



NITTE
(Deemed to be University)

**NMAM INSTITUTE
OF TECHNOLOGY**

DEPARTMENT OF ELECTRONICS AND COMMUNICATION

COURSE: BASIC ELECTRONICS (MCQ)

COURSE CODE: EC1001-1

UNIT-1

1. The voltage at which forward current through the diode starts increasing rapidly is called as
a) **Cut in voltage** b) Breakdown voltage c) Saturation voltage d) Cut off voltage
2. Smaller the ripple factor, the output will have higher components of
a) **DC** b) AC c) spike d) pulse
3. The efficiency of full wave rectifier is about
a) **81.2** b) 0.46 c) 1.21 d) 40.6
4. In a bipolar junction transistor the collector current is controlled by
a) **Base current** b) Collector voltage c) Collector resistance d) None
5. If a 2 mV input signal produces a 2V output signal, what is the voltage gain?
a) **1000** b) 0.004 c) 100 d) 0.001
6. Total emitter current in BJT is
a) **$I_B + I_C$** b) $I_C + I_{CBO}$ c) $I_C + I_E$ d) $I_B - I_C$
7. Which is not a MOSFET terminal?
a) **Base** b) Drain c) Source d) Gate
8. When the p-n junction diode is forward biased, it offers
a) **low resistance** b) high resistance c) low voltage d) high voltage
9. Zener diode is mainly used as
a) **Voltage regulator** b) Comparator c) Oscillator d) Amplifier
10. The efficiency of half wave rectifier is about

a) 81.2% b) 46 % c) 1.21% **d) 40.6 %**

11. What is the collector current for a C-E configuration with a beta of 100 and a base current of 30 μA ?

a) 3 mA b) 3 μA c) 30 μA d) 30 mA

12. In a CE amplifier circuit, the output signal generates a phase shift of

a) 180° b) 90° c) 0° d) 270°

13. For a BJT, the following statement is true

a) $I_E = I_C$ b) $I_B = I_C$ c) $I_B = I_E$ d) $I_B = \alpha I_E$

14. Which transistor element is used in CMOS logic?

a) MOSFET b) JFET c) BJT d) Diode

15. When the p-n junction diode is reverse biased, it offers

a) high resistance b) low resistance c) low voltage d) high voltage

16. Higher the ripple factor, the output will have higher components of

a) AC b) DC c) spike d) pulse

17. The r.m.s value of load current in a full wave rectifier is

a) 0.707 I_m b) 0.5π c) $0.5 I_m$ d) $0.3183 I_m$

18. The signal voltage gain of an amplifier, A_V , is defined as _____.

a) $A_V = \frac{V_{out}}{V_{in}}$ b) $A_V = I_C * R_C$ c) $A_V = \frac{V_{in}}{V_{out}}$ d) $A_V = \frac{V_{BE}}{V_{CC}}$

19. A transistor has a beta of 200 and a base current of 40 μA in CE configuration. Then the collector current is

a) 8 mA b) 8 μA c) 80 μA d) 80 mA

20. The amount of ripples present at the output of half wave rectifier is

a) 1.21 b) 0.81 c) 0.46 d) 0.50

21. Higher the ripple factor, the output will have smaller components of

a) DC b) AC c) spike d) pulse

22. When forward biased, a p-n junction diode

a) Conducts current b) Blocks current c) has high resistance d) low voltage

23. A transistor has a beta of 200 and a base current of $40\text{ }\mu\text{A}$ in CE configuration. Then the emitter current is

- a) **8.04 mA** b) $80\mu\text{A}$ c) $80.04\text{ }\mu\text{A}$ d) 80 mA

24. BJT is made to work as an amplifier when it is operated in region

- a) **Active** b) Cut off c) Saturation d) Inverted mode

25. A transistor has $I_B = 0.08\text{ mA}$ and $I_E = 9.60\text{ mA}$. The value of β is

- a) **119** b) 129 c) 960 d) 100

26. The enhancement type MOSFET works only with _____.

- a) **large positive gate voltage** b) large negative gate voltage
c) large positive source voltage d) large negative drain voltage

27. The amount of ripples present at the output of a full wave rectifier is

- a) **48%** b) 81% c) 42% d) 52%

28. The r.m.s value of load current in a half wave rectifier is

- a) **$0.5 I_m$** b) 0.5π c) $0.707 I_m$ d) $0.3183 I_m$

29. Zener diode regulates output voltage only when it is connected in

- a) **Reverse bias** b) Forward bias c) Short d) Open

30. A transistor has $I_B = 0.06\text{ mA}$ and $I_E = 9.00\text{ mA}$. The value of β is

- a) **149** b) 129 c) 960 d) 100

31. In CE configuration of BJT, output characteristics is plotted by taking

- a) **V_{CE} verses I_C for constant I_B** b) V_{CE} verses I_C for constant I_E
c) V_{CE} verses I_C for constant V_{CB} d) V_{CE} verse I_E for constant I_C

