Subject : Electronics
Paper name : Pulse Switching Circuits
Paper No : EL/IV/EC/04(T)
Semester : 4th Semester (CBCS)

A. Multiple choice questions [75 (15 from each unit)]

Q. No. 1 – 15 are from Unit 1
Q. No. 16 – 30 are from Unit 2
Q. No. 31 – 45 are from Unit 3
Q. No. 46 – 60 are from Unit 4
Q. No. 61 – 75 are from Unit 5

1. When a negative voltage feedback is applied to an amplifier, its voltage gain …….
   a) is increased
   b) is reduced
   c) remains the same
   d) insufficient data

2. Closed-loop gain of a feedback amplifier is the gain obtained when
   a) its output terminals are closed
   b) negative feedback is applied
   c) feedback loop is closed
   d) feedback factor exceeds unity

3. Negative feedback is employed in
   a) oscillators
   b) rectifiers
   c) amplifiers
   d) transducers

4. The gain of an amplifier with feedback is known as
   a) closed-loop gain
   b) open-loop gain
   c) resonant gain
   d) current gain

5. When a negative voltage feedback is applied to an amplifier, its output impedance …….
   a) is increased
   b) is decreased

c) remains the same
d) insufficient data

6. The value of negative feedback fraction is always
   a) less than 1
   b) more than 1
   c) equal to 1
   d) zero

7. If the output of an amplifier is 10 V and 100 mV from the output is fed back to the input, then feedback fraction is …….
   a) 10
   b) 0.1
   c) 0.01
   d) 0.15

8. When voltage feedback (negative) is applied to an amplifier, its input impedance …….
   a) is increased
   b) is decreased
   c) remains the same
   d) insufficient data

9. An amplifier has a gain of 1000 without feedback and cut-off frequencies are f_1 = 1.5 kHz and f_2 = 501.5 kHz. If 1% of output voltage of the amplifier is applied as negative feedback, the new cut-off frequencies (f'_1 and f'_2) are….
   a) f'_1 = 136.4 Hz and f'_2 = 3.24 MHz
   b) f'_1 = 165.5 Hz and f'_2 = 5.52 MHz
   c) f'_1 = 136.4 Hz and f'_2 = 5.52 MHz
   d) f'_1 = 120.8 Hz and f'_2 = 6.33 MHz

10. When negative voltage feedback is applied to an amplifier, its bandwidth …….
    a) is increased
    b) is decreased
    c) remains the same
    d) insufficient data

11. Feedback in an amplifier always helps to
    a) increase its gain
    b) decrease its input impedance
    c) stabilize its gain
    d) control its output

12. Negative feedback reduces distortion in an amplifier only when it…….
    a) comes as part of input signal
    b) is part of its output
    c) is generated within the amplifier
    d) exceeds a certain safe level

13. An amplifier with no feedback has a gain-bandwidth product of 4 MHz. Its closed-loop gain is 40. The new bandwidth is …..
    a) 100 kHz
    b) 160 MHz
    c) 10 MHz
    d) 20 kHz

14. If the feedback fraction of an amplifier is 0.01, then voltage gain with negative voltage feedback is approximately …….
    a) 500
    b) 100
    c) 1000
    d) 5000

15. Feedback circuit is …….. frequency.
    a) independent of
    b) strongly dependent on
    c) moderately dependent on
    d) less dependent on

16. An oscillator produces …… oscillations
    a) undamped
    b) damped
    c) modulated
    d) demodulated

17. An oscillators differs from an amplifier because it …….
    a) has more gain
    b) requires no d.c. supply
    c) always has the same input
    d) requires no input signal

18. For sustaining oscillation in an oscillator
    a) feedback factor should be unity
    b) phase shift should be 90°

c) feedback should be negative
d) no feedback

19. In a transistor Hartley oscillator
a) inductive feedback is used
b) untapped coil is used
c) entire coil is in the output circuit
d) no capacitor is used

20. If Barkhausen criterion is not fulfilled by an oscillator circuit, then it will
a) stop oscillating
b) become an amplifier
c) produce damped wave continuously
d) produce high frequency whistle

