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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Supplementary Examination May 2023 (2019 Scheme)

Course Code: ECT308

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. Which of the following power amplifiers has highest efficiency

a) Class A b) Class B c) Class AB d) Class C

2. A bypass capacitor provides

a) DC ground b) AC ground c) Both DC and AC ground d) None of these

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

a) 180° b) 270° c) 0° d) 90°

4. A bridge rectifier circuit using ideal diode has an input voltage of 20sinωt. The average and rms value of output voltage are

a) $\frac{40}{\pi}$ V and $\frac{20}{\sqrt{2}}$ V b) $\frac{20}{\pi}$ V and $\frac{20}{\sqrt{2}}$ V c) $\frac{40}{\pi}$ V and 10 V d) $\frac{20}{\pi}$ V and 10 V

5. An ideal power supply has

a) Zero internal resistance b) Infinite internal resistance c) High output resistance d) Both b and c

6. A full wave rectifier circuit using centre tapped transformer, input frequency is 50Hz. The frequency of the output is

a) 100Hz b) 50 Hz c) 25Hz d) 200Hz

7. A clipper

a) Adds a dc component to the input signal b) Removes signal voltages above or below a specified value c) Both a and b d) Either a or b

8. Which circuit is called emitter follower?

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

9. For a BJT, α and β are related as

a) $\alpha = \frac{\beta}{1-\beta}$ b) $\beta = \frac{1}{1+\alpha}$ c) $\beta = \frac{\alpha}{1+\alpha}$ d) $\beta = \frac{\alpha}{1-\alpha}$

10. N-channel FETs are superior to p-channel FETs because

a) Mobility of electrons is smaller than that of holes
b) Mobility of electrons is greater than that of holes
c) They consume less power
d) They have high switching time

11 $(E7F6)_{16} = (\quad)_{10}$

a) 59382 b) 600000 c) 9362 d) 382

12 Which of these are universal gates?

a) Only NOR b) Only NAND c) Both NOR and NAND d) NOR, NAND, NOT

13 A + A.B

a) B b) A.B c) A d) A or B

14 $(1100110)_2 = (\quad)_8$

a) 242 b) 446 c) 146 d) 58

15 A counter has 4 flip flops. It divides the input frequency by

a) 4 b) 2 c) 8 d) 16

16 Which has the lowest propagation delay?

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

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 A monostable multivibrator has

a) No stable state b) One stable state c) Two stable state d) None of these

19 Nibble is

a) A string of 4 bits b) A string of 8 bits c) A string of 16 bits d) A string of 64 bits

20 What is the number of selector lines required in a single input n-output demultiplexer?

a) n b) 2 c) 2^n d) $\log_2 n$

21 In a linear op-amp circuit

a) The product of gain and bandwidth is constant
b) Input can be dc only
c) Input can be ac only
d) None of these

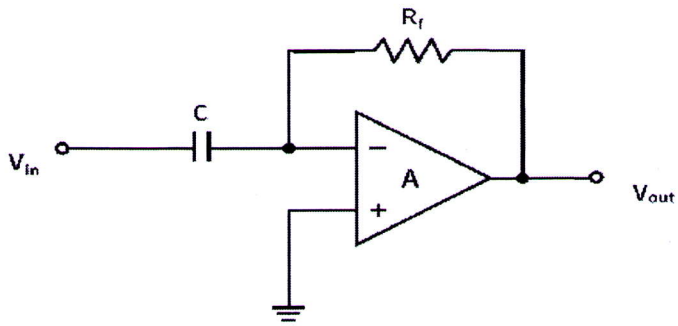
22 Which of the following circuit is op-amp used in open loop configuration?

a) comparator b) Summing amplifier c) Integrating amplifier d) Logarithmic amplifier

23 The slew rate for an ideal op-amp is

a) Very slow b) slow c) Finite d) Infinitely fast

24 If input V_{in} is triangular, the output V_{out} will be



a) Square wave b) Sine wave c) Triangular wave d) spikes

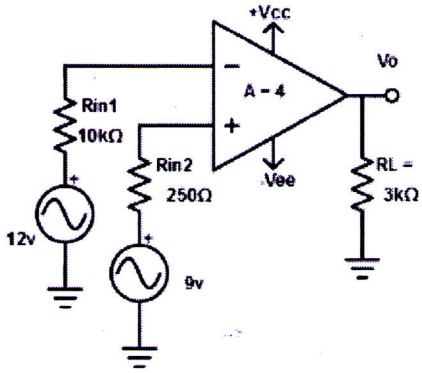
25 A 741 op-amp has a gain bandwidth product of 1 MHz. A non-inverting amplifier using this op-amp and having a voltage gain of 20dB will exhibit a 3dB bandwidth of

a) 50kHz a) 100kHz a) 1000kHz a) 25kHz

26 Which of the following electrical characteristics is not exhibited by an ideal op-amp?

a) Infinite voltage gain a) Infinite bandwidth a) Infinite output resistance a) Infinite slew rate