32. A highly stable biasing network used in CE-RC coupled amplifier is

- a) **Voltage divider biasing circuit** b) Collector feedback bias circuit
c) Base bias circuit d) Emitter bias circuit

33. The MOSFET stands for

a) **Metal oxide semiconductor FET** b) Metal oxide surface FET

c) Metal oxidized selenium FET d) Metal of surface FET

34. A silicon diode is connected in series to a dc supply of 2 volts and resistance of $13\ \Omega$, the current in the circuit is

a) **0.10A** b) 0.55 A c) 0.45 A d) 1.5A

35. The DC load current of a half wave rectifier is

a) **I_m/π** b) $2I_m/\pi$ c) $2I_{dc}/\pi$ d) $1.414/\pi$

36. A sinusoidal voltage of peak value 40V is applied to a half wave rectifier with $R_L = 800\ \Omega$ and $R_f = 8\ \Omega$. The peak value of the current is

a) **49.5 mA** b) 4.95 mA c) 0.495 mA d) 4.95 A

37. A transistor has $I_B = 0.06\text{ mA}$ and $I_E = 9.00\text{ mA}$. The value of α is

a) **0.99** b) 9.9 c) 990 d) 100

38. When the transistor operates as an amplifier, the operating point is located

a) **In the center of active region** b) In the cut-off region

c) In the Saturation region d) In the Ohmic region

39. When BJT operates as a switch, it is operated alternately in _____

a) **Cut-off and Saturation region** b) Active and cut-off region

c) Saturation and active region d) Active and saturation region

40. MOSFET has greatest application in digital circuit due to

a) **Low power consumption** b) Less noise

c) Small amount of space it takes on a chip d) None

41. A silicon diode is connected in series to a dc supply of 5 Volts and resistance of $1.5\text{ k}\Omega$, the current in the circuit is

a) **2.86 mA** b) 3.86 mA c) 0.38 mA d) 1.5mA

42. Average DC load voltage of a full wave Bridge rectifier is

a) **$2V_m/\pi$** b) $2I_m/\pi$ c) $I_m/0.707$ d) $I_m/0.5$

43. What is the state of an ideal diode in the region of non-conduction?

- a) **Open circuit** b) Short circuit c) Unpredictable d) Undefined

44. A transistor has $I_B = 0.08 \text{ mA}$ and $I_E = 9.60 \text{ mA}$. The value of α is

- a) **0.99** b) 9.9 c) 990 d) 100

45. The collector to base current gain β in terms of α is defined as

a) $\frac{\alpha}{1-\alpha}$

b) $\frac{\alpha}{1+\alpha}$

c) $\frac{\beta}{1+\alpha}$

d) $\frac{\beta}{1+\beta}$

46. The collector to emitter current gain α in terms of β is defined as

a) $\frac{\beta}{1+\beta}$

b) $\frac{\alpha}{1-\alpha}$

c) $\frac{\beta}{1+\alpha}$

d) $\frac{\alpha}{1+\alpha}$

47. A germanium diode is connected in series to a dc supply of 4volts and resistance of $2 \text{ k}\Omega$, the current in the circuit is

- a) **1.85 mA** b) 1.45mA c) 0.185 mA d) 18.5 mA

48. What is the resistance of an ideal diode in the region of conduction?

- a) **0 Ω** b) 5 $\text{k}\Omega$ c) Unpredictable d) Infinity

49. A zener diode of 10V is connected to a supply of 20V through a series resistance of 200 ohms. With no load, current through the zener is

- a) **50 mA** b) 500 mA c) 5 A d) 400 mA

50. The leakage current in a transistor is due to:

- a) **Minority charge carriers**
- b) Majority charge carriers
- c) Zener effect
- d) Breakdown

51. A bipolar junction transistor is a

- a) **Current controlled device**
- b) Voltage controlled device
- c) Resistance controlled device
- d) Junction controlled device

52. The range of collector to emitter current gain α is

- a) **0.96 to 0.99**
- b) 20 to 200
- c) 0.76 to 0.96
- d) 0.50 to 1

53. A germanium diode is connected in series to a dc supply of 7.5 volts and resistance of 1.3 k Ω , the current in the circuit is

- a) **5.53 mA**
- b) 5.53 A
- c) 5.35 mA
- d) 1.53 mA

54. A Zener diode is a heavily doped semiconductor device that is designed to operate in

- a) **Reverse direction**
- b) Forward direction
- c) Both forward and reverse
- d) None

