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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (R, S) / S6 (PT) (R) Examination June 2023 (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. An RC Low Pass filter act as integrator for analog signal of time period T if the time constant RC of circuit satisfy

   a) RC >> 16 T b) RC = T c) RC << 16 T d) RC = 0.0016T

2. In an amplifier circuit the emitter is at ac ground potential then the configuration is/are

   a) Common Base Configuration b) Common Collector Configuration c) Common Emitter Configuration d) Common Base and Common Collector Configuration

3. In a CE amplifier the input impedance is equal to the ratio of

   a) AC base voltage to ac base current b) AC base voltage to ac emitter current c) AC emitter voltage to AC collector current d) AC collector voltage to AC collector current

4. In an amplifier the coupling capacitor are employed for

   a) Increasing the gain b) Matching the impedance c) Controlling the output d) Preventing of DC mixing with input or output

5. Consider the voltage gain of an amplifier without and with feedback are 100 and 20 respectively. Find the negative feedback factor of feedback network (in %)

   a) 4% b) 5% c) 20% d) 80%

6. In an oscillator the total phase shift around the loop must be

   a) 180^0 b) 90^0 c) 270^0 d) 0^0

7. Push pull configuration is used in power amplifier to

   a) Improve power handling capability b) Balance out odd harmonics c) Balance out even harmonics d) Reduce input impedance

8. In a series regulator, what is the purpose of fold-back limiting

a) To provide more current in the case of a short circuit

b) To limit output voltage if input voltage goes too high

c) To bypass the pass-transistor, if the pass-transistor should fail

d) To provide current up to a maximum, but drop current to a lower value when the output becomes shorted, to prevent overheating of the device

9. Diode Connected MOSFET act as

a) Voltage Source b) Current Source c) Load Impedance d) Buffer

10. When two amplifiers each of bandwidth f_H =10kHz are cascaded, the overall bandwidth become

a) 10kHz b) 6.4kHz c) 5kHz d) 20kHz

11 The decimal equivalent of 2's complement representation 1100101 is

a) +37 b) -31 c) +27 d) -27

12 Which gate is called the anti – coincidence and coincidence gate respectively?

a) XNOR and XOR b) AND and OR c) OR and NOT d) XOR and XNOR

13 The simplified form of the Boolean expression A(A + B)

a) A b) B c) A + B d) AB

14 For implementing 4 bit full adder how many half adder and OR gates are required

a) 8 and 4 b) 7 and 4 c) 7 and 3 d) 8 and 3

15 Which of the following Flip-Flop do not have race around problem

a) T Flip Flop b) JK Flip Flop c) D Flip Flop d) None of the above

16 The output frequency of an 5 bit ring counter with an input clock frequency of 20 kHz is

a) 20 kHz b) 10kHz c) 5kHz d) 4kHz

17 To convert JK Flip Flop to D Flip Flop

a) Connect D to both J and K

b) Connect D to J directly and D to K through inverter

c) Connect D to K directly and D to J through inverter

d) Connect D to K and leave J open

18 In a positive edge triggered JK Flip Flop, J = 1; K = 0 and clock pulse is rising Qn+1 will be

a) Q_n b) $\overline{Q_n}$ c) 1 d) 0

19 Which of the following is a sequential circuit

a) Full Adder b) Encoder c) Multiplexer d) Master Slaver Flip Flop

20 Which of the logic family have lowest propagation delay time

a) ECL b) TTL c) CMOS d) RTL

21 Open loop gain of an Ideal OP-amp is

a) Zero b) Infinity c) 10^6 d) 1

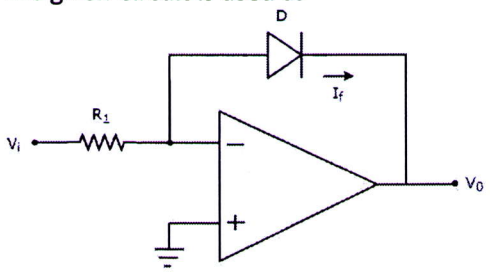
22 The output of a particular OP-amp increases 12 V in 8 µs. The slew rate is ....

a) 90 V/µs b) 12 V/µs c) 1.5 V/µs d) Infinity

23 For an inverting amplifier R_i= 10kΩ and feedback resistor is R_f = 100 kΩ. Then closed loop gain of OP-amp is

a) -10 b) -11 c) -1 d) Infinity

24 The given Circuit is used as



a) Precision Full wave Rectifier b) Integrator c) Log Amplifier d) Inverting amplifier

