2022

Time - 3 hours

Full Marks - 60

*Answer **all groups** as per instructions.*
Figures in the right hand margin indicate marks.
Candidates are required to answer
in their own words as far as practicable.

GROUP – A

1. Fill in the blanks. (all) [1 × 8

   (a) Transistor is a/an _____ component.

   (b) $(11001)_2 = (\_\_\_\_\_)_{10}$.

   (c) $(3F9)_{16} = (\_\_\_\_\_)_{10}$.

   (d) Decimal number $(2157)_{10}$ in BCD is _____.

   (e) $A + 1 =$ _____

   (f) $A + A' =$ _____

   (g) In a cathode ray oscilloscope, electrons are produced by _____.

   (h) OR logic gates can be realized by two _____ biased diodes.

GROUP – B

2. Answer any eight of the following questions within two to three sentences each. [1½ × 8

(a) Write two advantages of ICs.

(b) What is aquadag ? What is its role in CRO ?

(c) What is 555 IC ? Give two of its important features.

(d) What do you mean by Shift Register ? Why is it named so ?

(e) Write the basic differences between 4 bit synchronous up and down counters.

(f) What is the function of input of a computer ?

(g) Add BCD numbers 0111 and 0101.

(h) What are Active and Passive components ?

(i) What is BCD ?

(j) What is ROM ?

GROUP – C

3. Answer any eight of the following questions within 75 words each. [2 × 8

(a) Explain why the transistor is an active device.

(b) What are the differences between analog and digital signals ?

(c) Convert $(AB12)_{16}$ into octal number.

(d) State and prove De Morgan's first theorem.

(e) Find the 1's complement of -7.

(f) What is RAM ? What are the basic types of RAM ?

(g) What is electrostatic deflection sensitivity ?

(h) What are the advantages and limitations of ICs ?

(i) What is an IC chip ?

(j) Convert $(30.524)_{10}$ into binary.

GROUP – D

*Answer **any four** questions within 500 words each.*

4. Explain the different classifications of ICs. What are the advantages and limitations ? [6

5. What is a Chip ? Explain the various steps required in the production of IC. [6

6. Explain the working of an OR gate and an AND gate using diodes and transistor circuit. [6

7. Show that the NAND gate and NOR gate can be used as universal gates. [6

8. Discuss about a half adder and full adder of digital circuit. [6

9. Discuss about a half subtractor and full subtractor of digital circuit. [6

10. What is a shift register ? Discuss about a 4-bit serial in parallel out shift register. [6

11. Discuss about a 4-bit synchronous decade counter. [6