55. The range of collector to base current gain β is

- a) **20 to 200**
- b) 20 to 100
- c) 50 to 100
- d) 10 to 50

56. The value of β for a silicon transistor given the collector current as 1 mA and base current as 25 μ A is

- a) **40**
- b) 4
- c) 400
- d) 4000

57. The value of α for a silicon transistor, given the collector current as 1 mA and base current as 25 μ A is

- a) **0.9756**
- b) 0.9276
- c) 0.9376
- d) 0.9176

58. A silicon and a germanium diodes are connected in series to a dc supply of 8 volts and resistance of 2.5 k Ω , the current in the circuit is

- a) **2.8 mA**
- b) 28 mA
- c) 0.28 mA
- d) 2.8 A

59. In the breakdown region, zener diode behaves like a source of

- a) **Constant voltage**
- b) Constant current
- c) Constant resistance
- d) Constant power

60. A resistance is connected in series with zener diode in a voltage regulator to

a) **Protect the zener** b) Properly reverse bias the zener

c) Properly forward bias the zener d) switch off the zener

61. The value of β for a silicon transistor given the collector current as 1 mA and base current as 10 μ A is

a) **100** b) 10 c) 0.1 d) 1000

62. The value of α for a silicon transistor, given the collector current as 1 mA and base current as 10 μ A is

a) **0.9900** b) 0.9276 c) 0.9376 d) 0.9176

63. In CE-RC coupled amplifier, an emitter bypass capacitor is connected in parallel with emitter resistance R_E to

a) **To provide a low reactance path to the amplified ac signal**

b) Increase the noise in the circuit

c) To support the resistance R_E

d) To block the dc voltage

64. In which one of the following rectifiers the efficiency is low?

a) **Half-wave** b) Full-wave c) Bridge d) None of these

65. Ripple factor for a full wave bridge rectifier with capacitor filter is

a) $\frac{1}{4\sqrt{3}fCR_L}$ b) $\frac{1}{2\sqrt{3}fCR_L}$ c) $\frac{1}{2fCR_L}$ d) $\frac{1}{4fCR_L}$

66. If an emitter current is changed by 4mA, the collector current changes by 3.5mA. The value of β will be:

a) **7** b) 0.875 c) 0.5 d) 3.5

67. Which of the following statement is correct?

a) Rectification efficiency of a half wave rectifier is equal to that of the Full wave rectifier

b) All of the given options

c) **Rectification efficiency of a half wave rectifier is lower than that of the Full wave rectifier**

d) Rectification efficiency of a half wave rectifier is higher than that of the Full wave rectifier

68. A MOSFET is a

a) Current controlled device

b) Voltage controlled device

c) Resistance controlled device

d) Junction controlled device

69. In a Full wave bridge rectifier, the number of diodes conducting at a time during one half cycle of the input signal is

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

70. The doping level in a zener diode is that of a PN diode.

a) the same as

b) less than

c) more than

d) none of the above

71. A MOSFET has..... terminals.

a) two b) five c) four **d) three**

72. The number of depletion layers in a transistor is

a) four b) three c) one d) **two**

73. The base of a transistor is doped

a) heavily

b) moderately

c) lightly

d) none of the above

74. The emitter of a transistor is doped

a) lightly

- b) heavily**
- c) moderately
- d) none of the above

75. The value of α of a transistor is

- a) more than 1
- b) less than 1**
- c) 1
- d) none of the above

76. The value of β for a transistor is generally

- a) 1
- b) less than 1
- c) between 20 and 500**
- d) above 500

77. If the value of α is 0.9, then value of β is

- a) 9
- b) 0.9
- c) 900
- d) 90**

78. In a transistor, signal is transferred from a circuit

- a) high resistance to low resistance
- b) low resistance to high resistance**
- c) high resistance to high resistance
- d) low resistance to low resistance

79. With the E-MOSFET, when gate input voltage is zero, drain current is

- a) at saturation
- b) zero**
- c) I_{DSS}

d) widening the channel

80. MOSFET has a thin layer of silicon dioxide, which act as:

- a) Resistance
- b) Inductor
- c) Semiconductor
- d) Capacitor**

UNIT-II

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

- a) Infinite output resistance**
- b) Infinite bandwidth
- c) Infinite voltage gain
- d) Infinite slew rate

2. An integrator circuit using an Op Amp hasin its feedback path

- a) Capacitor**
- b) Resistor
- c) inductor
- d) Diode

3. The representation 555 for IC 555 timer is mainly because

- a) It has a series of three $5k\ \Omega$ resistors in the internal circuitry**
- b) It has voltage levels of 5V in the internal circuitry
- c) It has five Op Amp comparators internally
- d) None of these

4. IC 555 timer working as a free running oscillator is a

- a) DC to AC converter**
- b) AC to DC converter
- c) DC to DC converter
- d) DC to DC inverter

