M – 2024

Register Number : | | | | | | |

Subject Code : 40

ELECTRONICS

Time : 3 Hours 15 Minutes] [Total No. of questions : 48] [Max. Marks : 70

Instructions : *1) The question paper has four parts **A, B, C** and **D**.*
*2) Part – **A** is **compulsory**.*
*3) Part – **D** consists of **two** Sections.*
*Section – **I** is of essay type questions and Section – **II** is of problems.*
*4) Circuit diagram and truth tables must be drawn **wherever** necessary.*
*5) Solve the problems with **necessary** formulae.*

PART – A

I. Select the correct answer from the choices given. **(15×1=15)**

1) The BJT stands for
   A) Bipolar Junction Transistor B) Bipolar Junction Transformer
   C) Basic Junction Transistor D) Basic Junction Transducer

2) Which of the following is the SI unit of Resistance ?
   A) Coulumb B) Ohm C) Ampere D) Volt

3) What is the value of resistance in a filament of the bulb, when it is glowing with a current of 200 mA and applied voltage is 230V ?
   A) R = 1.15Ω B) R = 1.15KΩ C) R = 1.15 MΩ D) R = 1.51KΩ

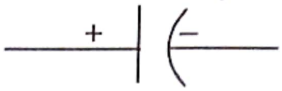
4) In a resistor four band color code system, the fourth band indicates
   A) Current rating B) Multiplier C) Tolerance D) Power rating

5) Statement 1 : The resistance is directly proportional to the length.
   Statement 2 : The resistance is inversely proportional to the cross-section area.
   A) Both statement 1 and 2 are correct
   B) Only statement 1 is correct
   C) Only statement 2 is correct
   D) Both the statements are false

P.T.O.

6) Which among the below is a correct symbol for variable capacitor ?

A) 

B) 

C) 

D) 

7) The working principle of transformer is
   A) Mutual induction
   B) Self induction
   C) Mutual conduction
   D) Self conduction

8) When an AC is applied to a resistor the phase difference between voltage and current is
   A) 0° B) 180° C) 90° D) 45°

9) In a series RLC circuit under resonance condition the circuit is
   A) Capacitive B) Inductive C) Resistive D) Transitive

10) Which among the following diode is used in voltage regulation ?
   A) Semiconductor diode
   B) Photodiode
   C) Varactor diode
   D) Zener diode

11) The number of diodes used in a center tapped full wave rectifier is
   A) 1 B) 4 C) 2 D) 8

12) The transistor region which has larger physical area is
   A) Base B) Collector C) Emitter D) Intrinsic

13) The DC current gain (β) of a transistor having base current 20μA and collector current of 4mA is
   A) 400 B) 100 C) 200 D) 50

14) The base or radix of binary number system is
   A) 2 B) 10 C) 16 D) 8

15) Which logic gate producess 'HIGH' output if and only if all its inputs are 'HIGH' ?
   A) NOR gate B) OR gate C) NAND gate D) AND gate

II. Fill in the blanks by choosing appropriate answer from the bracket. **(5×1=5)**

(1, 0, Sphygmomanometer, 50, 0.3, ECG)

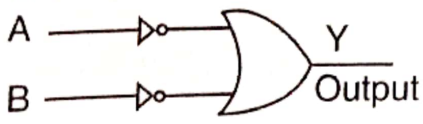
16) Resistance of a short circuit is _____Ω.

17) A _____ is a device used for measuring arterial pressure.

18) The effective inductance when inductances of 20 mH and 30 mH are connected in series is _____ mH.

19) _____ V is the value of barrier potential of Germanium diode.

20) In the circuit shown below, if input A = 1 and B = 0 then output Y = _____



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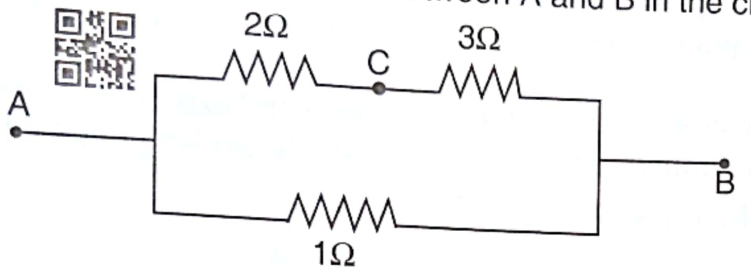
PART – B

III. Answer **any five** questions. **(5×2=10)**

21) Sketch the symbol for ideal voltage source and draw its VI characteristics.

22) Calculate the resistance between A and B in the circuit shown below.



23) Name the instruments used to measure the following electric quantities.
a) Current b) Resistance **(1+1)**

24) Write the expression for energy stored in an inductor and explain the terms used.

25) Mention any two uses of Choke.

26) Write the circuit diagram and frequency response curve for RC Low pass filter.

