) 0.2 d) 0.01

13 The expression $(\mathbf{X} + \bar{X}.\mathbf{Y})$ is equal to

a) 1 b) 0 c) X+Y d) 1+Y

14 In Boolean algebra $\bar{A}.A$ is equal to

a) 1 b) A c) A^2 d) 0

15 The minimum number of gates required to realize the function $AB + \bar{C}$ using NAND only is

a) 2 b) 3 c) 4 d) 6

16 Which logic device is called a data distributor?

a) MUX b) DEMUX c) Encoder d) Decoder

17 How many full adders are required in a serial adder to perform 8-bit addition

a) 2 b) 1 c) 3 d) 4

18 Ring and Johnson counters are :

a) Synchronous counter b) Asynchronous counter c) Binary counter d) Shift registers

19 An 8-bit SISO mode needs …… Clock pulses to load an 8-bit number into a register

a) 4 b) 1 c) 8 d) 2

20 Which of the following technology results in least power dissipation

a) TTL b) DTL c) NMOS d) CMOS

21 In ideal op-amp, the current through the virtual ground is

a) 1 A b) 10 A c) Zero d) Infinity

22 The frequency compensation is used in op-amp to increase its

a) Input impedance b) output impedance c) Gain d) Bandwidth

23 What is the maximum frequency for a sine wave output voltage of 10V peak with an op-amp ,whose slew rate is 1V/μs

a) 15.92 KHz b) 19.92 KHz c) 25.92 KHz d) 27.36 KHz

24 For a given op-amp ,CMRR $=10^5$ and differential gain 10^5 what is the common mode gain of the Op-amp

a) 10^5 b) 10^{10} c) $2 * 10^5$ d) 1

25 In RC integrator circuit using op-amp , the output is taken across……

a) Resistor b) Transistor c) capacitor d) diode

26 An instrumentation amplifier generally uses the following number of Op-amp

a) 1 b) 2 c) 3 d) 4

27 The basic important blocks of IC-555 timer

a) Voltage source b) Flip-Flop c) Resistors d) Switch

28 Which one of the following is a regulated power supply ?

a) IC 555 b) IC 723 c) IC 844 d) IC 3080

29 The number of comparator in a 4-bit Flash ADC is

a) 4 b) 5 c) 15 d) 16

30 The resolution of N-bit system DAC converter is

a) $\frac{1}{2^N}$ b) $\frac{1}{(2^N-1)}$ c) (2^N-1) d) 2^N

31 If DFT {x [n]} =X[k] ,then DFT $\{x[n+m]_N\}$

a) $X[K]e^{\frac{-j2\pi km}{N}}$ b) $X[K]e^{\frac{-j2\pi k}{N}}$ c) $X[K]e^{\frac{j2\pi km}{N}}$ d) X[K]

32 Given x[n] = {1, 2, 0, 3, -2, 4, 7, 5},calculate X[4] ?

a) 20 b) -8 c) -20 d) 4

33 The frequency response of a digital filter is periodic in the range .....

a) $0<\omega<2\pi$ b) $-\pi<\omega<\pi$ c) $0<\omega<\pi$ d) $0 \le \omega \le 2\pi$ or $-\pi \le \omega \le \pi$

34 In FIR filters the Gibbs oscillations are due to .....

a) linear magnitude characteristics b) Non linear phase characteristics c) abrupt truncation of the FIR filter coefficient sequence. d) None of the mentioned

35 The width of the main lobe in rectangular window spectrum is .....

a) $\frac{4\pi}{N}$ b) $\frac{16\pi}{N}$ c) $\frac{8\pi}{N}$ d) $\frac{2\pi}{N}$

36 The zeros of the Butterworth filter exist at .....

a) Left half of s-plane b) Origin c) Infinity d) Right half of s-plane

37 The relation between analog and digital frequency is nonlinear in case of.....

a) Impulse invariant b) Bilinear transformation c) Frequency sampling d) All the mentioned

38 Which of the following is true in fixed point binary representation?

a) Only positive number can be represented b) Integer cannot be represented c) The position of binary point is fixed d) None of the mentioned

39 The architecture that employs instruction level parallelism is……..

a) Von Neumann architecture b) Harvard architecture c) Modified Harvard architecture d) VLIW architecture

40 If x[n] and y[n] are input and output of a decimator with sampling rate conversion factor A ,then,

a) y[n]=x[n-A] b) y[n]=x[n+A] c) y[n]=x[n/A] d) y[n]=x[nA]

41 The capacity of the channel is the

a) Band width required for information b) Maximum rate of information transmission c) Number of digits used in coding d) Volume of information it can take

42 Eye diagram gives an idea of ……..

a) Modulation scheme b) CLOCK jitter c) SNR d) All the mentioned

43 In duobinary signalling method, for M-ary transmission, the number of output obtained is

a) 2M b) 2M-1 c) 2M+1 d) M-1

44 A speech signal, band-limited to 8 kHz with peak to peak between +20 V to - 20 V, and the signal are sampled at Nyquist rate, and the bits 0 and 1 are transmitted using bipolar pulses. Find the minimum bandwidth for distortion-free transmission in KHz?

a) 64 KHz b) 32 KHz c) 16 KHz d) 64MHz

45 If noise figure of a receiver is 1.8 at 20 Degree Celsius , find its equivalent noise temperature?

a) 184.6 K b) 474.9 K c) 200.3 K d) 234.4 K

46 If the two signals modulate the same carrier with different modulation depths of 0.4 and 0.8. Find the resulting modulation signal?

a) 0.89 b) 0.98 c) 0.80 d) 1.2

47 In FM modulation, when the modulation index increases, the transmitted power?

a) Half b) Decreased c) Doubled d) Unchanged

48 Which of the given modulator is an indirect way of generating FM?

a) Inductance FET modulator b) Armstrong modulator c) Reactance Tube modulator d) Zener diode modulator

49 If the number of bits per sample in a PCM system is increased from a n to n + 1, the improvement in signal to quantization nose ratio will be

a) 2n dB b) 3 dB c) 6 dB d) 2(n+1) dB

50 A balanced modulator is used in the generation of which of the following signal?

a) FM Signal b) DSB-SC Signal c) AM Signal d) SSB-SC Signal