5. In Colpitts' oscillator, the components used in the feedback network are

- a) 2C and 1L**
- b) 2L and 1C
- c) 2R and 2C
- d) 2L and 2C

6. With a resistance value of $R=1\text{k}\Omega$ in a feedback network of RC oscillator, frequency of oscillations generated is 5 kHz. The value of the capacitor C is

- a) **$0.0129\ \mu\text{F}$** b) $0.129\ \mu\text{F}$ c) $0.0219\ \mu\text{F}$ d) $129\ \mu\text{F}$

7. Gain with negative feedback is given by $A_f = \frac{A}{1+A\beta}$. The feedback factor is

- a) β b) A c) A_f d) None

8. An amplifier has an open loop voltage gain of 1000. If 10% negative voltage series feedback is used, then the closed loop gain is

- a) **9.9** b) 99.9 c) 0.9 d) 990

9. Find the output voltage of an ideal op-amp if V_1 and V_2 are the two input voltages

- a) $V_0 = A(V_1 - V_2)$ b) $V_0 = V_1 - V_2$ c) $V_0 = A(V_1 + V_2)$ d) $V_0 = V_1 \times V_2$

10. A differentiator circuit using an Op Amp hasin its feedback path

- a) **Resistor** b) Capacitor c) Inductor d) Diode

11. The voltage levels fixed at one of the terminals of two comparators in the internal circuitry of IC 555 timer are

a) $\frac{1}{3}V_{cc}$ & $\frac{2}{3}V_{cc}$

b) V_{cc} & $\frac{2}{5}V_{cc}$

c) $\frac{1}{5}V_{cc}$ & $\frac{2}{5}V_{cc}$

d) 0V & $\frac{2}{5}V_{cc}$

12. A sine wave of 0.5 V peak voltage is applied as an input to an inverting amplifier with $R_1 = 10\text{k}\Omega$ and $R_f = 50\text{k}\Omega$ The output voltage V_o is

- a) **-2.5 V peak** b) 5.2 V peak c) -10 V peak d) -2.5 V peak-peak

13. In Hartley oscillator, the components used in the feedback network are

- a) **2L and 1C** b) 2L and 2C c) 2R and 2C d) 1L and 2C

14. For an amplifier with negative feedback, the closed loop gain is given by

a) $A_f = \frac{A}{1+A\beta}$

b) $A_f = \frac{A}{1-A\beta}$

c) $A_f = \frac{A}{1-\beta}$

d) $A_f = \frac{A}{1-V\beta}$

15. In a practical oscillator circuit, to start oscillations, the loop gain $A\beta$ must be

- a) **Greater than 1** b) Equal to 1 c) Less than 1 d) Not equal to 1

16. An amplifier has an open loop voltage gain of 2000. If 40% negative voltage series feedback is used, then the closed loop gain is

- a) 2.49 b) 24.9 c) 0.249 d) 249

17. The output voltage obtained for an ideal op-amp is by

- a) **Amplifying the difference between the two input voltages**
 b) Amplifying individual input voltages
 c) Amplifying products of two input voltage
 d) None of the mentioned

18. The output voltage V_0 of an Op Amp integrator is given by

a) $V_0 = -\frac{1}{R_1 C_f} \int_0^t V_{in} dt$ b) $V_0 = -\frac{1}{C_f} \int_0^t V_{in} dt$

c) $V_0 = -\frac{1}{R_1 C_f} \int_{-\infty}^t V_{in} dt$ d) $V_0 = -\frac{1}{R_f C_1} \int_0^t V_{in} dt$

19. The outputs of two comparators are connected to a in the internal circuitry of IC 555 timer

- a) **S-R Flip Flop** b) D-type Flip Flop c) J-K Flip Flop d) T-Type Flip Flop

20. A sine wave of 0.5 V peak voltage is applied as an input to a non-inverting amplifier with $R_1 = 10\text{ k}\Omega$ and $R_f = 50\text{ k}\Omega$. The output voltage V_o is

- a) **3 V peak** b) 2.5 V peak c) -3 V peak d) 3 V peak-peak

21. In an amplifier, positive feedback leads to

- a) **Oscillations** b) Amplification c) Breakdown d) None of these

22. For an amplifier with positive feedback, the closed loop gain is given by

a) $A_f = \frac{A}{1-A\beta}$

b) $A_f = \frac{A}{1+A\beta}$

c) $A_f = \frac{A}{1-\beta}$

d) $A_f = \frac{A}{1-V\beta}$

23. What is an oscillator?

- a) A rectifier b) A generator c) **An amplifier with positive feedback** d) An amplifier with positive feedback

24. An amplifier has an open loop voltage gain of 100,000. If the negative voltage series feedback factor is 0.01, then the closed loop gain is

