

PhD Entrance Examination  
Electronics and Communication Engg.

Maximum Marks: 50  
Time : 1 Hr

Note: Each question carries equal marks.

Q1 Thevenin resistance is found by \_\_\_\_\_

- a) Shorting all voltage sources
- b) Opening all current sources
- c) Shorting all voltage sources and opening all current sources
- d) Opening all voltage sources and shorting all current sources

Q2 Which of the following is also known as the dual of Thevenin's theorem?

- a) Norton's theorem
- b) Superposition theorem
- c) Maximum power transfer theorem
- d) Millman's theorem

Q3 What is the z-transform of the following finite duration signal?

$$x(n) = \{2, 4, 5, 7, 0, 1\}?$$

- a)  $2 + 4z + 5z^2 + 7z^3 + z^4$
- b)  $2 + 4z + 5z^2 + 7z^3 + z^5$
- c)  $2 + 4z^{-1} + 5z^{-2} + 7z^{-3} + z^{-5}$
- d)  $2z^2 + 4z + 5 + 7z^{-1} + z^{-3}$

Q4 The z-transform of a sequence  $x(n]$  which is given as  $X(z) = \sum_{n=-\infty}^{\infty} x(n)z^{-n}$  is known as

- a) Uni-lateral Z-transform
- b) Bi-lateral Z-transform
- c) Tri-lateral Z-transform
- d) None of the mentioned

Q5 Which of the following is a causal system?

- a)  $y(n) = 3x(n) - 2x(n-1)$
- b)  $y(n) = 3x(n) + 2x(n+1)$
- c)  $y(n) = 3x(n+1) + 2x(n-1)$
- d)  $y(n) = 3x(n+1) + 2x(n-1) + x(n)$

Q6 From the given conditions, what are the Dirichlet conditions?

- i.  $X(t)$  should be absolutely integrable
  - ii.  $X(t)$  should have finite discontinuities
  - iii.  $X(t)$  should have a finite number of maxima as well as minima in its domain
- a) i, ii and iii
  - b) i and ii
  - c) i and iii
  - d) ii and iii

Q7 A system is said to be causal if the output of the system depends on \_\_\_\_\_

- a) The Past and Present Inputs
- b) The Present Inputs
- c) The Future Inputs
- d) The Past and Future Inputs

Q8 When Op-Amp is used as integrator, the feedback element is

- a) Resistor
- b) Capacitor
- c) Zener Diode
- d) Voltage Divider

Q9 How many Flip flop are required to build a binary counter circuit to count from 0 to 1023

- a) 1
- b) 6
- c) 10
- d) 24

Q10 The maximum size of a segment in an 8086 based system is

- a) 128 KB
- b) 256 KB
- c) 64 KB
- d) 1 MB

Q11 In a BJT, if the collector-base junction is reverse-biased and the base-emitter junction is forward-biased, which region is the BJT operating in?

- a) Saturation region
- b) Active region
- c) Cutoff region
- d) Reverse active region

Q12 The abbreviation PIV in the case of a diode stands for \_\_\_\_\_

- a) Peak Inferior Voltage
- b) Problematic Inverse Voltage
- c) Peak Inverse Voltage
- d) Peak Internal Voltage

Q13 In an oscillator if phase of feedback is same as that of oscillation waveform then feedback is called \_\_\_\_\_

- a) Positive feedback
- b) Negative feedback
- c) Cannot be predicted
- d) Either positive or negative depending upon frequency

Q14 The transmitter-receiver combination in the satellite is known as a \_\_\_\_\_

- a) Relay
- b) Repeater
- c) Transponder
- d) Duplexer

Q15 Why are techniques like frequency reuse and spatial isolation carried out?

- a) Reduce traffic load
- b) More gain
- c) High speed
- d) Error detection

Q16 which of the following logic family is fastest of all

- a) TTL
- b) RTL
- c) DCTL
- d) ECL

Q17 Photoconductive device are made of

- a) Radioactive materials
- b) Highly conductive material
- c) Semiconductor material
- d) Highly insulating material

Q18 which of the following device is suitable for very low power oscillator circuit only

- a) TRAPATT diode
- b) IMPATT diode
- c) Gunn diode
- d) Tunnel diode

Q19 Phase locked loop system is used for detection of

- a) PM
- b) AM
- c) FM
- d) QAM

Q20 a transistor amplifier has a measured S/N of 10 at its input and 5 at its output. The transistor noise Figure in dB is

- a) 2dB
- b) 3dB
- c) 6dB
- d) 10dB

Q21 Zener breakdown mechanism occurs in reverse biased PN junction

- a) When P and N regions are lightly doped
- b) When P and N regions are heavily doped
- c) Are of silicon material
- d) When P and N regions are equally doped

Q22 Which of the following is true about the resistance of a Zener diode?

- a) It has an incremental resistance
- b) It has dynamic resistance
- c) The value of the resistance is the inverse of the slope of the i-v characteristics of the Zener diode
- d) All of the mentioned

Q23 For MOSFET is to be used as a switch then it must operate in

- a) Cut-off region
- b) Triode region
- c) Saturation region
- d) Both cut-off and triode region can be used

Q24 An AM signal is represented by  $x(t) = (20 + 4\sin(500\pi t)) \cos(2\pi t \times 10^5)V$ . What is the modulation index?

- a) 20
- b) 4
- c) 0.2
- d) 10

Q25 In PCM system, if the quantization levels are increased from 2 to 8, the relative bandwidth requirement will

- a) Remain same
- b) Be doubled
- c) Be tripled
- d) Become four times

Q26 If 120 C of charge passes through an electric conductor in 60 sec, the current in the conductor is \_\_\_\_\_

- a) 0.5 A
- b) 2 A
- c) 3.33 mA
- d) 0.3 mA

Q27 Which of the following statement is true about FET?

