

Government Engineering College, Idukki
 Test for Assistant Professor on contract
Branch: Electronics & Communication

Name

Reg. No.

Time: 1 Hr

Max. Marks: 160

Instructions

1. Write your name and Register Number in the space provided in the top this page.
2. Use of calculator is not allowed.
3. **Four marks** will be given for each correct answer. **One mark** will be deducted for each incorrect answer.
4. Write the choice A/B/C/D in the box provided adjacent to each question.

1. A signal $x(t) = \cos \frac{\pi}{3}t + \sin \frac{\pi}{4}t$. The fundamental period of the signal is

- A. 2 B. 6 C. 8 D. 24

1 - D

2. $\int_{-1}^1 (3t^2 + 1)\delta(t)dt =$

- A. 0 B. 1 C. $\delta(t)$ D. ∞

2 - B

3. For a discrete time aperiodic signal, the frequency spectrum will be

- A. Discrete and aperiodic B. Discrete and periodic
 C. Continuous and periodic D. Continuous and aperiodic

3 - C

4. System function H(s) of a system is having poles at $\sigma = -1$ and $\sigma = 2$. It is given that its ROC is a strip parallel to the $j\omega$ axis from $\sigma = -1$ and $\sigma = 2$. The system is

- A. non causal and stable B. non causal and unstable
 C. causal and stable D. causal and unstable

4 - A

5. The z – transform of a system is $(z) = z/(z - 0.2)$ If the ROC is $|z| < 0.2$, then the impulse response of the system is

- A. $(0.2)^n [n]$ B. $(0.2)^2[-n - 1]$
 C. $-(0.2)^2 [n]$ D. $-(0.2)^n[-n - 1]$

5 - D

6. The steady state error of a stable ‘type 0’ unity feedback system for a unit step function is

- A. 0 B. $1 / (1+K_p)$
 C. ∞ D. $1 / K_p$

6 - B

14. Find the velocity of the wave propagation and characteristic impedance of the lossless transmission line whose inductance and capacitance per unit length are 250 nH/m and 0.1 nF/m.

- (A) 2×10^8 m/s, 100Ω (B) 3×10^8 m/s, 50Ω
(C) 2×10^8 m/s, 50Ω (D) 3×10^8 m/s, 100Ω

14 - C

15. The voltage wave in a lossless transmission line has the maximum magnitude of 6 volt and minimum magnitude of 2.4 volt. The reflection coefficient of the transmission line is

- A. 0.43 B. 2.33 C. 1.40 D. 0.71

15 - A

16. An analog signal of frequency 5 kHz is sampled at 8 kHz. Find the cut of anti aliasing filter to be used.

- A. 5 kHz B. 2.5 kHz C. 8 kHz D. 4 kHz

Question
Cancelled

17. In a baseband communications link, frequencies upto 3500 Hz are used for signalling. Using a raised cosine pulse with 75% excess bandwidth and for no inter-symbol interference, the maximum possible signalling rate in symbols per second is

- A. 1750 B. 2625 C. 4000 D. 5250

17 - C

18. The line code that has zero dc component for pulse transmission of random binary data is

- A. Unipolar B. Polar
C. Alternate Mark Inversion (AMI) D. None of the above

18 - C

19. For a fully loaded input sinusoidal signal, increasing the bits of a quantiser from 8 to 9 leads to an SNR improvement in dB of

- A. 5 B. 6 C. 7 D. 8

19 - B

20. The line code that ensures synchronisation in bit level is

- A. Unipolar (B) Polar (C) Bipolar (D) Manchester

20 - D

21. Thermal voltage V_t is approximately equal to ----- at room temperature

- A. 25mV. B. 2.5mV C. 100mV D. 30mV

21 - A

22. The threshold voltage of n-MOS can be increased by

- A. Reducing channel dopant concentration B. reducing channel length

22 - D

C. reducing gate oxide thickness

D. increasing channel dopant concentration

23. A silicon sample is uniformly doped with 10^{16} Phosphorous atoms / cm^3 and 2×10^{16} Boron atoms/ cm^3 . If all dopants are fully ionised the material is -----

- A. n type with 10^{16} electrons/ cm^3 B. intrinsic
C. p type with 10^{16} holes / cm^3 D. data insufficient

23 - C

24. The typical operating current of an LED is-----

- A. 50mA. B. 10mA. C. 20mA D. 5mA.

24 - B

25. The drain of an n-MOS is shorted to gate so that $V_{GS} = V_{DS}$. The threshold voltage of MOSFET is 1V. If the drain current is 1mA for $V_{GS} = 2\text{V}$, then for 3V drain current is

- A. 2mA B. 3mA C. 9mA D. 4mA.