- a) **99.9** b) 9.9 c) 0.9 d) 990

25. Which is not the ideal characteristic of an op-amp?

- a) **Input Resistance is zero**
b) Output impedance is zero
c) Bandwidth is infinity
d) Open loop voltage gain is infinity

26. The output voltage V_o of an Op Amp differentiator is given by

a) $V_o = -R_f C \frac{dV_{in}}{dt}$ b) $V_o = -\frac{1}{C_f} \int_0^t V_{in} dt$

c) $V_0 = -\frac{1}{R_f C} \frac{dV_{in}}{dt}$ d) $V_0 = -\frac{1}{R_f} \int_0^t V_{in} dt$

27. The charging time or ON time of the capacitor in Astable mode of operation using IC 555 timer is

a) $T_{ON} = 0.693(R_1 + R_2)C$ b) $T_{ON} = 0.693(R_2)C$

c) $T_{ON} = 0.693(R_1)C$ d) $T_{ON} = 0.693(F)C$

28. A sine wave of 0.5 V peak voltage is applied as an input to a non-inverting amplifier with $R_1 = 12 \text{ k}\Omega$ and $R_f = 24 \text{ k}\Omega$. The output voltage V_o is

a) **1.5 V peak** b) -2.5 V peak c) 10 V peak d) -5 V peak

29. In an amplifier with positive feedback, open loop gain A is 20 with feedback factor β as 0.04. Then the gain of the amplifier with feedback is

a) **100** b) 50 c) 200 d) Infinity

30. The feedback factor of Colpitt's oscillator is given by

a) $\beta = \frac{C_2}{C_1}$

b) $\beta = \frac{C_1}{C_2}$

c) $\beta = \frac{A}{A_f}$

d) $\beta = \frac{A_f}{A}$

31. Which of the following is not the advantages of negative feedback amplifier?

a) **Unstable gain** b) Higher input impedance c) Reduction in noise d) Lower output impedance

32. An amplifier has an open loop voltage gain of 10,000. If the negative voltage series feedback factor is 0.01, then the closed loop gain is

a) **99** b) 9.9 c) 0.9 d) 990

33. Which factor determines the output voltage of an op-amp?

- a) **Both positive and negative saturation voltage** b) Negative saturation
c) Positive saturation d) Supply voltage

34. The output voltage swing of a comparator for an applied input voltage depends on

- a) **Dual power supply voltages** b) Regulated power supply voltages
c) AC signals applied at the terminals of the Op Amp d) DC signals applied at the terminals of the Op Amp

35. The two Op Amps used in the internal circuit of IC 555 timer function as

- a) **Comparators** b) voltage followers c) Differentiators d) Amplifiers

36. A sine wave of 0.5 V peak voltage is applied as an input to an inverting amplifier with $R_1 = 12 \text{ k}\Omega$ and $R_f = 24 \text{ k}\Omega$. The output voltage V_o is

- a) **-1.0 V peak** b) -2.5 V peak c) -1 V peak-peak d) -5 V peak

37. In an amplifier with negative feedback, open loop gain A is 20 with feedback factor β as 0.04. Then the gain of the amplifier with feedback is

- a) **11.11** b) 100 c) 200 d) Infinity

38. The feedback factor of Hartley oscillator is given by

a) $\beta = \frac{L_1}{L_2}$

b) $\beta = \frac{L_2}{L_1}$

c) $\beta = \frac{A}{A_f}$

d) $\beta = \frac{A_f}{A}$

39. Which among the following parameters acts as an initiator for the operation of an oscillator in the absence of input signal?

- a) **Noise voltage** b) Noise power c) Noise current d) Noise temperature

40. In which type of oscillator circuit capacitor split representation can be seen in tank circuit?

a) **Colpitts** b) RC phase shift c) Hartley d) Weinbridge

41. A non-inverting closed loop op amp circuit generally has a gain factor

a) **Greater than one** b) Less than one c) Zero d) Equal to one

42. An inverting amplifier using Op Amp with R_1 and R_f as the resistors provide an output voltage equal to one of them as

a) $V_0 = -\left(\frac{R_f}{R_1}\right) V_{in}$

b) $V_0 = -\left(1 + \frac{R_f}{R_1}\right) V_{in}$

c) $V_0 = \left(1 + \frac{R_f}{R_1}\right) V_{in}$

d) $V_0 = \left(\frac{R_f}{R_1}\right) V_{in}$

43. The duty cycle 'D' of IC 555 timer in astable mode in terms of its time period is defined by

a) $\frac{T_{ON}}{T_{ON}+T_{OFF}}$ b) $\frac{T_{ON}}{T_{OFF}}$ c) $\frac{T}{T_{OFF}}$ d) None