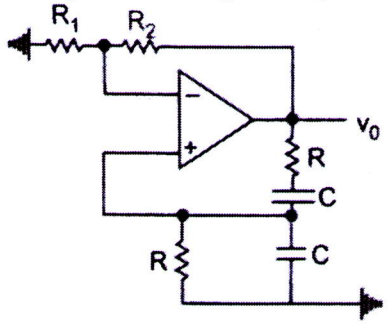
25 An OP-amp has an open loop gain of 10^5 and an open loop upper cut off frequency is 10Hz. If this OP-amp is connected as an amplifier with a closed loop gain of 100, then the new upper cut-off frequency is

a) 10Hz b) 100Hz c) 10kHz d) 100kHz

26 The functional diagram of a 555 Timer IC consists of _____ comparators.

a) 1 b) 2 c) 3 d) No Comparators

27 Identify the following OP-amp circuit



a) Precision Rectifier b) Second order Low Pass filter c) Precision Integrator d) Wien bridge Oscillator

28 Which of the following is not a component of PLL

a) Frequency Multiplexer b) Phase Detector c) VCO d) Low Pass Filter

29 An n-bit Analog to Digital convert is required to convert analog input in the range of 0 to 5 V with an accuracy of 10mV. Then the value of n should be

a) 16 b) 10 c) 9 d) 8

30 Find the cut off frequency for an RC low pass filter of R=10kΩ and C=0.003µF?

a) 1kHz b) 10kHz c) 2kHz d) 5kHz

31 The integral of a unit impulse is

a) Unit step function b) A ramp function of slope 1 c) Unit pulse function d) Train of Impulse

32 Evaluate the integral $\int_{-\infty}^{\infty}(t^2+2)\delta(t-3)dt$

a) Infinity b) 2 c) 5 d) 11

33 Find the initial value of function f(t) , if its Laplace transform is $\frac{25s+10}{5s^2+10s}$

a) 0 b) 25 c) 5 d) 2.5

34 If X(k) is the N-point DFT of a sequence x(n), then what is the DFT of x*(n)

a) X*(k) b) X*(N-k) c) X(N-k) d) X(k)

35 The number of complex addition in direct DFT are

a) N(N-1) b) N^2 c) $N\log_2 N$ d) $(N/2)\log_2 N$

36 If a discrete time signal x(n) of length L is convolved with a discrete time signal y(n) of length N then the length of output signal is

a) L + N b) L + N -1 c) L * N d) (L * N) -1

37 Find the circular convolution between two sequences x(n) = { 2,1,2,1} and y(n) = {1,2,3,4}

a) {2,5,10,16,10,11,2} b) {2,5,10,16,10} c) {14,14,16,16} d) {14,16,14,16}

38 Consider impulse response of FIR filter is h(n). Find the condition for FIR filter become linear phase

a) h(n)= ±h(M-1-n) b) h(n)= h(M-1-n) c) |h(n)| = |h(M-1-n)| d) None of the above

39 Peak side lobe in dB of a rectangular widow is

a) -13dB b) -26dB c) -32dB d) -3dB

40 Which of the following method is used to implement IIR filter

a) Rectangular Window b) Hamming Window c) Bilinear Transform d) Frequency sampling method

41 Consider sinusoidal AM modulation with maximum and minimum values of the envelope are 3V and 1V respectively, Find the modulation index (μ in %)

a) 10 b) 25 c) 50 d) 100

42 A super heterodyne radio receiver with an intermediate frequency of 455 KHz , the local oscillator tuned to 1200 KHz. The associated image frequency is ----------KHz.

a) 765 b) 1655 c) 2100 d) 900

43 FM Modulation pre-emphasis are done for

a) High frequency components b) Low frequency components c) Middle frequency components d) Both a and b

44 The number of bits per sample in PCM system is increased from 5 to 6, then the improvement in signal to quantization ratio will be

a) 3dB b) 6dB c) 2dB d) No change

45 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 noise d) Increasing the step size

46 In digital communication Pulse shaping is done for

a) To control Inter Symbol Interference b) By limiting the bandwidth of transmission c) After line coding and modulation of signal d) All of the above

47 Zero forced equalizers are used for

a) Reducing ISI to zero
b) Reduce the Quantization error
c) Reduce the bandwidth
d) All of the above

48 Characteristics of Matched filter are

a) Matched filter is used to maximize Signal to noise ratio even for non Gaussian noise
b) It gives the output as signal energy in the absence of noise
c) They are used for signal detection
d) All of the above

49 In QAM, both _____ of a carrier frequency vary

a) Frequency and Amplitude
b) Phase and Amplitude
c) Frequency and Phase
d) None of the above

50 The detector that minimizes the error probability is called as

a) Maximum likelihood detector
b) Minimum likelihood detector
c) Maximum & Minimum likelihood detectors
d) Synchronous detector

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