21. A Colpitts oscillator uses
a) tapped coil
b) inductive feedback
c) tapped capacitance
d) no tuned LC circuit

22. In an LC oscillator, if the value of L is increased four times, the frequency of oscillations is ……
a) increased 2 times
b) decreased 4 times
c) increased 4 times
d) decreased 2 times

23. In Colpitts oscillator, feedback is obtained ……..
a) by magnetic induction
b) by a tickler coil
c) from the centre of split capacitors
d) from the emitter of transistor

24. Hartley oscillator is commonly used in
a) radio receivers
b) radio transmitter
c) TV receivers
d) rectifiers

25. The tuned collector oscillator circuit used in the local oscillator of a radio receiver makes use of an LC tuned circuit with L_1 = 58.6 μH and C_1 = 300 pF. The frequency of oscillations is……..
    a) 2599 kHz
    b) 1199 kHz
    c) 1533 kHz
    d) 2132 kHz

26. A Colpitts oscillator having C_1 = 0.001 μF, C_2 = 0.01 μF and L = 15 μH. The operating frequency is…….
    a) 1361 kHz
    b) 1261 kHz
    c) 1161 kHz
    d) 1461 kHz

27. A Hartley oscillator having L_1 = 1000 μH, L_2 = 100 μH and C = 20 pF. The mutual inductance between the coils, M = 20 μH .Then, operating frequency is…….
    a) 1022 kHz
    b) 1032 kHz
    c) 1052 kHz
    d) 1010 kHz

28. In an LC oscillator, the frequency of oscillator is …….. L or C.
    a) proportional to square of
    b) directly proportional to
    c) independent of the values of
    d) inversely proportional to square root of

29. An LC oscillator cannot be used to produce …… frequencies.
    a) high
    b) audio
    c) very low
    d) very high

30. An electronic oscillator is
    a) just like an alternator
    b) nothing but an amplifier
    c) an amplifier with feedback
    d) a converter of a.c. to d.c. energy

31. In a Phase-shift oscillator, the frequency determining element(s) is/are
    a) L and C
    b) R, L and C
    c) R and C
    d) only R

32. The crystal oscillator frequency is very stable due to …… of the crystal.
    a) rigidity
    b) vibrations
    c) low Q
    d) high Q

33. An important limitation of a crystal oscillator is
    a) its low output
    b) its high Q
    c) less availability of quartz crystal
    d) its high output

34. In a Wien-bridge oscillator, if the resistances in the positive feedback circuit are decreased, the frequency …….
    a) remains the same
    b) decreases
    c) increases
    d) insufficient data

35. If the crystal frequency changes with temperature, we say that crystal has …… temperature coefficient.
    a) positive
    b) zero
    c) negative
    d) constant

36. In RC phase-shift oscillator circuits
    a) there is no need for feedback
    b) feedback factor is less than unity
    c) pure sine wave output is possible
    d) transistor parameters determine oscillation frequency

37. Wien-bridge oscillator is most often used whenever
    a) wide range of high purity sine waves are to be generated
    b) high feedback ratio is needed

c) square output waves are required
d) extremely high resonant frequencies are required

38. In the Phase-shift oscillator, $R_1 = R_2 = R_3 = 1$ MΩ and $C_1 = C_2 = C_3 = 68$ pF. Frequency of oscillations is
a) 911 Hz
b) 954 Hz
c) 925 Hz
d) 935 Hz

39. …… is a fixed frequency oscillator.
a) Phase-shift oscillator
b) Wien-bridge oscillator
c) Negative resistance oscillator
d) Crystal oscillator

40. In the Wien-bridge oscillator, $R_1 = R_2 = 220$ kΩ and $C_1 = C_2 = 250$ pF. The frequency of oscillations is
a) 2892 Hz
b) 2928 Hz
c) 2982 Hz
d) 2298 Hz

41. Quartz crystal is most commonly used in crystal oscillators because ……..
a) it is easily available
b) it has superior electrical properties
c) it is quite inexpensive
d) it occupies less space