25 - D

26. A network N' is a dual of network N if

- A. both of them have the same mesh equations
B. both of them have the same node equations
C. KCL and KVL equations are the same
D. mesh equations of one are the node equations of the other

26 - D

27. The root-mean-square value of a voltage waveform consisting of a superimposition of 2 V dc and a 4 V peak-to-peak square wave is

- A. 2 V B. $\sqrt{6}$ V C. $\sqrt{8}$ V D. $\sqrt{12}$ V

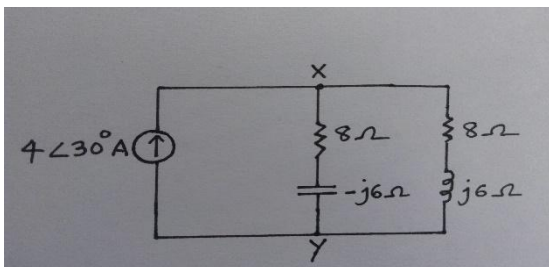
27 - C

28. The maximum power that a 10 V dc. source with an internal resistance of 5Ω can supply to a resistive load is

- A. 3 W B. 5 W C. 10 W D. 12 W

28 - B

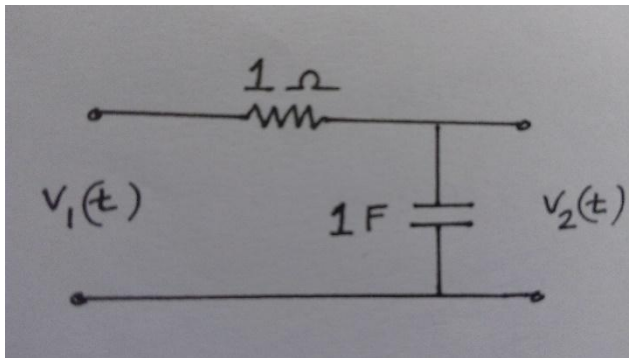
29. In the AC network shown in figure, the phasor voltage V_{XY} (in Volts) is



- A. 0 B. $16 \angle -30^\circ$
C. $25 \angle -30^\circ$ D. $36 \angle -30^\circ$

29 - C

30. For the given circuit, a source of $V_1(t) = e^{-2t}$ is applied. The resulting response $V_2(t)$ is given by



- A. $e^{-t} - e^{-2t}$ B. e^{-t}
 C. $e^{-2t} + e^{-t}$ D. $e^{-2t} / 2$

30 - A

31. Emitter follower in terms of feedback is an example of

- A. voltage shunt type feedback B. voltage series type feedback
 C. current series type feedback D. current shunt type of feedback

31 - B

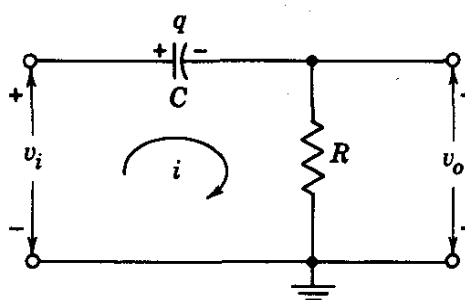
32. A CE amplifier has an unbypassed emitter resistance R_E . Given collector load $R_C = 10 \text{ K}\Omega$, $R_E = 1 \text{ K}\Omega$, $r_\pi = 500 \Omega$, $h_{fe} = 100$, the voltage gain is approximated by

- A. 2000 B. 1000 C. 20 D. 10

32 - D

33. For the circuit given in the figure square wave input with a period T is applied. Consider the following statements

1. The output v_o will be similar to v_i , if $RC \gg T$
2. The output v_o will consist of a positive and negative spike if $RC \ll T$
3. The output pulse will have higher rise time if RC is made progressively smaller than T



- A. 1, 2 and 3 B. 1 and 2 C. 2 and 3 D. 1 and 3

33 - B

34. In a common emitter BJT amplifier putting a capacitor across R_E will

- A. decrease the voltage gain and decrease the input resistance
 B. increase the voltage gain and decrease the input resistance
 C. decrease the voltage gain and increase the input resistance
 D. increase the voltage gain and increase the input resistance

34 - B

35. An ideal transconductance amplifier is characterized by

- A. input resistance 0 and output resistance ∞
- B. input resistance ∞ and output resistance 0
- C. input resistance ∞ and output resistance ∞
- D. input resistance 0 and output resistance 0

35 - C

36. In 8086 processor, words are stored in two consecutive memory locations. The entire word can be read in one operation provided the first

- A. word is even
- B. word is odd
- C. memory location is odd
- D. memory location is even

36 - D

37. The minimum number of 2 to 1 multiplexers required to realize a 4 to 1 multiplexer is

- A. 1
- B. 2
- C. 3
- D. 4

37 - C

38. 4-bit 2's complement representation of a number is 1000. The number is

- A. -8
- B. -7
- C. +8
- D. 0

38 - A

39. A 4-bit modulo 16 ripple counter uses JK flip flops. If the propagation delay of each flip flop is 50 nsec, the maximum clock frequency that can be used is equal to MHz

- A. 4
- B. 5
- C. 10
- D. 20

39 - B

40. The output Y of a 2 bit comparator is logic 1 whenever the 2 bit input A is greater than the 2 bit input B. The number of combinations for which the output is logic 1 is

- A. 4
- B. 6
- C. 8
- D. 10

40 - B

The End