44. A sine wave of 0.5 V peak voltage is applied as an input to a non-inverting amplifier with $R_1 = 6 \text{ k}\Omega$ and $R_f = 24 \text{ k}\Omega$. The output voltage V_o is

a) **2.5 V peak** b) -2.5 V peak c) 10 V peak d) 2.5 V peak-peak

45. In an RC phase shift oscillator, the resistances in the feedback network are $4.7 \text{ k}\Omega$ and capacitor values are $C = 0.47 \mu\text{F}$. The frequency of oscillations is

a) **29.413 Hz** b) 294.13 Hz c) 2941.3 Hz d) None of these

46. Negative feedback amplifier

a) **Reduces gain** b) Increases gain c) Increases noise d) Reduces phase shift

47. The tank circuit of a Colpitt's oscillator has $L = 5 \text{ mH}$ with $C_1 = 22.22 \text{ nF}$ and $C_2 = 2.22 \text{ nF}$. The feedback factor β is

- a) **0.1** b) 0.001 c) 0.01 d) 1

48. In which type of oscillator circuit inductor split representation can be seen in tank circuit?

- a) **Hartley** b) RC phase shift c) Colpitts d) Wein bridge

49. An ideal OP-AMP has following characteristics

- a) **$R_i = \text{infinity}$, $A = \text{infinity}$, $R_o = \text{infinity}$**

b) $R_i = 0$, $A = \text{infinity}$ $R_o = \text{zero}$

c) $R_i = \text{infinity}$, $A = 0$, $R_o = \text{infinity}$

d) $R_i = 0$, $A = \text{infinity}$, $R_o = \text{infinity}$

50. A non-inverting amplifier using Op Amp with R_1 and R_f as the resistors provide an output voltage equal to one of them as

a) $V_0 = \left(1 + \frac{R_f}{R_1}\right) V_{in}$

b) $V_0 = -\left(\frac{R_f}{R_1}\right) V_{in}$

c) $V_0 = -\left(1 + \frac{R_f}{R_1}\right) V_{in}$

d) $V_0 = \left(\frac{R_f}{R_1}\right) V_{in}$

51. The duty cycle 'D' of IC 555 timer in astable mode in terms of resistors used in the external circuit is defined by

a) $\frac{R_1 + R_2}{R_1 + 2R_2}$

b) $\frac{R_1 + 2R_2}{R_1 + R_2}$

c) $\frac{R_1 - R_2}{R_1 - 2R_2}$

d) $\frac{R_1 + R_2}{R_1 - 2R_2}$

52. A non-inverting Op-Amp has a gain of 61 with $R_1 = 1 \text{ k}\Omega$. The resistor in the feedback path must have a value of

- a) 60 k Ω b) 59 k Ω c) 61 k Ω d) 62 k Ω

53. An RC network in an RC phase shift oscillator has $C = 0.1 \mu\text{F}$. The frequency of oscillations is 1 kHz. The value of R used in the feedback network is

- a) 650 Ω b) 500 Ω c) 600 Ω d) 1 k Ω

54. RC phase shift oscillator is a

- a) Low frequency oscillator b) High frequency oscillator
c) Stable frequency oscillator d) Relaxation oscillator

55. In a Hartley oscillator, if $L_1 = 5 \text{ mH}$, $L_2 = 10 \text{ mH}$ and $C = 0.01 \mu\text{F}$, the value of the feedback factor β is

- a) **0.5** b) 0.05 c) 50 d) 500

56. The frequency of oscillations generated by RC phase shift oscillator is

- a) $\frac{1}{2\pi\sqrt{6}RC}$ b) $\frac{1}{2\pi RC}$ c) $\frac{1}{2\pi\sqrt{6}RC}$ d) $\frac{1}{2\pi 6RC}$

57. For an Op-Amp having differential gain A_d and Common mode gain A_c , CMRR is

- a) **A_d/A_c** b) $A_d + A_c$ c) $1 + (A_d/A_c)$ d) A_c/A_d

58. A voltage follower using Op Amp is also known as

- a) **Buffer amplifier** b) Non inverting amplifier c) Inverting amplifier d) Switch

59. The pin number 7 in IC 555 timer is assigned as

- a) **Discharge pin** b) Threshold pin c) output pin d) None of these

60. A non-inverting Op-Amp has a gain of 61 with $R_1 = 2 \text{ k}\Omega$. The resistor in the feedback path must have a value of

- a) **120 k Ω** b) 121 k Ω c) 61 k Ω d) 62 k Ω

61. An RC network in an RC phase shift oscillator has $C = 0.2 \mu\text{F}$. The frequency of oscillations is 1 kHz. The value of R used in the feedback network is

- a) **325 Ω** b) 500 Ω c) 600 Ω d) 1 k Ω

62. Hartley oscillator is a

- a) **High frequency oscillator** b) Stable frequency oscillator
c) Low frequency oscillator d) Relaxation oscillator