42. A phase-shift oscillator uses 5 pF capacitors. The value of R to produce a frequency of 800 kHz is
a) 15 kΩ
b) 17.3 kΩ
c) 16.2 kΩ
d) 10 kΩ

43. A crystal has a thickness of t mm. If the thickness is reduced by 1%, the frequency of oscillations will
a) increase by 1%
b) decrease by 1%
c) increase by 2%
d) remains the same

44. The piezo-electric effect in a crystal is
    a) a voltage developed because of mechanical stress
    b) a change in resistance because of temperature
    c) a change of frequency because of temperature
    d) zero temperature coefficient

45. A Wien-bridge oscillator uses …….
    a) only positive feedback
    b) only negative feedback
    c) both positive and negative feedback
    d) no feedback is used.

46 ……multivibrator is a square wave oscillator.
    a) monostable
    b) astable
    c) bistable
    d) none of the above

47. A monostable multivibrator has ……..
    a) no stable state
    b) one stable state
    c) two stable states
    d) none of the above

48. In an astable multivibrator
    a) $\beta = 1$
    b) $\beta A = 1$
    c) $\beta > 1$
    d) $\beta < 1$

49. The frequency of oscillation of an astable multivibrator depends on the
    a) value of transistor β
    b) value of collector load resistors
    c) RC values of the circuit
    d) width of the input pulse

50. The term “free running” is associated with
    a) Bistable multivibrator
    b) Monostable multivibrator

c) Astable multivibrator
d) Schmitt Trigger

51. The number of energy storing element (s) in monostable multivibrator is/are
a) two
b) one
c) three
d) no element

52. How many types of multivibrators are?
a) 2
b) 4
c) 5
d) 3

53. Bistable multivibrator is _____ in any state.
a) Stable
b) Unstable
c) Saturated
d) Independent

54. Bistable circuit is also known as _____
a) Latch
b) Gate
c) Flip-flop
d) Bidirectional circuit

55. Astable circuit acts as a/an _____
a) Amplifier
b) Oscillator
c) Relaxation oscillator
d) Multiplexer

56. Monostable multivibrator can also be termed as _____
a) Full astable multivibrator
b) Half astable multivibrator
c) Half bistable multivibrator
d) Full bistable multivibrator

57. Which circuit converts irregularly shaped waveform to regular shaped waveforms?
a) Schmitt trigger
b) Voltage limiter

c) Comparator
d) None of the mentioned

58. What happens if the threshold voltages are made longer than the noise voltages in schmitt trigger?
a) All the mentioned
b) Enhance the output signal
c) Reduce the transition effect
d) Eliminate false output transition

59. The external triggering is not needed for the transition of state in the
a) Bistable multivibrator
b) Monostable multvibrator
c) Astable multivibrator
d) both (b) and (c)

60. The switching time of Astable multivibrator is T = ……..
a) 0.83 RC
b) 1.38 RC
c) 0.38 RC
d) 1.83 RC

61. After counting 0, 1, 10, 11, the next binary number is
a) 12
b) 100
c) 101
d) 110

62. The number 12_8 is equivalent to decimal
a) 12
b) 20
c) 10
d) 4

63. An XOR gate produces an output only when its two inputs are
a) high
b) low
c) different
d) same

64. The universal gate is
    a) NAND gate
    b) OR gate
    c) NOT gate
    d) AND gate

65. The inputs of a NAND gate are connected together. The resulting circuit is.....
    a) OR gate
    b) AND gate
    c) NOT gate
    d) XOR gate

66. The NAND gate is AND gate followed by
    a) NOT gate
    b) OR gate
    c) AND gate
    d) NOR gate

67. When an input signal 1 is applied to a NOT gate, the output is.....
    a) 0
    b) 1
    c) either 0 or 1
    d) 10

68. The number 1000_2 is equivalent to decimal number
    a) one thousand
    b) eight
    c) four
    d) sixteen

69. Boolean algebra is essentially based on
    a) symbols
    b) logic
    c) truth
    d) numbers

70. A logic gate is an electronic circuit which
    a) makes logic decisions
    b) allows electron flow only in one direction
    c) works on binarry algebra
    d) alternates between 0 and 1 values