27 Calculate the output voltage for the given circuit assuming gain of the amplifier, A=4



a) Vo=7V b) Vo=5.9V c) Vo=12V d) Vo=11.4V

28 What happens if any positive input signal is applied to open loop configuration of op-amp

a) Output reaches saturation level b) Output is a sine wave c) No output d) None of These

29 Why differential amplifiers are preferred for instrumentation and industrial applications

a) Input resistance is low b) Produce amplified output c) Amplify individual input voltage d) Reject common mode voltage

30 Which is not present in the internal circuit of operational amplifier?

a) Differential Amplifier b) Level Shifter c) Clamper d) Output Driver

31 The DFT of two sample sequence x[n]= {A, B} is X[K] =

a) a) A+iB b) A-iB c) A+B , A-B d) 0

32 The computation of 32-point DFT by Radix-2 DIT-FFT involves .....stages of computation.

a) 6 b) 5 c) 3 d) 2^5

33 DFT perform filtering operation in .....

a) Time domain b) Frequency domain c) Both Time & Frequency domain d) None of these

34 FFT is a faster method of computation, because it exploits the ..... property of the phase factor W_N

a) linearity b) time reversal c) Time invariant d) periodicity

35 The tolerance in the pass band and stop band are called.....

a) Bandwidth b) Ripples c) Beam width d) None of these

36 In linear phase filter when the impulse is symmetrical and N is even, the magnitude function is .....

a) Anti-symmetric b) symmetric c) constant d) 0

37 In FIR filter, ...is a linear function of ω

a) Amplitude b) Phase c) Frequency d) None of these

38 In Bilinear Transformation, the .....poles of S-plane are mapped in to the interior of the unit circle in Z-plane

a) left half b) right half c) centre d) entire

39 For a b-bit number, the quantization step size is q=.....

a) 2^{-b} b) 2^b c) b+1 d) $2^{-b}+1$

40 The finite word length effects are due to

a) quantization of input b) quantization of products c) quantization of coefficients d) all of the above

41 For AM receivers, the standard IF frequency is

a) 106kHz b) 455kHz c) 10.7MHz d) 1.07MHz

42 A 1000kHz carrier is simultaneously amplitude modulated by 300Hz and 2kHz audio signal. Which of the following frequencies will not be present in the output?

a) 998kHz b) 999.7kHz c) 1000.3kHz d) 700kHz

43 A sinusoidal signal of 2kV peak is amplitude modulated to give 20% modulation. The peak value of each side band is

a) 400V b) 200V c) 100V d) 800V

44 In frequency modulation broadcast, the maximum deviation is 80 kHz, and the maximum modulating frequency is 20 kHz. In reference to Carson's rule, find the maximum required bandwidth?

a) 300kHz b) 200kHz c) 500kHz d) 600kHz

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

a) 0.96 b) 0.69 c) 0.89 d) 0.64

46 Without any filtering, a broadcast station at 1800 kHz is heard together with another station at 2800 kHz on a superheterodyne receiver. Find the value of employed IF?

a) 200Hz b) 400Hz c) 600Hz d) 500Hz

47 In a PCM system each quantization level is encoded into 7 bits. The signal-to-quantization noise ratio is equal to

a) 25.8dB b) 34.6dB c) 43.9dB d) 49.8dB

48 Delta modulation suffers from

a) Slope Overload error b) Granular Noise c) Both a and b d) None of these

49 The bandwidth for transmission in pulse code modulation is _____

a) Higher than DPCM b) Lower than DPCM c) Equal to DPCM d) None of these

50 For a 10-bit PCM system, the signal-to-quantization noise ratio is 62 dB. if the number of bits is increased by 2, then the signal-to-quantization noise ratio will

a) Increased by 6dB b) Increased by 12dB c) Increased by 24dB d) Increased by 26dB

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