

22371

24225

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Use of steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. Attempt any FIVE of the following :

10

- (a) Draw VI characteristics of PN junction diode in forward bias.
- (b) Draw the symbols of NPN and PNP transistors.
- (c) Define rectifier and filter.
- (d) Define α and β of the transistor.
- (e) List any four laws of Boolean algebra.
- (f) Convert $(48BA)_{16}$ to a binary number.
- (g) Identify the given ICs.
 - (i) IC 0808
 - (ii) IC 0809

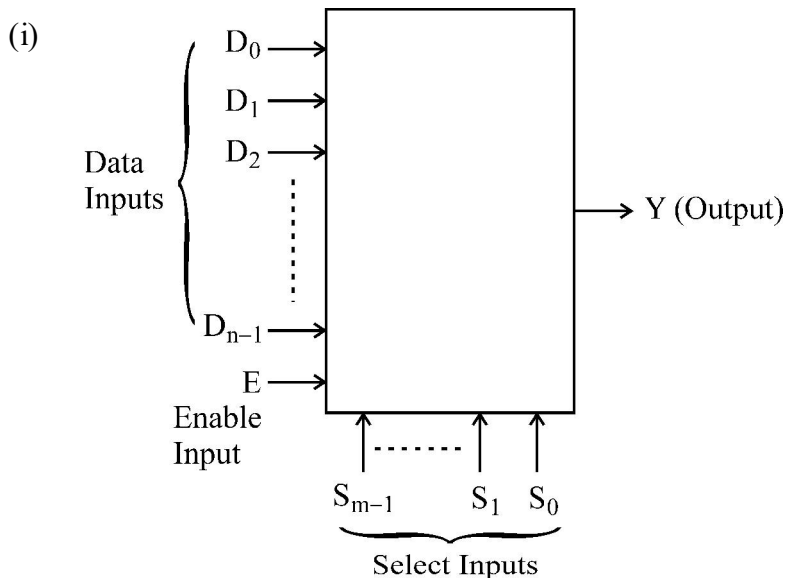


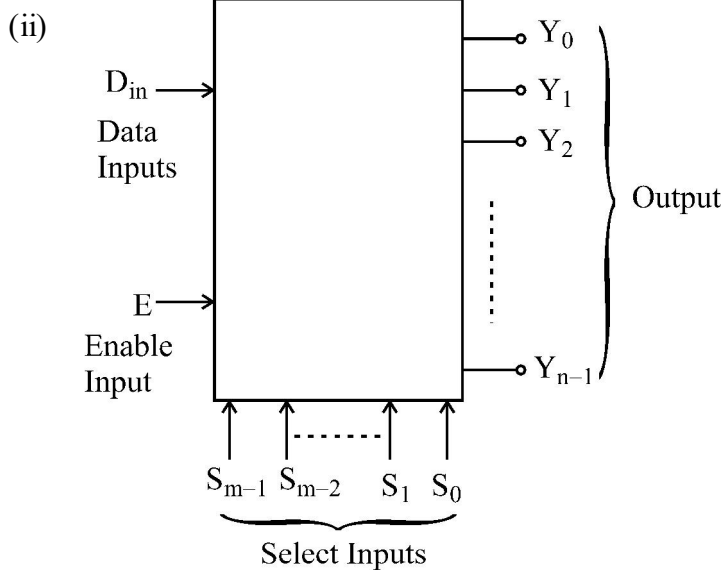
2. Attempt any THREE of the following :**12**

- (a) State the working principle of LED with neat labelled diagram.
- (b) Construct a dual power supply capable of giving $\pm 12V$ using 78XX and 79XX series ICs.
- (c) Describe working of SR latch using NAND gates with its truth table.
- (d) Draw symbol and truth table of following ICs :
 - (i) IC 7400
 - (ii) IC 7402

3. Attempt any THREE of the following :**12**

- (a) Describe the working principle of successive approximation (SA) type ADC with neat diagram.
- (b) Elaborate the operation of zener diode as voltage regulator with the help of neat sketch.
- (c) Draw the circuit diagram of single stage RC coupled amplifier. State the function of each component.
- (d) Add $(569)_{10}$ and $(687)_{10}$ in BCD.
- (e) Identify the following circuits and list their any two applications :





4. Attempt any THREE of the following :

12

- (a) Draw the circuit diagram of 3 bit synchronous UP counter. Write its truth table and timing diagram.
- (b) Compare L, C and π filter (any 4 points).
- (c) Describe with neat sketch how transistor works as a switch.
- (d) Why NAND and NOR gates are called as universal gates ? Realize AND gate using NAND gate only.
- (e) Define the following specifications w.r.t. DAC :
 - (i) Resolution
 - (ii) Accuracy
 - (iii) Linearity
 - (iv) Speed

5. Attempt any TWO of the following :

12

- (a) For a full adder circuit
 - (i) Draw its block diagram.

- (ii) Write its truth table.
- (iii) Draw k-maps for sum and carry.
- (iv) Derive expression for sum.
- (v) Derive expression for carry.
- (vi) Draw logic diagram.
- (b) Give any two applications of each
 - (i) PN junction diode
 - (ii) LED
 - (iii) Photodiode
- (c) Draw output characteristics of CE configuration and explain active, saturation and cutoff regions.

6. Attempt any TWO of the following :

12

- (a) Draw the circuit diagram of bridge rectifier, describe its working and state its applications.
 - (b) State and prove both the De-Morgan's theorems with logic diagram and truth table.
 - (c) Draw and explain the working of R-2R ladder DAC and obtain its output voltage expression.
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