71. In positive logic, logic state 1 corresponds to
    a) positive voltage
    b) higher voltage level
    c) zero voltage level
    d) lower voltage level

72. An AND gate
    a) implements logic addition
    b) is equivalent to a series switching circuit
    c) is an any-or-all gate
    d) is equivalent to a parallel switching circuit

73. When an input electrical signal A = 10100 is applied to a NOT gate, its output signal is
    a) 01011
    b) 10101
    c) 10100
    d) 00101

74. A NOR gate is ON only when all its inputs are
    a) ON
    b) positive
    c) high
    d) OFF

75. In a certain 2-input logic gate, when A = 0, B = 0, then C = 1 and when A = 0, B = 1, then again C = 1. It must be ..... gate.
    a) XOR
    b) AND
    c) NAND
    d) NOR

B. Fill up the blanks [15 (5 from each unit)]

Q. No. 1 – 5 are from Unit 1
Q. No. 6 – 10 are from Unit 2
Q. No. 11 – 15 are from Unit 3
Q. No. 16 – 20 are from Unit 3
Q. No. 21 – 25 are from Unit 3

1. Feedback does not change the gain bandwidth …….
2. Negative feedback in amplifiers gives reduced gain but …… bandwidth.
3. Positive feedback occurs when feedback voltage and input voltage are in …….. with each other.
4. Positive feedback is often used in ……. circuits.
5. Negative feedback is frequently used in ……. circuits.
6. An oscillator circuit must satisfy ……
7. Oscillators are used to produce high-frequency …… waves for radio transmission.
8. In …… oscillator, one part of the tapped capacitor is in the output circuit and the other in the input circuit.
9. Hartley oscillator uses …… feedback.
10. ……. feedback is used in Colpitts oscillator.
11. Conversion of mechanical stress into electric potential by a crystal is called …….
12. Phase-shift oscillator do not use …….. circuits.
13. Wien-bridge oscillator produces an exceedingly good …….. output.
14. Y-cut quartz crystals have …… temperature coefficient.
15. Phase-shift oscillators are well-suited for comparatively …… frequencies.
16. In a multivibrator, we have ……feedback.
17. The multivibrator which generates square wave of its own is the ……. Multivibrator.
18. A bistable multivibrator has ……... stable states
19. The Schmitt trigger is often called a ……. Circuit.
20. The Schmitt trigger is frequently used as a pulse height ……..
21. The inverter is ..... gate
22. The binary system uses powers of ……. for positional values.
23. The digital systems usually operate on ..... system.
24. In Boolean algebra, the plus sign (+) indicates ..... operation.
25. The binary addition 1 + 1 + 1 gives ……

Key Answers

A. Multiple choice questions :

1. b)
2. c)
3. c)
4. a)
5. b)
6. a)
7. c)
8. a)
9. c)
10. a)
11. d)
12. c)
13. a)
14. b)
15. a)
16. a)
17. d)
18. a)
19. a)
20. a)
21. c)
22. d)
23. c)
24. a)
25. b)
26. a)
27. c)
28. d)
29. c)
30. c)
31. c)
32. d)
33. a)
34. c)
35. a)
36. c)

37. a)
38. b)
39. d)
40. a)
41. b)
42. c)
43. a)
44. a)
45. c)
47. b)
48. a)
49. c)
50. c)
51. b)
52. d)
53. a)
54. c)
55. c)
56. b)
57. a)
58. d)
59. c)
60. b)
61. b)
62. c)
63. c)
64. a)
65. c)
66. a)
67. a)
68. b)
69. b)
70. a)
71. b)
72. b)
73. a)
74. d)
75. c)

B. Fill up the blanks :

1. product
2. increased
3. phase
4. oscillator
5. amplifier
6. barkhausen criterion
7. undamped
8. Colpitts
9. inductive
10. capacitive
11. piezo-electric effect
12. tuned
13. sine wave
14. positive
15. low
16. positive
17. astable
18. two
19. Squaring or squarer
20. Discriminator
21. NOT
22. 2
23. binary
24. OR
25. 11