Subject: ELECTRONICS (40)   **Maximum marks:70**

PART -A

I. Pick the right answer from the options given below   **15 × 1= 15**

1. Electron was invented by
a. JJ Thomson   b. Faraday   c. Kirchhoff's   d. Dr William Gilbert

2. Which of the following is the SI unit of charge
a. Coulomb   b. Ampere   c. Watt   d. Ohms

3. The current flowing through a resistance of 2Ω, when a potential of 10V applied is?
a. 5A   b. 5mA   c. 0.5A   d. 0.5mA

4. Color code of 220Ω resistor is
a. Orange, Orange, Red   b. Red, Red, Red
c. Red, Red, Brown   d. Red, Red, Orange

5. Capacitance of capacitor depends on which of the following parameters
a. Distance between the plates   b. Permittivity of the medium
c. Area of the conductor   d. All of the above

6. The Inductor doesn't allow sudden changes in
a. Voltage   b. Current   c. Resistance   d. Inductance

7. Among these which is NOT a transducer?
a. Loud Speaker   b. Microphone   c. Camera   d. Capacitor

8. Which among the following statements are true w.r.t. Inductor?
   Statement I: In the case of inductors reactance is directly proportional to frequency.
   Statement II: For DC inductors acts as a short circuit
a. Both I and II are false   b. Both I and II are true
c. Only statement I is true   d. Only statement II is true

9. For what value of Φ Average power of an AC signal in an LCR circuit will be zero
a. 0 degree   b. 45 degrees   c. 90 degrees   d. 180 degrees

10. The output voltage of IC 7812 is
a. +12 V   b. -12V   c. +9V   d. -9V

11. Semiconductor Diodes are used in rectifiers because.
a. Unidirectional device   b. Zero On state resistance
c. It's a semiconductor device   d. None of the above.

12. Which of the following terminals of BJT are lightly doped?
a. Base   b. Collector   c. Emitter   d. None of the above.

13. In which of the following region do BJT operates as closed switch.
a. Active   b. Cut-off   c. Saturation   d. Both a and c

14. $15_{(10)}=$_____ $_{(2)}$
a. 1011   b. 1111   c. 1010   d. 1110

15. In which logic gate output is HIGH if one of the inputs is LOW?
a. AND   b. OR   c. NOR   d. NAND

II. Fill in the blanks with choices given in the brackets.   5 x 1= 05

(Pulse oximeter, LOW, 0.7V, Zero, ONE, ECG)

16. Value of internal resistance of an ideal voltage source _____

17. _____ is the instrument used to measure oxygen content in blood.

18. Value of permittivity of AIR is _____

19. _____ is the value of barrier potential of silicon semiconductor Diode

20. In the logic circuit given below If the input A=1, B=0, output will be _____.
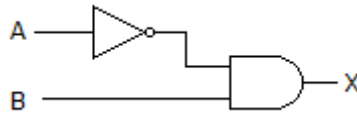
PART B

III. Answer any Five questions   5 X 2 = 10

21. Draw the V-I characteristics of a practical voltage source.

22. Find the resistance between A and B.
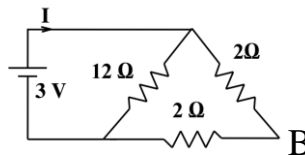
23. Mention two control knobs of a CRO and write its uses.

24. Distinguish between active and passive components.

25. List the factors on which self-inductance of a coil depend.

26. What is capacitive reactance and give the expression for the capacitive reactance.

27. Write the circuit of positive clamper and show the input and output waveforms.

28. Find the Binary equivalent of $(DADF)_{16}$?

29. List any four advantages of data sheet.

PART C

IV. Answer any Five questions   5 X 3 = 15

30. Write a note on applications of electronics in medical field.

31. Define the following terms in an ac signal

a) Frequency   b) Time period   c) Peak Value

32. Explain the role of dielectric in capacitor construction.

33. Calculate the energy stored in the magnetic field of 100mH inductor with a current of 80 mA.

34. Briefly explain the formation of n-type semiconductors.

35. Design a regulated +12 V DC power supply.

36. Obtain a relation between α and β of a BJT.

37. State and prove De-Morgaṅs Theorems.

38. Draw the logic circuit for the given Boolean expression, $Y = \overline{AB + BC}$.

PART D(SECTION - I)

V. Answer any THREE questions   **3 X 5 = 25**

39. State and explain Thevenin's theorem with an Example.

40. Explain the construction of Carbon microphone.

41. Explain low pass filter with its frequency response.

42. Explain the working of Full wave bridge rectifier with a neat circuit diagram.

43. Explain CE mode input and output characteristics of a NPN transistor. Distinguish between the cutoff, active and saturation regions of a transistor.

44. Explain with a DTL circuit the action of 2 input NAND gate

SECTION-II

VI. Answer any TWO questions   **2 x 5 = 10**

45. What should be the value of load RL to abstract maximum power from 12 V battery? Hence determine the power transferred.
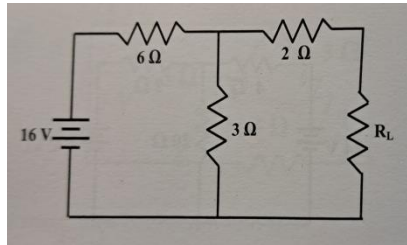
46. Two capacitors of capacitances 3 pF and 12 pF are connected in parallel across 30 V dc supply. Determine
    a) Effective capacitance of the combination
    b) the charge on eachcapacitor
    c) the total charge on the combination.

47. Calculate maximum and minimum values of Zener current if $V_S = 60\text{-}80$ V, $R_S = 5$ KΩ, $V_Z = 12$V and $R_L = 5$ KΩ

48. Subtract $23_{(10)}$ from $34_{(10)}$ using 2's complement method.