- a) It has high output impedance
- b) It has high input impedance
- c) It has low input impedance
- d) It does not offer any resistance

Q28 The Shockley equation is \_\_\_\_\_

- a)  $I_D = (1 - V_{gs}/V_p)^2$
- b)  $I_D = I_{DSS} (1 - V_{gs}/V_p)^2$
- c)  $I_D = I_{DSS} (1 - V_{gs}/V_p)^1$
- d)  $I_D = I_{DSS} (1 + V_{gs}/V_p)^2$

Q29 For what value of  $V_{gs}$ , the drain current will be 1/4th of its maximum current?

- a) 0
- b) 1
- c)  $V_p$
- d)  $V_p/2$

Q30 The truth table for an S-R flip-flop has how many VALID entries?

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

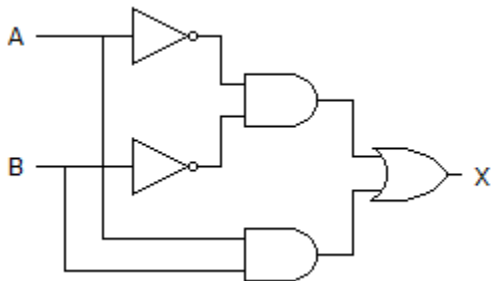
Q31 Which of the following is correct for a gated D-type flip-flop?

- a) The Q output is either SET or RESET as soon as the D input goes HIGH or LOW
- b) The output complement follows the input when enabled
- c) Only one of the inputs can be HIGH at a time
- d) The output toggles if one of the inputs is held HIGH

Q32 Whose operations are more faster among the following?

- a) Combinational circuits
- b) Sequential circuits
- c) Latches
- d) Flip-flops

Q33 What type of logic circuit is represented by the figure shown below?



- a) XOR
- b) XNOR
- c) AND
- d) XAND

Q34 How many natural states will there be in a 4-bit ripple counter?

- a) 4
- b) 8
- c) 16
- d) 32

Q35 The terminal count of a typical modulus-10 binary counter is \_\_\_\_\_

- a) 0000
- b) 1010
- c) 1001
- d) 1111

Q36 The logical sum of two or more logical product terms is called \_\_\_\_\_

- a) SOP
- b) POS
- c) OR operation
- d) NAND operation

Q37 The decimal equivalent of the binary number  $(1011.011)_2$  is \_\_\_\_\_

- a)  $(11.375)_{10}$
- b)  $(10.123)_{10}$
- c)  $(11.175)_{10}$
- d)  $(9.23)_{10}$

Q38 2's complement of 11001011 is \_\_\_\_\_

- a) 01010111
- b) 11010100
- c) 00110101
- d) 11100010

Q39 Memory connected to a microprocessor has 20 address lines and 16 data lines. What will be the memory capacity?

- a) 8 KB
- b) 1 MB
- c) 16 MB
- d) 64 KB

Q40 How many address lines are required to connect a 4 KB RAM to a microprocessor?

- a) 10
- b) 16
- c) 12
- d) 20

Q41 Suppose registers 'A' and 'B' contain 50H and 40H respectively. After instruction

MOV A, B what will be the contents of registers A and B?

- a) 40H, 40H
- b) 50H, 40H
- c) 50H, 50H
- d) 60H, 40H

Q42 A control system is generally met with the time response specifications:

- a) Damping factor
- b) Setting time
- c) Steady state accuracy
- d) All of the mentioned

Q43 For a quarter wave ideal transmission line of characteristic impedance of  $50\Omega$  and load impedance of  $100\Omega$ , the input impedance of line is in (ohm  $\Omega$ )

- a) 50
- b) 25
- c) 100
- d) 175

Q44 Acceleration error constant is a measure of the steady state error of the system when the input is

- a) Unit step function
- b) Ramp function
- c) Impulse function
- d) Parabolic function

Q45 the open loop transfer function of a unity feedback control system is given by  $G(s)=25/s(s+5)$

Consider that

1. Natural frequency
  2. Damped frequency
  3. Damping factor
  4. Damping ratio
- Arrange the above in increasing order of their numerical value
- a) 4,1,2,3
  - b) 1,2,4,3
  - c) 4,3,2,1
  - d) 1,3,4,2

Q46 If the reflection co-efficient is  $\frac{1}{2}$  then VSWR is \_\_\_\_

- a) 3
- b) 4
- c) 1
- d) 5



Q 47 A linear antenna having length less than  $\lambda/8$  is called as \_\_\_\_\_

- a) Short monopole
- b) Short dipole
- c) Half-wave dipole
- d) Quarter-wave monopole

Q48 The ratio of radiation intensity in a given direction from antenna to the radiation intensity over all directions is called as \_\_\_\_\_

- a) Directivity
- b) Radiation power density
- c) Gain of antenna
- d) Array Factor

Q49 The waveguide is preferred over the transmission lines, when operated at the range of

- a) Hz
- b) KHz
- c) MHz
- d) GHz

Q50 What is the divergence of the vector field F where  $F = xi + yj + zk$  ?

- (a) 3
- (b)  $x + y + z$
- (c)  $xyz$
- (d) Zero



1. C
2. A
3. D
4. B
5. A
6. A
7. A
8. B
9. C
10. C
11. B
12. C
13. A
14. C
15. A
16. D
17. C
18. D
19. C
20. B
21. B
22. D
23. D
24. C
25. C
26. B
27. B
28. B
29. D
30. C
31. A
32. A
33. B
34. C
35. C
36. A
37. A
38. C
39. B
40. C
41. A
42. D
43. B
44. D
45. C
46. A

- 47. A
- 48. A
- 49. D
- 50. A