27) Explain the importance of Bleeder resistance in a DC regulated supply.

28) Write the circuit diagram of transistor NOT gate.

29) Expand DIP and SIP.

PART – C

IV. Answer **any five** questions. **(5×3=15)**

30) Mention any three electronic equipments used in defence field.

31) Define the following terms w.r.t. an AC
a) cycle b) time period c) frequency. **(1+1+1)**

32) Explain the principle of capacitor.

33) A 2 cm long air core coil with cross-sectional area of 3 cm^2 has 10 turns. Determine the inductance of the coil.
(Given $\mu_0 = 4\pi \times 10^{-7}$ Wb/A/M).

34) With a neat diagram explain the lattice structure of silicon.

35) Write a note on the formation of N-type semiconductor.

36) Explain the working of NPN transistor.

37) a) Convert $FD_{(16)}$ into binary.
b) Add $1010_{(2)}$ and $0110_{(2)}$ using binary addition method. **(1+2)**

38) Draw the logic circuit for the given boolean expression $y = \overline{A}B + A\overline{B}$.

PART – D (SECTION – I)

V. Answer **any three** questions. **(3×5=15)**

39) Write the properties of charge.

40) Explain the construction of carbon composition resistor and give any one application.

41) Discuss the process of growth of current in a RL circuit.

42) What is a rectifier ? With the help of circuit and waveforms explain the working of a half wave rectifier.

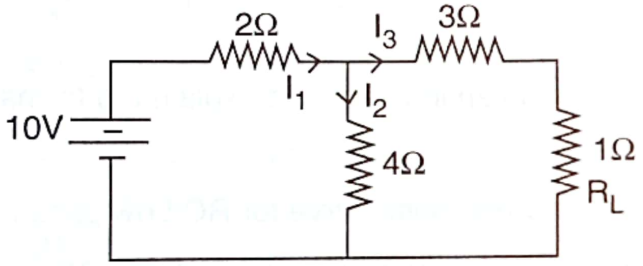
43) Draw the output characteristics of a transistor in CE mode and explain different regions.

44) With the help of circuit diagram and truth table explain the working of DTL NOR gate.

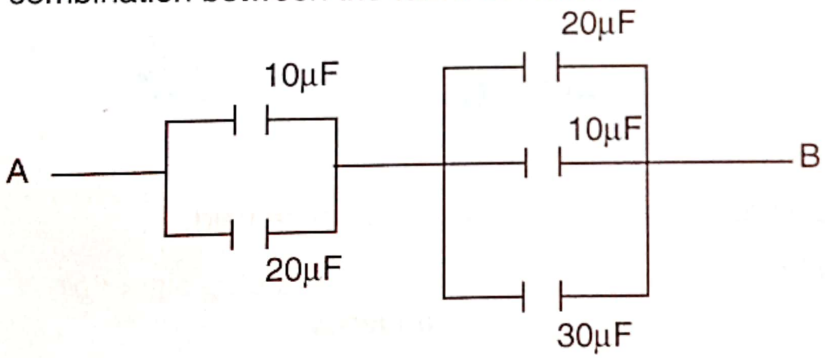
PART – D (SECTION – II)

VI. Answer **any two** questions. **(2×5=10)**

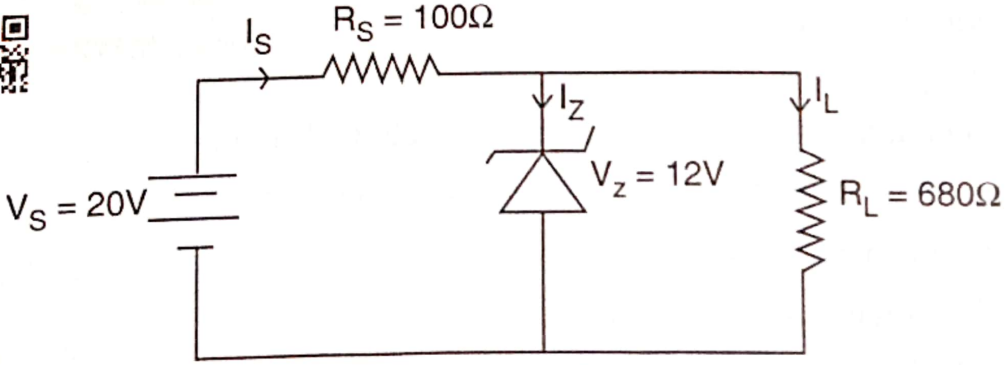
45) Find the branch currents in the circuit shown below.



46) In the capacitor network shown below, determine the effective capacitance of the combination between the terminal A and B.



47) In a voltage regulator circuit shown, find
i) Load voltage ii) Voltage across R_S and iii) Current through zener diode **(1+2+2)**



48) Subtract $16_{(10)}$ from $32_{(10)}$ using 2's compliment method.