63. In a Hartley oscillator, if $L_1 = 7 \text{ mH}$, $L_2 = 10 \text{ mH}$ and $C = 0.01 \mu\text{F}$, the value of the feedback factor β is

- a) **0.7** b) 0.07 c) 70 d) 700

64. The frequency of oscillations generated by Colpitts oscillator is

- a) $\frac{1}{2\pi\sqrt{LC_{eq}}}$ b) $\frac{1}{2\pi\sqrt{L_{eq}C}}$ c) $\frac{1}{2\pi\sqrt{LC}}$ d) $\frac{1}{2\pi LC}$

65. A simple application of an Op-Amp that can be used to generate a gain of unity is

- a) **Voltage follower** b) Differentiator c) Integrator d) Comparartor

66. Op Amp Comparator is a circuit whose output voltage switches between

- a) $+V_{sat}, -V_{sat}$ b) $+V_{in}, -V_{in}$ c) $+V_o, -V_o$ d) None

67. The discharge pin in IC 555 timer is connected to ----- of the transistor.

- a) **Collector terminal** b) Emitter terminal c) Base terminal d) None of these

68. An inverting Op-Amp has a gain of - 61 with $R_1 = 1 \text{ k}\Omega$. The resistor in the feedback path must have a value of

- a) **61 k Ω** b) 59 k Ω c) 60 k Ω d) 62 k Ω

69. The components in the feedback network of LC oscillators are

- a) **L & C components** b) R & C components c) Only L Component d) None of these

70. What is an angle of phase shift for each designed RC network in the Phase Shift Oscillator circuit?

- a) **60 $^\circ$** b) 45 $^\circ$ c) 30 $^\circ$ d) 90 $^\circ$

71. In a Hartley oscillator, if $L_1 = 2 \text{ mH}$, $L_2 = 8 \text{ mH}$ and $C = 0.01 \mu\text{F}$, the value of the feedback factor β is

- a) **0.25** b) 0.025 c) 250 d) 25

72. The frequency of oscillations generated by Hartley oscillator is

- a) $\frac{1}{2\pi\sqrt{L_{eq}C}}$ b) $\frac{1}{2\pi\sqrt{LC_{eq}}}$ c) $\frac{1}{2\pi\sqrt{LC}}$ d) $\frac{1}{2\pi LC}$

73. For an ideal op-amp, which of the following is false?

- a) **The current from output terminal is zero**
b) The current into the input terminals is zero
c) The differential voltage between the input terminals is zero
d) The output resistance is zero

74. With reference to the output voltage of an inverting Op Amp summer $V_0 =$

$-\left(\frac{R_f}{R_1}V_1 + \frac{R_f}{R_2}V_2 + \frac{R_f}{R_3}V_3\right)$, if $R_f = R_1 = R_2 = R_3 = R$, then

- a) $V_0 = -(V_1 + V_2 + V_3)$
b) $V_0 = -V_1 + V_2 + V_3$
c) $V_0 = V_1 + V_2 + V_3$
d) None of these

75. The duty cycle D in astable mode using IC 555 is obtained using

- a) **External resistors** b) Internally connected resistors
c) Comparators d) RS Flip flop

76. An inverting Op-Amp has a gain of - 61 with $R_1 = 1 \text{ k}\Omega$. The resistor in the feedback path must have a value of

- a) **162k Ω** b) 82 k Ω c) 182 k Ω d) 62 k Ω

77. In an RC-Phase shift oscillator, the components used in the feedback network are

- a) **3R and 3C** b) 1R and 1C c) 4R and 4C d) 2R and 2L

78. Gain with negative feedback is given by $A_f = \frac{A}{1-A\beta}$. The feedback factor is

- a) β b) A c) A_f d) None

79. In a Colpitts oscillator, if $C_1 = 100 \text{ pF}$, $C_2 = 60 \text{ pF}$ and $L = 0.422 \text{ H}$, the value of the feedback factor β is

- a) **0.6** b) 0.06 c) 60 d) 600

80. The criterion that determines mathematical condition to generate sustained oscillations is

- a) **Barkhausen** b) Shockley c) Pinch off d) Threshold

UNIT-III

1. The unit used for measuring Message or information is

- (a) **bits per second** (b) Hertz (c) Ohms (d) meter per second

2. The initial mobile communication systems for public safety in United states used the following modulation technique,

- a) **Amplitude modulation**
- b) Frequency modulation
- c) Phase modulation
- d) Time based modulation

3. Actuators are used to

- a) **Make a mechanical movement**
- b) Sense an object
- c) Activate a chemical
- d) All of the above

4. The function of a sensor is to _____

- a) **Detect events within specified environment**
- b) Separate physical parameters
- c) Only Track the data
- d) **None**

5. Fibre optic cable is a ----- type of channel.

- (a) **Wired channel** (b) Free space channel (c) Radio channel (d) Wireless channel

6. The mechanism of using the same frequency band within a geographical area in a Cellular or mobile communication system is referred to as,

- a) **Frequency reuse**
- b) Efficiency
- c) Reliability
- d) Bandwidth coordination

7. A microcontroller at-least should consist of:

- a) **CPU, RAM, ROM, I/O ports and timers**
- b) RAM, ROM, I/O ports and timers
- c) CPU, RAM, I/O ports and timers
- d) CPU, ROM, I/O ports and timers

8. Which of the following is true about microprocessors?

- a) **It contains ALU, CU, and registers**
- b) It has an internal memory
- c) It has interfacing circuits
- d) It uses Harvard architecture

9. ----- converts the information into signal suitable to be transmitted over the communication medium.

- (b) **Transmitter** (b) Transmission line (c) Receiver (d) Channel

10. Which of the following is not an example of a Small-Scale Embedded Systems?

- a) **Cell Phone**
- b) Electronic Barbie doll
- c) Simple Calculator
- d) Electronic Toy Car

10. In a communication system, the noise can be generated at the

- (a) **transmitter, channel, receiver** (b) channel, receiver

- (c) transmitter, channel (d) only in the channel

11. A fixed station in a mobile radio system used for radio communication with the mobile stations is

a) Base station b) Cellular station c) Switching center d) Public switching station

12. Which of the following is true about optocouplers?

- a) Optocoupler can be used in both input and output circuitry**
- b) Optocoupler acts as an input device only
- c) Optocoupler acts as an output device only
- d) None of these

13. Which of the following is example for the input subsystem of an embedded system?

- a) Optocoupler**
- b) LED
- c) Seven Segment
- d) None of these

14. Best example for natural noise is

(a) Rain (b) Traffic noise (c) Industrial noise (d) Sound pollution

15. The radio channel used for transmission of information from a base station to a mobile station is called,

- a) Forward channel**
- b) Reverse channel
- c) Control channel
- d) Mobile channel

16. Which one of the following offers external chips for memory and peripheral interface circuits?

- a) Microprocessor**
- b) Microcontroller
- c) Embedded system
- d) Peripheral System

17. Best example for man-made noise is

(a) Traffic noise (b) Rain (c) Radiations from sun, stars (d) Reflections from earth

18. The process of transferring a mobile station from one base station to another base station is called

- a) **Hand-off**
- b) Channel efficiency
- c) Frequency reuse
- d) Frequency Division Duplexing

19. The speech signal frequency range is

- (a) **300 Hz to 3.4 kHz** (b) 20 Hz to 20 kHz (c) 30 to 34 kHz (d) 10 to 10 kHz

20. In a cellular radio system, the _____ connects the cellular base stations and mobile stations to the Public Switched Telephone Networks.

- a) **Mobile Switching Center (MSO)**
- b) Base station'(BS)
- c) Forward Control Channel (FCC)
- d) Time Division Multiple Access (TDMA)

21. ASIC stands for?

- a) **Application Specific Integrated Circuit**
- b) Avionics Subsystem Interface Contractor
- c) Aviation Security Identification Card
- d) Application-Specific introduction code

22. The audio frequency range is

- (a) **20 Hz to 20 kHz** (b) 30 to 34 kHz (c) 300 Hz to 3.4 kHz (d) 10 to 10 kHz

23. Which of the following is true about Embedded System?

- a) **All of them**
- b) An embedded system usually performs a specialized operation and does the same repeatedly
- c) It must have a memory, as its software usually embeds in ROM
- d) It must have connected peripherals to connect input and output devices.

24. The loss in the transmission is minimum for the following type of wire

- (a) **Fiber optic cable** (b) Coaxial cable (c) Flat cable (d) Copper wire

25. The following frequency band is utilized in cellular or mobile communication system,

- a) **Radio frequency**
- b) Audio frequency
- c) Audible frequency
- d) Unlicensed frequency

26. On which component modulation is performed?

- a) **Transmitter**
- b) Signal
- c) Jammer
- d) None of the above

27. What kind of modulation is used in television for sound signal?

- a) Amplitude modulation
- b) **Frequency modulation**
- c) Phase modulation
- d) Both a and b

28. What is modulated signal?

- a) **It is the product of modulating signal and carrier signal**
- b) It is the product of modulating signal and information signal
- c) It is an input signal
- d) None of the above

29. A microprocessor with 8-bit can process _____ bits of data at a time.

- a) 4
- b) **8**
- c) 12
- d) 16

30. What is the primary difference between a microcontroller and a microprocessor?

- a) Microcontrollers have higher clock speeds than microprocessors.
- b) **Microcontrollers have built-in memory and peripherals.**

- c) Microprocessors have built-in ADCs and DACs.
- d) Microprocessors are smaller in size.